Request for Proposal (RFP)

RFP No.: 626-003
Macklin Tower Roof Replacement & Limited HVAC Upgrades
Rockville Campus

Project No.: FP24-021

Issue Date: September 2, 2025
Montgomery College
9221 Corporate Boulevard
Rockville, Maryland 20850

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MONTGOMERY COLLEGE

Procurement Office, Central Services
9221 Corporate Boulevard
Rockville, Maryland 20850
Phone: (240) 567-5292

REQUEST FOR PROPOSAL

No. **626-003**

DATE ENTERED	BID CLASS	PAGE of

THIS IS NOT AN ORDER

MONTGOMERY COLLEGE

REQUEST FOR PROPOSAL
RFP NO.: 626-003

MACKLIN TOWER ROOF REPLACEMENT & LIMITED HVAC UPGRADES
ROCKVILLE CAMPUS

It is the intent of this Request for Proposal (RFP) to provide Montgomery College with construction services for the Macklin Tower Roof Replacement & limited HVAC upgrades on the Rockville campus, located at 51 Mannakee Street, Rockville, MD 20850, in accordance with the terms, conditions, specifications and drawings described herein.

This RFP will be conducted by using a single step two-envelope bidding procedure. Offerors shall submit their Technical Proposals (Part A) and Price Proposals (Part B) in two separately sealed envelopes/boxes simultaneously. One original hard copy of the complete Technical Proposal submission with original ink signatures, plus one electronic version of complete Technical Proposal submission saved as PDF on a separate clearly marked USB flash drive; and one original and one hard copy of Price Proposal submission are required.

Complete SEALED offers comprising Technical Proposals and Price Proposals must be delivered and received by the Montgomery College Procurement Office located at **9221 Corporate Blvd., Rockville, Maryland 20850** on or before **2 p.m. on September 23, 2025**. Proposals will not be accepted if sent by facsimile or electronic mail, or if received after the closing date and time.

Proposals must remain valid for **ninety (90) days** from the proposal closing date and prior to contract award. Upon contract award, prices must remain firm for the duration of the overall contract term.

All required submissions must accompany each proposal. Incomplete proposals may be deemed non-responsive and will not be considered further.

An electronic PDF version of RFP documents can be downloaded from the Montgomery College Procurement website at http://www.montgomerycollege.edu/procure/ on or after **September 2, 2025.**

A Pre-Proposal Conference will be held at 10:00 a.m. on September 9, 2025, in **Room 152, Sciences Center (SC), 51 Mannakee Street, Rockville, Maryland 20850.** Attendance by Contractors is strongly encouraged. **A site inspection opportunity will be provided right after the Pre-Proposal meeting.** Site examination is **mandatory** and verification of the examination by a College representative is required.

Request for clarifications from perspective Offerors must be submitted in writing no later than **5:00 p.m., on September 12, 2025**. All questions related to this solicitation shall be directed to Yu (Judy) Zhu, Purchasing Manager via email to yu.zhu@montgomerycollege.edu. Only answers provided via a written addendum issued by the College will be binding.

Proposal submission will be evaluated by a College Evaluation Committee. Evaluation will be based on the substantiated ability of the Offerors to perform the required construction services described in the RFP documents, and the Offeror's responsiveness to Technical Proposal and Price Proposal requirements. Technical Proposals will be opened first and reviewed. Price Proposals from only those Offerors deemed qualified following the review of the Technical Proposals, will then be opened and reviewed. Price Proposals from those Offerors deemed not qualified by the College after the review of the Technical Proposals will not be opened. An award will be recommended in the best interest of the College to the Offeror achieved the highest combined scores of technical and price proposal evaluations, who can meet or exceed the terms, conditions, and specifications of this solicitation, including project delivery requirements.

Bid and Performance Security Requirements apply as follows:

Bid Bond Requirements:	**No less than 5% of the total bid amount, including all add alternates, but excluding all deduct alternates is required for bidding, if the total base bid amount exceeds $100,000.**
Performance, Labor and Material Bonds requirements:	**100% Performance and 100% Labor and Material Payment Bonds** upon signature of the Contract.

Insurance certificate and other required documents after the contract award, and prior to start of any work.

State of Maryland Prevailing Wage law requirements are NOT applicable to the project.

Minority firms are encouraged to respond to this solicitation.

IMPORTANT: YOUR PROPOSAL WILL BE JEOPARDIZED IF ANY PORTION OF THIS INQUIRY IS NOT COMPLETE. NO PROPOSAL WILL BE ACCEPTED AFTER THE DATE AND TIME STATED ABOVE.

Patrick Johnson

Patrick L. Johnson, MBA, CPPB
Director of Procurement

NOTE: Prospective Offerors who have received this document from a source other than the Procurement Office should immediately contact the Procurement Office and provide their name and e-mail address so that any amendments to the Bid/RFP or other communications can be sent to them. Failure to contact the Procurement Office may result in non-receipt of important information.

REGISTRATION OF CORPORATIONS NOT REGISTERED IN THE STATE OF MARYLAND Pursuant to 7-202 et. Seq. of the Corporation and Associations Article of the Annotated Code of Maryland, corporations not incorporated in the State of Maryland shall be registered with the State Department of Assessments and Taxation, 301 West Preston Street, Baltimore, Maryland 21201 before doing any interstate or foreign business in this State. **Corporations must be registered, and in good standing no later than proposal submittal deadline date**. A copy of the registration or application for registration may be requested by the College. The registration process can be completed at the following link: https://businessexpress.maryland.gov/start/register-a-business-in-maryland

NOTE: Failure to complete the registration process by the proposal submittal deadline listed above, WILL result in the disqualification of your submitted proposal.

CONDITIONS AND INSTRUCTIONS

1. ADDITIONAL ORDERS: Unless it is specifically stated to the contrary in the bid response, the College reserves the option to place additional orders against a contract awarded as a result of this solicitation at the same terms and conditions, if it is mutually agreeable.

2. APPLICABLE LAW: This contract shall be construed and interpreted according to Maryland law.

3. ASSURANCE OF NON-CONVICTION OF BRIBERY: The bidder hereby declares and affirms that, to its best knowledge, none of its officers, directors or partners and none of its employees directly involved in obtaining contracts has been convicted of bribery, attempted bribery or conspiracy to bribe under the laws of any state or the Federal government.

4. AUDIT: Bidder shall permit audit and fiscal and programmatic monitoring of the work performed under any contract issued from this solicitation. The College shall have access to and the right to examine and/or audit any records, books, documents and papers of bidder and any subcontractor involving transactions related to this Agreement during the term of this Agreement and for a period of three (3) years after final payment under this Agreement.

5. AWARD CONSIDERATIONS: Awards of this bid will be made to the lowest responsible bidder conforming to specifications with consideration being given to quantities involved, time required for delivery, purpose for which required, responsibility of bidder and its ability to perform satisfactorily with consideration to any previous performance for Montgomery Community College. A bid may be awarded at the sole discretion of the College in the best interest of the College. Prompt payment discounts will not be considered in bid evaluation. All discounts other than prompt payment are to be included in bid price.

6. BID AND PERFORMANCE SECURITY: If bid security is required, a bid bond or cashier's check in the amount indicated on the bid cover must accompany each bid and be made payable to Montgomery Community College. Corporate or certified checks are not acceptable. Bonds must be in a form satisfactory to the College and underwritten by a company licensed to issue bonds in the State of Maryland. If bid security fails to accompany the bid, it shall be deemed unresponsive, unless the Director of Procurement deems the failure to be nonsubstantial. Such bid bonds or checks will be returned to all except the three (3) lowest bidders within five (5) days after the opening of bids, and the remaining checks or bid bonds will be returned to all but successful bidder(s) within forty-eight (48) hours after award of contract. If a performance bond is required, the successful bidder must submit an acceptable performance bond in the designated amount of the bid award, prior to award of contract. All bid bonds will be returned to the successful bidder(s) within fortyeight (48) hours after receipt of the performance bond.

7. BRAND NAMES: Brand name materials used in these specifications are known and acceptable. Bids including proposals to use alternate brands are invited as long as they are of equal type and equal or better quality. The burden of proof that alternate brands are in fact equal or better falls on the bidder, and proof must be to the College's satisfaction.

8. COMPLIANCE WITH LAWS: Bidder agrees to comply, at no additional expense, with all applicable Executive orders, Federal, State, bi-county, regional and local laws, ordinances, rules and regulations in effect as of the date of this Agreement and as they may be amended from time to time, including but not limited to the equal employment opportunity clause set forth in 41 CFR 60-250.4.

9. CONTINGENT FEES: Bidder hereby declares and affirms that neither it nor any of its representatives has employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee or agent working for the bidder, to solicit or secure a contract, and that it has not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee or agent, any fee or any other consideration contingent on the making of a contract as a result of this solicitation.

10. DELIVERY AND PACKING: All prices quoted must include delivery. All goods delivered under this contract shall be packed in accordance with accepted trade practices. No charges may be made over and above the bid price for packaging, or for deposits or containers unless specified in the bid. No charge will be allowed for cartage unless by prior written agreement. Complete deliveries must be made by the successful bidder to the designated location as indicated on the Montgomery Community College purchase order. A packing slip shall be included in each shipment. All deliveries must be prepaid and must be delivered to each location designated on purchase order at no additional cost. DELIVERIES MUST BE MADE TO THE SPECIFIED LOCATION. NO COLLECT SHIPMENTS OR SIDEWALK DELIVERIES WILL BE ACCEPTED.

11. DELIVERY OF BIDS: Sealed bids must be received in the Procurement Office by the date and time specified in the bid in order to be considered. NO LATE BIDS OR PROPOSALS WILL BE ACCEPTED. Late bids will be returned to the bidder unopened. Bids submitted by mail must be addressed to the Procurement Office, Montgomery College, P.O. Box 1006, Rockville, Maryland 20850, and clearly marked to indicate the bid number, title and opening date. Hand delivered bids will be accepted only at the Procurement Office, Montgomery College Central Administrative Center, located at 9221 Corporate Boulevard, Rockville, Maryland 20850.

12. DISPUTES: Any dispute arising under a contract awarded as a result of this bid which is not disposed of by agreement shall be decided by the President of the College or designee. Pending the final decision of the dispute, contractor shall proceed with the contract performance. Nothing hereunder shall be interpreted to preclude the parties from seeking after completion of the contract any and all remedies provided by law.

13. ERRORS IN BIDS: Bidders are assumed to be informed regarding conditions, requirements, and specifications prior to submitting bids. Failure to do so will be at the bidder's risk. Bids already submitted may be withdrawn without penalty prior to bid opening. Errors discovered after bid opening may not be corrected. In the case of an error in price extension, the unit price will govern. The intention of the bidder must be evident on the face of the bid.

14. HAZARDOUS AND TOXIC SUBSTANCES: Bidder must comply with all applicable Federal, State, County and bi-county laws, ordinances and regulations relating to hazardous and toxic substances, including such laws, ordinances and regulations pertaining to access to information about hazardous and toxic substances, and as amended from time to time. Bidder shall provide the College with a "Material Safety Data Sheet" or in the case of a controlled hazardous waste substance, a hazardous waste manifest for all hazardous chemicals listed or subsequently added to the Chemical Information List in compliance with applicable laws, ordinances and regulations.

15. INSPECTION OF PREMISES: If a site visit is recommended or required, each bidder is responsible to visit the site(s) prior to submitting a bid in order to observe the existing conditions affecting the work, and to obtain precise dimensions of the area(s) involved. No allowance will be made to the successful bidder, at a later date, for additional work required because of his or her failure to visit the site and/or to obtain the exact dimensions. Discrepancies, if any, must be reported to the College.

16. INSURANCE: If a contract results from this bid, the contractor shall maintain such insurance as will indemnify and hold harmless the College from Workmen's Compensation and Public Liability claims for property damage and personal injury, including death, which may arise from the contractor's operations under this contract, or by anyone directly or indirectly employed by him/her.

17. MARYLAND PUBLIC INFORMATION ACT: Bidder recognizes that the College is subject to the Maryland Public Information Act, Title 10 of the State Government Article of the Annotated Code of Maryland. Bidder agrees that it will provide any justification as to why any material, in whole or in part, is deemed to be confidential, proprietary information or trade secrets and provide any justification of why such materials should not be disclosed pursuant to the Maryland Public Information Act.

18. NON-ASSIGNMENT AND SUBCONTRACTING: Bidder shall not assign any contract or any rights or obligations hereunder without obtaining prior written consent of the College. No contract shall be made by bidder with any other party for furnishing the services to be performed under a contract issued from this solicitation without the written approval of the College. These provisions will not be taken as requiring the approval of the contract of employment between bidder and its personnel.

19. NON-COLLUSION: Bidder certifies that it has neither agreed, conspired, connived, or colluded to produce a deceptive show of competition in the compilation of the bid or offer being submitted herewith; bidder also certifies that it has not in any manner, directly or indirectly, entered into any agreement, participated in any collusion to fix the bid price or price proposal of the bidder or offeror herein or any competitor, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for which the within bid or offer is submitted.

20. NON-DISCRIMINATION: Bidder assures the College that, in accordance with applicable law, it does not, and agrees that it will not discriminate in any manner on the basis of sex, race, age, color, creed, national origin, religious belief, handicap, marital status, or status as a disabled veteran or veteran of the Vietnam era. Bidder further agrees to post in conspicuous places notices setting forth the provisions of the nondiscrimination clause and to take affirmative action to implement the provisions of this section. Bidder further assures the College that, in accordance with the Immigration Reform and Control Act of 1986, it does not and will not discriminate against an individual with respect to hiring, or recruitment or referral for a fee, of the individual for employment or the discharging of the individual from employment because of such individual's national origin or in the case of a citizen or intending citizen, because of such individual's citizenship status.

21. PATENTS: Bidder guarantees that the sale and/or use of the goods offered will not infringe upon any U.S. or foreign patent. Bidder will at his/her own expense, indemnify, protect and save harmless the College, its trustees, employees, agents and students with respect to any claim, action, cost or judgment for patent infringement, arising out of the purchase or use of these goods.

22. PREPARATION OF BID: Bids submitted must be hand signed by an authorized agent of the company submitting the bid. Notification of award will be made by "Notice of Intent to Award" and/or purchase order. A bidder may attach a letter of explanation to the bid for clarification. Bidders will be required, if requested by Montgomery Community College, to furnish satisfactory evidence that they are, in fact, bona fide manufacturers of or dealers in the items listed, and have a regularly established place of business. The College reserves the right to inspect any bidder's place of business prior to award of contract to determine bidder responsibility.

23. PRODUCT TESTING DURING TERM OF CONTRACT: Goods delivered under any contract resulting from this Request for Bid may be tested for compliance with specifications stipulated herein. Any shipment failing to meet or comply fully with the specification requirements will be rejected. The cost of testing a representative sample of an order or shipment for acceptance shall be borne by the College unless the order is rejected for failure to meet specifications or purchase description. In such cases of rejection, the cost of testing will be charged back to the vendor.

24. RECORD RETENTION: If awarded a contract, vendor shall maintain books and records relating to the subject matter of this Agreement, including but not limited to all charges to the College, for a period of three (3) years from the date of final payment under this Agreement.

25. REJECTIONS AND CANCELLATIONS: Montgomery Community College reserves the right to accept or reject any or all bids in whole or in part for any reason. The College reserves the right to waive any informalities and to make awards in the best interest of the College. The College also reserves the right to reject the bid of any bidder who has previously failed to perform adequately on a prior award for furnishing goods and/or services similar in nature to those requested in this bid. The College may cancel this solicitation in whole or in part, in its sole discretion.

26. RIDER PROVISION FOR MONTGOMERY COUNTY PUBLIC SCHOOLS AND MONTGOMERY COUNTY: The bidder agrees when submitting the bid that it will make available to every office and department of the Montgomery County Public Schools and the Montgomery County Government the same bid prices, terms and conditions offered during the term of contract. Orders will be placed directly by these agencies. There will be no penalty if bidder notes exception to this provision in the bid offered.

27. SAMPLES AND CATALOG CUTS: If samples are required, bidder shall be responsible for delivery of samples to location indicated. All sample packages shall be marked "Sample for Procurement Office, Bid No. ___" and each sample shall be tagged or marked. Failure of the bidder to clearly identify samples as indicated may result in rejection of bid. The College reserves the right to test any materials, equipment or supplies delivered to determine if the specifications have been met. Samples will not be returned.

28. SIGNATURE: Each bid must show the full business address and telephone number of the bidder and be signed by the person or persons legally authorized to sign such contracts. All correspondence concerning the bid and contract, including the bid summary, copy of contract, and purchase order, will be mailed or delivered to the address shown on the bid. NO BID WILL BE ACCEPTED WITHOUT ORIGINAL SIGNATURE.

29. TAXES: The College is exempt from Federal and Maryland taxes. Exemption Certificates are available upon request. Bidder shall be responsible for the payment of any and all applicable taxes resulting from any award and/or any activities hereunder, including but not limited to any applicable amusement and/or sales taxes.

30. TERMINATION BASED ON LACK OF FUNDING: Any contract awarded as a result of this solicitation will be subject to funding and continued appropriation of sufficient funds for the contract. For purposes of this solicitation, the College's appropriating authority is deemed to be the Board of Trustees of Montgomery Community College. Insufficient funds shall be grounds for immediate termination of this solicitation.

31. TERMINATION FOR DEFAULT: If an award results from this bid, and the contractor has not performed or has unsatisfactorily performed the contract, payment shall be withheld at the discretion of the College. Failure on the part of the contractor to fulfill contractual obligations shall be considered just cause for termination of the contract and the contractor is not entitled to recover any costs incurred by the contractor up to the date of termination.

32. TERMINATION FOR THE CONVENIENCE OF THE COLLEGE: The performance of the work or services under a contract as a result of this solicitation may be terminated in whole or in part, whenever the President of Montgomery Community College shall deem that termination is in the best interest of the College. Such determination shall be in the sole discretion of the President. In such event, the College shall be liable only for payment in accordance with the payment provisions of the contract for work or services performed or furnished prior to the effective date of termination. Termination hereunder shall become effective by delivery to contractor of written notice of termination upon which date the termination shall become effective.

33. WARRANTY: Bidder expressly warrants that all articles, material and work offered shall conform to each and every specification, drawing, sample or other description which is furnished to or adopted by the College and that they will be fit and sufficient for the purpose intended, merchantable, of good material and workmanship, and free from defect. Such warranty shall survive a contract and shall not be deemed waived either by the College's acceptance of said materials or goods, in whole or in part, or by payment for them, in whole or in part. The bidder further warrants all articles, material and work performed for a period of one year, unless otherwise stated, from date of acceptance of the items delivered and installed, or work completed. All repairs, replacements or adjustments during the warranty period shall be at bidder's sole expense.

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INSTRUCTIONS TO CONTRACTORS

PART 1 - RFP AND AWARD SCHEDULE

1.1 REQUEST FOR PROPOSAL SCHEDULE

It is the College's intent to administer the Request for Proposal process for this project according to the schedule dates outlined below. The College reserves the right to alter schedule dates as may be determined necessary in the College's best interests.

September 2, 2025	Advertised on eMaryland Marketplace and RFP Documents Available on the College Procurement Website
September 9, 2025	Pre-Proposal Meeting and Site Visit
September 12, 2025	Last Date to Submit Request for Information by 5:00 p.m.
September 23, 2025	**Submission of Technical Proposal and Price Proposal due at 2:00 p.m.**
October 13, 2025	Proposal Evaluation Process Concludes and Recommendation of Award to be approved by the College Board of Trustees

1.2 AWARD SCHEDULE

It is the College's intention to seek approval of award recommendation by the College Board of Trustees at the **October 13, 2025** meeting, and the award is subject to approval by the Board of Trustees.

Notice to proceed will be timely provided upon receipt of documentation and information required from the Contractor before the start of work including, but not limited to, performance, payment, labor and material payment bonds and Insurance certificates.

Notwithstanding these expectations, the College may require additional time to administer the contract award or other processes. To accommodate this possibility, prices must remain firm for ninety (90) days from the proposal due date. Anticipated Contract Award date, Notice to Proceed date and project scheduling expectations may be adjusted in concert with this provision. It is the Contractor's sole responsibility to ensure their price proposal response accommodates this requirement.

PART 2 - PRE-PROPOSAL CONFERENCE

2.1 A Pre-Proposal Conference will be held at **10:00 am, September 9, 2025,** in **Room 152 of Science Center (SC)** on the Rockville Campus located at 51 Mannakee Street, Rockville, Maryland 20850**.** Attendance by Contractors is strongly encouraged but is not required. **A mandatory site inspection opportunity will be provided immediately following the Pre-Proposal Conference**. Contractors will be able to satisfy the required Verification of Examination of Site Conditions obligation associated with this proposal by attending that site inspection.

A campus map showing the location of the Pre-Proposal meeting is in Appendix A.

It is each Offeror's responsibility to become familiar with all information necessary to prepare a proposal. Failure to do so will not relieve the successful Offeror of the obligation to carry out the

provisions of the Contract. Data in the RFP documents pertaining to existing conditions and site locations is for convenience only to inform Offerors of the existing building conditions.

PART 3 - RFP DOCUMENTS

3.1 RFP documents include the Invitation Letter of RFP, Instructions to Contractors, Supplementary Instructions to Contractors, Required Submissions, Information Available to Contractors, ,Technical Proposal Form, Price Proposal Form and attachments thereto, Bid Bond, Verification of Examination of Site Conditions, Contractor's Qualification Statement, Subcontractor Information Form, Minority Participation Form, Procurement Office Questionnaire, Conflict of Interest Statement, Non-Debarment Acknowledgement, Montgomery College Standard Performance Bond, Labor and Material Payment Bonds, Application and Certificate for Payment, Montgomery College Standard Form of Contract, Montgomery College General Conditions of the Contract, Montgomery College Supplementary Conditions of the Contract, Specifications, Drawings, and all Addenda if applicable.

3.2 An electronic PDF of the RFP documents can be downloaded from the College Procurement website at http://www.montgomerycollege.edu/procure/ .

3.3 Montgomery College is not responsible for content of and/or information obtained from sources not listed in the RFP. Only information obtained through the College's Procurement Office, on its website or from sources listed in the RFP should be considered reliable. It is highly recommended that Offerors obtain all information pertaining to this RFP from the College's Procurement website at http://www.montgomerycollege.edu/procure/ and those sources referred to in the RFP document. It is the Offeror's responsibility to assure that accurate information has been used in preparation of their proposal response.

PART 4 - SITE EXAMINATION

4.1 A site examination opportunity will be provided at the project site on **September 9, 2025**, right after the Pre-Proposal Meeting. Additional site visit may be accommodated **no later than September 12, 2025** by contacting Antonio Gomez Fortuna, Senior Architect, via email to: Antonio.GomezFortuna@montgomerycollege.edu

4.2 Potential Contractors shall thoroughly examine and investigate existing site conditions that may affect their pricing proposals, prior to proposal submission. Site examination is **mandatory** and verification of the examination by a college representative is required. The price proposal shall be firm and final, no adjustments shall be granted at a later date, if contractors fail to account for site variances.

4.3 Contractors MUST attach the Verification of Examination of Site Conditions form, which is included in Section 004400 and is to be signed by an authorized College Representative upon the completion of site examination and include it in the Technical Proposal (Part A) submission.

4.4 Proposal submission shall serve as verification that, at the time of receipt of the proposal by the College, the Contractor has inspected the site and has read and is thoroughly familiar with the RFP documents (including all Addenda); has examined and finds the Specifications and the Drawings adequate; and agrees that given what the Specifications and Drawings require, in any part of the Work, the required result can be produced. Failure or omission of a Contractor to inspect the site or to examine any form, instrument or document shall in no way relieve a Contractor from obligations with respect to their Proposal.

4.5 Data in the RFP documents pertaining to existing conditions is for convenience only and does not supplant obtaining first-hand information at the site. Submission of proposals shall constitute acceptance by the Contractor of existing site conditions as a part of the requirements for this work.

PART 5 - INTERPRETATION OR CORRECTION OF RFP DOCUMENTS

5.1 The RFP documents should be examined carefully. Should any Contractors find discrepancies or omissions in the solicitation documents, or be in doubt as to the meaning of any item(s), Request for Clarification related to RFP documents shall be submitted to Yu (Judy) Zhu, Procurement and Contracts Manager, via email to yu.zhu@montgomerycollege.edu.

5.2 Contractors shall be responsible for reviewing and coordinating the submission of clarifications requested by Subcontractors or Vendors. Clarification requests made directly by Subcontractors or Vendors will not be accepted by the College.

5.3 Request for Clarifications must be submitted by email no later than **5:00 p.m. on September 12, 2025.**

5.4 No oral interpretation of the meaning of the RFP documents will be made to any Contractor, and oral responses or oral interpretations will not be binding in any way to modify or change any requirement in the RFP documents.

5.5 The College will review the written questions and requests for clarification, if any, and all such interpretations and any supplemental instructions will be issued in the form of written Addenda to the RFP. Any issued Addenda may be obtained by downloading the file from the College's Procurement website http://www.montgomerycollege.edu/procure at no charge.

5.6 All Addenda shall become part of the RFP documents.

5.7 Notification regarding addenda posted at the above referenced website will be provided by email, to all Contractors who are known by the College to have received a complete set of Proposal Documents by downloading the RFP from the College's Procurement website and who have provided an accurate current e-mail address. To ensure that an accurate notification attempt can be made, and is delivered to the appropriate contact person, the College requests the Contractor register one person's contact information with the College's website. The College will make a good faith, one-time, attempt to e-mail the notification to that contact person, but cannot be held responsible for unsuccessful delivery if an incorrect e-mail address is provided and/or technical difficulties are experienced in the transmission.

5.8 It is the Offeror's sole responsibility to ensure receipt of all Addenda. It is highly recommended that all Offerors check the College's website for all posted Addenda prior to submitting their proposals. All Addenda shall become part of the Request Proposal documents.

5.9 Failure of any Offeror to receive any such Addenda or interpretation shall not relieve the Offeror from any obligation or requirement provided for in the Addenda or issued interpretation.

PART 6 – PROPOSAL PREPARATION AND SUBMISSION

6.1 A submittal consisting of the Technical Proposal and the Price Proposal is required when responding to this RFP.

6.2 Offerors are required to submit:

- **One (1) original hard copy of Technical Proposal including all attachments,** with original ink signatures; plus, one electronic copy of complete Technical Proposal submission saved as one PDF file on clearly marked USB flash drive.

- **One (1) original hard copy and one photocopy of Price Proposal submission including all attachments.** The cover page of each copy should be clearly marked "original" or "copy" accordingly.

It is the sole responsibility of the Offerors to make sure that the electronic copy of Technical Proposal shall be identical to the original hard copy.

6.3 The hardcopy of Technical Proposals and Price Proposals must each be submitted in separately sealed envelope/box, one containing the Technical Proposal (Part A) submission and the second containing the Price Proposal (Part B) submission.

6.4 Proposals must be submitted on the enclosed Proposal Forms and must include all the attachments listed. Offers may use their own forms if any required submission forms are not provided in the RFP documents. Proposals must be signed by an authorized officer of the firm. Blank spaces must be filled in, either in ink or typewritten, both in words and figures. The person signing the Proposals must initial all erasures on or changes to the forms.

6.5 Submitted proposal responses, will not be returned to the Offerors. Proposals must include all required information. All proposal packages submitted in response to this RFP shall be certified, signed, and dated by a bona-fide agent of the Offeror, and include minority classification, if applicable.

6.6 Offerors must copy the package sample label below and paste it on the outside of each sealed proposal package. It is mandatory that the proposal envelope labels are used, or this exact information is provided on the envelopes of the sealed proposal. Failure to do so may cause the proposal to be rejected.

PROPOSAL ENVELOPE LABELS

PART A - TECHNICAL PROPOSAL

RFP No.:	626-003 (Part A)
Proposal Due Date and Time:	2:00 PM on September 23, 2025
Offeror's Name:	_____
Offeror's Address:	_____
Project Title:	Macklin Tower Roof Replacement & Limited HVAC Upgrades Rockville Campus

PART B – PRICE PROPOSAL

RFP No.:	626-003 (Part B)
Proposal Due Date and Time:	2:00 PM on September 23, 2025
Offeror's Name:	_____
Offeror's Address:	_____
Project Title:	Macklin Tower Roof Replacement & Limited HVAC Upgrades Rockville Campus

6.7 Any proposal received after the closing time and date specified, or at a different location other than specified above will not be opened or given any consideration.

6.8 Oral, emailed, or faxed proposals are invalid and will not be accepted or considered.

6.9 All costs incurred by responding firms associated with the preparation, submission, presentation or proposals and attendance at meetings, including but not limited to, costs related to transportation, meals, lodging, bonding, and other related expenses, if applicable, will be the sole responsibility of the Offerors, and will not under any circumstances by reimbursed by the College.

PART 7 - DELAYED OPENING

7.1 No proposal will be accepted after the stated closing date and time. In the event the College is closed on the RFP closing date due to an unforeseen circumstance, the RFP will close at the stated time on the next open business day, unless the Contractor is notified otherwise.

PART 8 - ERRORS IN PROPOSALS

8.1 With the submission of their proposals, Contractors assure the College that they are fully informed regarding conditions and requirements of the project site and the RFP documents prior to submitting proposals. Contractors are responsible for seeking proper information and making the necessary investigations. Failure to do so is at the Contractor's sole risk.

PART 9 - WITHDRAWAL OF PROPOSALS

9.1 Offerors may not withdraw or modify the Proposals for ninety (90) calendar days after the Proposal closing date and time.

9.2 The College may require additional time to administer College, County and/or State contract award or other regulatory processes. To accommodate this possibility, prices must remain firm for ninety (90) days from the price proposal due date. Anticipated Contract Award date, Notice to Proceed date and project scheduling expectations may be adjusted in concert with this provision. It is the Contractor's sole responsibility to ensure that their price proposal response accommodates this requirement.

PART 10 - EVALUATION OF PROPOSALS

10.1 The evaluation of proposals includes both Technical Proposal (Part A) and Price Proposal (Part B) evaluation.

10.2 The contract will be awarded in consideration of Technical Proposal and Price Proposal and the substantiated ability of the apparent highest overall scoring Offeror to perform the required construction services described in the RFP documents.

10.3 Technical Proposals will be opened first and evaluated by the College Evaluation Committee based on the substantiated ability of the Offeror to perform the required construction services described in the RFP documents and the Offeror's responsiveness to the Technical Proposal requirements. Price Proposals from only those Offerors who are deemed qualified following the review of the Technical Proposals, will then be opened, and reviewed. Price Proposals from those Offerors deemed not qualified after the review of the Technical Proposals will not be opened.

10.4 Evaluation Criteria

A. Technical Proposal (Part B): 70% of Total Score

Offeror's Technical Proposal will be evaluated by the College Technical Evaluation Committee based on Offeror's responsiveness to the following key areas:

- Contractor Qualification Statement including Financial Statements

a. Relevant Project Experience
b. Professional Qualifications and Technical Competence of Proposed Project Team
c. Subcontractor's Information Form(s)

- Project Approach Statement

d. Administrative Process Methodology
e. Quality Control Program
f. Willingness and ability to coordinate with Construction Manager at Risk for Macklin Tower Library Renovation project, who is directly contracted with the College.
g. Proposed Project Schedule Outline

- Verification of Examination of Site Conditions
- Conflict of Interest Form
- Non-Debarment Acknowledgement
- Acknowledgement of Receipt of Addenda, if applicable
- Exceptions to the General and Supplementary Conditions of the Contract, Montgomery College Standard Form of Contract, and/or any other deviations to the RFP documents, if applicable

B. Price Proposal (Part B): 30% of Total Score

Price Proposals from only those Offerors who are deemed qualified following the review of the Technical Proposals, will then be opened, and examined for responsiveness and responsibleness by the College Procurement Office. To be considered for the award, Offeror must bid all line items in the Price Proposal Form and fill out all blanks. Failure to do so may deem an offer non-responsive.

Contractor's Price Proposal will be evaluated based on the following:

a. Base Price Total
b. Submission of an acceptable Bid Bond (required if the total bid amount exceeds $100,000)
c. Bonding Company Letter Guaranteeing the Required 100% Performance, Labor and Material Payment Bonds

Offeror's Price Proposal will be evaluated with the lowest responsive and responsible base price total awarded the highest point score. Other proposal prices will be awarded reduced point scores, determined by ratio comparing the proposed price to the lowest responsive and responsible proposal price. The College reserves the right to negotiate with the responsive and responsible Offeror with the lowest Base Bid, if it deems in the best interest of the College to do so.

PART 11 - AWARD CONSIDERATIONS

11.1 An award will be recommended in the best interest of the College to the Offeror with the highest combined scores of technical and price proposal evaluations, who can meet or exceed the terms, conditions, and specifications of this solicitation, including project delivery requirements. It is the College's intention to seek approval of award of this contract at the College's Board of Trustees **on October 13, 2025** and is subject to approval by the Board of Trustees. Only alternates submitted by the recommended Contractor may be reviewed and considered by the College. The College reserves the right to negotiate the pricing, and to accept or reject any alternate pricing.

11.2 The award will be made subject to the availability of public funds and only if it is in the best interest of the College to award the project. The College reserves the rights to exercise the following rights at the College's sole discretion.

PART 12 – COLLEGE'S RIGHTS

12.1 The College reserves the following rights to be exercised at the College's sole discretion:

A. To make such investigation as deemed necessary to determine the qualifications of the Contractor and to determine the ability of the Contractor to perform the work. The Contractor shall furnish to the College all such information and data as the College may request. The College reserves the right to reject any proposal if the evidence submitted by, or investigation of, such Contractor fails to satisfy the College that such Contractor is properly qualified to carry out the obligations of the contract and to complete the work contemplated herein.

B. Conditional proposals will not be accepted.

C. To reject any or all proposals and to make awards in the best interest of the College, in the name of the Board of Trustees. The College also reserves the right to cancel the RFP.

D. To accept or reject any item of price proposal or any alternate prices in the priority order established by the Price Proposal Form.

E. To consider informal, any proposal not prepared or submitted in accordance with the provisions hereof. The College may at its sole discretion waive any informality. A waiver of any provision of the RFP Documents shall not constitute a waiver of any subsequent breach.

F. To defer award of the Contract for a period of up to ninety (90) calendar days after closing of the proposals. Anticipated Contract Award date, Notice to Proceed date and project scheduling expectations may be adjusted in concert with this provision. It is the Contractor's sole responsibility to ensure their proposal response accommodates this requirement. Upon Award, prices must remain firm for the duration of the contract.

G. If no award or other disposition is made, the expiration of the ninety (90) calendar days will constitute rejection of all proposals without any further action by the College.

H. The Contractor deemed most responsible and responsive with the highest combined scores in technical and price proposal evaluation will be recommended for contract award to the College's Board of Trustees.

PART 13 - REGISTRATION OF CORPORATIONS NOT REGISTERED IN THE STATE OF MARYLAND

13.1 Pursuant to 7-202 et. Seq. of the Corporation and Associations Article of the Annotated Code of Maryland, corporations not incorporated in the State of Maryland shall be registered with the State Department of Assessments and Taxation, 301 West Preston Street, Baltimore, Maryland 21201 before doing any interstate or foreign business in this State. Prior to the finalization of contract award, proof of State of Maryland business registration and standing will be verified with the Maryland State Department of Assessments and Taxation. For further information, please visit: https://businessexpress.maryland.gov/manage/maintain-good-standing-status.

PART 14 – PUBLIC RECORD AND PROPRIETARY INFORMATION

14.1 As a public entity, the College is subject to the disclosure requirements in the Maryland Public Information Act ("MPIA"), Title 4 of the General Provisions Article of the Annotated Code of Maryland. Information that is deemed to be confidential commercial or financial information, as defined by the MPIA, may be exempted from disclosure. Offeror's must clearly identify each part of the Offer that it believes contains confidential commercial or financial information by stamping the top right-hand corner of each pertinent page with large red bold letters stating the words "confidential" or "proprietary". It is not sufficient to preface your proposal with a proprietary statement, or to use a page header or footer that arbitrarily marks some or all pages as confidential. General claims of confidentiality or similar blanket designations shall not be effective. Each Offeror must submit a proprietary and confidential redacted copy of its proposal to be used in responding to MPIA requests upon request.

14.2 Offeror agrees that upon request from the College, it will provide justification as to why any material, in whole or in part, should be considered confidential, proprietary information or trade secrets and provide any justification of why such materials should not be disclosed pursuant to a request under the MPIA. The College, by law must apply the MPIA requirements for public information disclosure deemed proprietary and/or confidential; therefore, even the information marked as such by the Offeror may still require public disclosure. Offeror agrees that any portion of the proposal that is not stamped as proprietary or confidential is not proprietary or confidential and shall be disclosed upon request under the MPIA.

PART 15 – CONFIDENTIALITY

15.1 The Contractor agrees to maintain in strict confidence Montgomery College's confidential information as listed herein. The Contractor may use the College's confidential information solely to perform the services required, as listed herein and may not disclose such information to any person or entity without the expressed written consent of Montgomery College.

15.2 The information contained in Offeror's proposals submitted for the College's consideration will be held in confidence until all evaluations are concluded and an award has been made. Pricing and other information that is an integral part of the offer cannot be considered confidential after an award has been made. Offeror's must clearly mark any information considered proprietary and confidential. The College will honor requests for confidentiality for information of a proprietary nature. Pricing may not be deemed confidential.

PART 16 - MULTIPLE/ALTERNATIVE PROPOSALS

16.1 Multiple and/or alternate Proposals will not be accepted.

PART 17 – POST AWARD DEBRIEFINGS

17.1 Debriefing of an unsuccessful Offeror will be conducted upon written request submitted to the purchasing agent within ten (10) days of the announcement of the recommended award. This debriefing will be oral and be limited to a discussion of the unsuccessful firm's proposal only and will provide information on areas in which it was deemed weak or deficient.

END OF INSTRUCTIONS TO CONTRACTORS

SUPPLEMENTARY INSTRUCTIONS TO CONTRACTORS

PART 1 – PRELIMINARY PROJECT SCHEDULE

1.1 Preliminary schedule instructions apply to the project as follows:

A. The College offers classes during traditional Fall and Spring academic semesters, as well as during a winter intersession and two summer session periods. Contractor is reminded that they may be asked to refrain from noisy and/or dusty work during the associated testing periods when tests are scheduled in adjoining buildings. Specific calendars and constraints will be provided by the College when available. Calendars are subject to adjustment in the event that inclement weather, or other cause, closes the College.

B. The College anticipates that the project will be complete and fully operational by the following milestone dates administered by the College, concurrent with the Contractor's completion of the project as follows:

1)	**Notice to Proceed:**	**December, 2025**
2)	**Site Mobilization**	**January 21, 2026**
3)	**Substantial Completion:**	**June 1, 2027**
4)	**Final Completion:**	**June 22, 2027**

C. It is expected for the contractor of this project to closely coordinate construction activities with the CMAR for the Macklin Tower Library Renovation project to ensure timely delivery of both projects. Construction activities on this project will have a schedule impact on the Macklin Tower Library Renovation project, and the reverse is also true.

PART 2 – PREVAILING WAGES

2.1 With regard to General Condition 3.3.1.3, **please note that <u>this project is NOT subject to State of Maryland DLLR Prevailing Wage Rate requirements.</u>**

PART 3 – MINORITY PARTICIPATION

3.1 Pursuant to Section 16-311(7) of the Education Article and Board Resolutions #87-82 and #87-83, adopted on July 20, 1987, it is the policy of Montgomery College to encourage the participation of responsible certified minority business enterprises to provide goods and services for the performance of College projects. "Minority business enterprise" has the meaning stated in Section 14-301 of the State Finance and Procurement Article and means a legal entity, except a joint venture, that is: (1) organized to engage in commercial transactions; (2) at least 51% owned and controlled by one or more individuals who are socially and economically disadvantaged; and (3) managed by, and the daily business operations which are controlled by, one or more of the socially and economically disadvantaged individuals who own it. A "socially and economically disadvantage individual" means a citizen or lawfully admitted permanent resident of the United States who is in any of the following minority groups: African American, American Indian/Native American, Asian, Hispanic, physically or mentally disabled, women, or a group (e.g., LGBTQIA+) otherwise found by the certification agency to be a socially and economically disadvantaged individual.

3.2 All Offerors must submit an updated Minority Participation Form and include in the Technical Proposal submission.

3.3 If the Contractor is not a minority business entity, the Contractor is encouraged to develop a plan that,

at a minimum, will award **15% of the total contract value** to subcontractors and/or vendors that are minority businesses.

3.4 Non-minority Contractors are advised that following contract award, within three business days of request by the College, the Contractor shall provide a list indicating minority subcontractor and/or vendor participation anticipated for the project. The Contractor shall provide the College with routine updates should any changes in subcontractor or vendor status occur during the contract term.

PART 4 – BONDS

4.1 If Contractor's total bid amount exceeds $100,000, Contractor is required to furnish a Bid Bond and a Letter of Intent from its Bonding Company for the Macklin Tower Roof Replacement & Limited HVAC Upgrades on the Rockville Campus with the Price Proposal (Part B) as required below.

4.1.1 Contractor shall submit **one original hard copy and one photocopy of a Bid Bond** from a surety company authorized to do business in the State of Maryland, acceptable to the College, made payable without condition to the College, or a cashier's check, in the amount of **not less than 5% of the total base bid amount, including all bid alternates, but excluding all deduct alternates.** Bid Bond shall be prepared and submitted on **AIA Form A310-2010, "BID BOND".**

4.1.2 Contractor shall submit **one original and one photocopy of a letter from the Contractor's bonding company** stating that it guarantees to furnish the required 100% performance and labor and material payment bonds if the Contractor is recommended for contract award. Letter provided shall not be generic but must be written specifically for this project.

4.2 Prior to the execution of this Contract, the successful Contractor is required to furnish a performance bond, properly executed on the **Montgomery College Standard Performance Bond**, a copy of which is included in the Request for Bid documents, and a labor and material payment bond executed on **AIA Document A312-2010, "PAYMENT BOND",** for 100% of the amount of the Contract.

4.3 Upon failure or refusal to execute and deliver the Contract and bonds required within five (5) days (Saturdays, Sundays and legal holidays excluded) after having received notice of acceptance of its proposal, the Contractor shall forfeit to the College, as liquidated damages for such failure or refusal, the bid security included with its proposal.

4.4 After the College and the successful Contractor have executed a contract, or if no contract has been executed within ninety (90) calendar days after the proposal due date, and Contractor has not been notified of acceptance of its bid, Contractor may request return of his Bid Bond.

4.5 If at any time, the bonding Company becomes insolvent, files for bankruptcy or for any reason whatsoever loses its right to do business in the state of Maryland, the Contractor shall, within ten (10) calendar days after notice from the College to do so, substitute an acceptable Bond (or bonds) in such form and sum and signed by such other Bonding Company as may be satisfactory to the College.

4.6 Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond, a certified and effectively dated copy of their power of attorney.

PART 5 – INSURANCE

5.1 Prior to start of any work, the successful Contractor must provide sufficient evidence of insurance showing adequate coverage as defined in the RFP documents.

PART 6 – FORM OF CONTRACT

6.1 The Contract Agreement between the successful Offeror and the College for the Macklin Tower Roof Replacement & Limited HVAC Upgrades on the Rockville Campus project will be executed on the College Standard Form of Contract, a copy of blank form is included in the RFP documents.

6.2 Any exceptions to the Montgomery College General and Supplementary Conditions of the Contract, College Standard Form of the Contract, and/or any other deviations to the RFP requirements must be included in the Technical Proposal (Part A) submission to initiate further consideration by the College. An exception submitted by the Contractor are considered as a request for information by the College.

6.3 The College makes no implicit or explicit statement as to any willingness to deviate from all requirements set forth in the RFP documents.

6.4 Unless explicitly stated by the Contractor in the proposal submission that an exception to the Montgomery College General and Supplementary Conditions of the Contract, College Standard Form of the Contract, and/or any deviation to the RFP requirements are a condition of the proposal, the College does not consider such exceptions provided by the Contractor to be the submission of a conditional proposal.

PART 7 – NOT USED

PART 8 – VENDOR QUALIFICATIONS (UPON REQUEST)

8.1 The College's intent with regard to verification of Vendor qualifications, and financial stability is that it is the Contractor's responsibility to evaluate the qualifications, financial viability and solvency of all vendors used for the project.

8.2 Within three (3) business days from the request by the College, Contractor shall submit to the College a Qualification Statement for each Principal Vendor, herein defined as those Vendors whose contract value is anticipated to exceed $ 100,000, to include the following:

a) Name
b) Address
c) Type of Work Performed
d) Years in Business
e) Representative Project List (including at least three projects of similar size, scope and complexity)
f) References (list at least three references, including contact name and telephone number)
g) Copy of Maryland registration/license number, if applicable

8.3 The College reserves the right to reject any Vendor.

PART 9 – TAXES

9.1 In the event of a conflict between General Conditions and any other provision in the Request for Proposal documents relating to taxes, Article 3.5 of General Conditions in Section 007200 shall prevail.

PART 10 – LAWS AND REGULATIONS

10.1 The Contractor's attention is directed to the fact that all applicable Federal and State laws, County, Bi-County, local, and municipal ordinances, and the orders, rules and regulations of all authorities having jurisdiction over this work shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

PART 11 – DEBARMENT

11.1 Any Offeror as an individual or as an organization, presently debarred, suspended, proposed for debarment by any County, State, or Federal departments or agencies will be declared ineligible to respond to the proposed contract. The Contractor shall not enter into any subcontract with any individual, firm or organization debarred from doing business with government agencies.

11.2 Submission of a signed proposal in response to this solicitation is certification that an Offeror (or any sub-contractors) is not currently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any County, State, or Federal departments or agencies. Submission is also the agreement that the College will be notified of any change in this status.

END OF SUPPLEMENTARY INSTRUCTIONS TO CONTRACTORS

REQUIRED SUBMISSIONS

TO: PROSPECTIVE OFFERORS

FROM: PROCUREMENT OFFICE
MONTGOMERY COLLEGE

A submittal consisting of the Technical Proposal and the Price Proposal is required when responding to this RFP. Offerors are required to submit:

- **One (1) original hard copy of Technical Proposal including all Attachments,** with original ink signatures; plus, one electronic version of complete Technical Proposal submission saved as one PDF file on clearly marked USB flash drive.

- **One (1) original hard copy and one photocopy of Price Proposal, including all Attachments, each marked "original" or "copy" accordingly.**

Technical Proposal and Price Proposal submission must be submitted **in two separately sealed envelopes/ boxes**, one containing the Technical Proposal (Part A) submission and the second containing the Price Proposal (Part B) submission. Each envelope/box must be clearly marked Technical Proposal or Price Proposal, Offeror's name and address, RFP number and descriptions, as well as RFP closing date and time; and be addressed to:

Office of Procurement
Montgomery College
9221 Corporate Boulevard
Rockville, Maryland 20850

Proposals shall be submitted on the enclosed Proposal Forms with required attachments, if any and properly signed. Offerors may use their own forms if any required submission forms are not provided in the RFP documents. It is the responsibility of the Offerors to make sure that electronic version of technical proposal shall be identical to the original hard copy. Failure to include any of the required submission may render the proposal non-responsive and the Offer may be rejected.

PART 1 - ITEMS REQUIRED FOR TECHNICAL PROPOSAL (PART A) SUBMISSIONS

Technical proposal submission shall include and be organized as follows:

1.1 Technical Proposal Form, Section 004213 A

1.2 Attachments specified in Technical Proposal Form Section 004213A, including:

a) Contractor's Qualification Statement, Section 004513

b) Financial Statements as required in Contractor's Qualification Statement

Contractor is required to provide copies of financial statements for the last two years, preferably audited, including your organization's balance sheet and income statement showing Current Assets, Net Fixed Assets, Other Assets, Current Liabilities and Other Liabilities. Include name and address of firm preparing attached financial statement(s), and date(s) thereof.

Information provided in the Financial Statements is for the express purpose of assisting Montgomery College in its assessment of the Contractor's suitability for providing services as a Contractor for the referenced project.

c) Copy of Contractor's Maryland Business Registration and Contractor License

d) Contractor's Relevant Project Experience

1) Submit a list of the major projects your organization has completed in the last three years, giving the name of the project, owner, architect, the contract amount, date of completion and percentage of cost of the work performed with your own forces.

Two of the projects included shall be within the Metropolitan Baltimore-Washington region. Document successful completion of projects of similar size, scope and complexity, within the last three years, such as:

- Demonstrated experience with projects whose construction value is between $3,000,000 and $6,000,000
- Demonstrated experience with comparable projects
- Demonstrated experience managing projects with finite schedule requirements

e) Submit three (3) of the above relevant project references of similar scope, size and complexity completed within the past three years. Two (2) of the project references shall be within the Metropolitan Baltimore-Washington areas.

Provide a brief description of the scope of work and list each project's size, relevant features, construction cost (including general conditions, OH&P), change order value (excluding or annotating Owner directed scope changes), images/photos suitable for assessing the quality of the completed work, anticipated schedule, actual schedule and an Owner's reference contact person's name and current telephone number. Please make sure the references and contact persons are current. Use separate sheets if necessary and include these with the submission.

f) Proposed Project Management/Supervisory Personnel List (including Construction Superintendent) and their Professional Qualifications and Technical Competence

Contractor shall list the names and describe previous experience by the overall Construction Superintendent and the personnel who will be assigned to the College's project in providing project management and supervision services for construction projects of similar size, complexity and scope together with a statement as to the extent to which these personnel will be full-time or part-time.

1) Submit resumes and/or other relevant information demonstrating the qualifications and technical competence of proposed project team members working onsite including, at a minimum:

- Project Manager (50%)
- Project Superintendent (100%)
- Quality Control Supervisor (20%)

2) Demonstration that team members have prior work experience together is preferred.

3) Demonstration that team members have prior work experience on comparable projects for academic institutions, particularly renovation projects involving multiple trades, including roof replacement, and requiring extensive internal and external coordination is preferred.

4) Indicate expected percentage (or range) of time each team member will devote to the Project.

g) Subcontractor Information Form(s), Section 004513 I

1) Contractor shall use Subcontractor Information Form per Section 004513 I and submit up to **three prospective key principal subcontractor** information per each trade category.

The key principle trades are as follows:

- Roofing
- HVAC/Mechanical
- Electrical
- Interior Finishes

2) Subcontractor Information collected will be used as a basis of discussion during evaluation of Contractor's Technical Proposal to amplify the College's understanding of the Contractor's approach to assembling an appropriately qualified and experienced project team for the work.

3) Submission of Subcontractor Information does not obligate the successful Contractor to restrict subcontract award to one of the subcontractors named on each Form.

4) The College reserves the right to reject any Subcontractor.

h) Project Approach Statement

1) Submit a statement outlining your anticipated approach to the project.

2) Explain your approach to site mobilization and sequencing of the work.

3) Identify special areas of concern you feel may merit additional monitoring during construction and explain how you would provide for those special needs.

i) Administrative Process Methodology

1) Submit a statement outlining your standard administrative processes.

2) Expand the roles and responsibilities of team members, if not sufficiently addressed in above items (e) or (f).

3) Indicate preferred mechanics for:

- preparing schedules and schedule updates
- managing and monitoring submittals
- managing and monitoring requests for information
- maintaining accurate records on-site
- documenting change events

- preparation of applications for payments and change orders
- punch list preparation and monitoring punch list completion
- compilation and submission of closeout materials

j) Quality Control Program

1) Submit a statement outlining the process by which you will assure compliance with the Proposal Documents.

2) Explain how the quality of construction will be maintained. What controls are put in place to minimize errors and re-work? What procedures are in place to ensure work is installed per manufacturer's installation instructions? Explain how high-quality construction work will be obtained.

k) Since this project will be constructed concurrently with the Macklin Tower Library project, it is very important that Offeror be a willing partner and have high ability to coordinate with another prime contractor/CMAR under contract with the College. Explain approach to achieving close coordination and highly collaborative construction process with another prime contractor/CMAR. Demonstrate past experience with successful collaboration with working with another contractor

l) Acknowledgement of Proposed Project Schedule

Include a letter acknowledging review and acceptance of the Proposed Project Schedule as outlined in Part 1 of Section 002213, Supplementary Information to Contractors. Provide preliminary schedule for the project in coordination with preliminary schedule for the Macklin Tower Library Renovation schedule.

m) Verification of Examination of Site Conditions, Section 004400-1

n) Minority Participation Form per Section 004539

o) Conflict of Interest Form, Section 004541

p) Non-Debarment Acknowledgement, Section 004542

q) Acknowledgement of Receipt of Addenda, if applicable

r) Proposed exceptions to the Montgomery College General and Supplementary Conditions of the Contract, Form of Contract, and/or any other deviations to the RFP requirements, if applicable.

PART 2 – ITEMS REQUIRED FOR PRICE PROPOSAL FORM (PART B) SUBMISSIONS

2.1 Price Proposal Form, per Section 004213B

2.2 AIA Document A310-2010, Bid Bond

a) Contractor shall submit a Bid Bond from a surety company authorized to do business in the State of Maryland, acceptable to the College, made payable without condition to the College or a cashier’s check, not less than 5% of the amount of the Base Price Total, including all add alternates, but excluding deduct alternates. Bid Bond shall be prepared and submitted on AIA Form A310-2010, "BID BOND".

2.3 Bonding Company Letter Guaranteeing the Required 100% Performance, Labor and Material Payment Bonds

a) Contractor shall submit a letter from the Contractor's bonding company stating that it guarantees it will furnish the required 100% performance and labor and material payment bonds if the Contractor is recommended for contract award. Letter provided shall not be generic, but must be written specifically for this project.

END OF REQUIRED SUBMISSIONS

INFORMATION AVAILABLE TO CONTRACTORS

1.1 GENERAL PROVISIONS

A. College records include documentation that is made available as information to Contractors to illuminate likely project conditions.

B. Reports, investigations, data, As-Built documentation, and all information related thereto included as Information Available to Contractors are not a part of the Contract Documents.

C. The College, Architect and Engineers do not guarantee continuity of conditions indicated and are not responsible for information contained or not contained in the Information Available to Contractors.

D. Contractors shall employ their own experts to analyze available information. Contractors shall be responsible for the consequences of acting on conclusions obtained from examination and analysis of available information.

E. Contractors will be responsible for any and all costs associated with obtaining copies of existing record or As-Built drawings. Costs associated with any request for this documentation will be determined by the College at the time of the request, and these costs must be paid for, prior to the release of any documentation to the Contractors.

1.2 BUILDING DOCUMENTATION

Contractors are advised that As-Built documentation is available as reference documents for all project worksites. Documentation may be examined by submitting a written request to:

Antonio Gomez Fortuna, Senior Architect
Email: Antonio.GomezFortuna@montgomerycollege.edu

END OF INFORMATION AVAILABLE TO CONTRACTORS

TECHNICAL PROPOSAL FORM

To: Montgomery College

Re: RFP No.: 626-003
Macklin Tower Roof Replacement & Limited HVAC Upgrades
Rockville Campus

Attn.: Procurement Office
Montgomery College
9221 Corporate Boulevard
Rockville, Maryland 20850

From: _____
(Provide Your Company's Name)

PART 1 - Offeror must submit one original hard copy and one electronic copy of the Technical Proposal Form (Part A) and all Attachments. Electronic copy of the technical proposal submittal must be saved as one PDF file on clearly marked USB flash drive.

It is the responsibility of the Contractors to make sure that electronic version of technical proposal submission shall be identical to the original hard copy.

PART 2 - Please read the questions, note what is requested, then provide appropriate responses. Failure to answer any of the applicable questions contained in this section will make the proposal non-responsive and be grounds for rejection of the entire proposal. Conditional proposals will not be accepted.

PART 3 - Contractor acknowledges receipt of the following Addenda:

Number_____Date_____

Number_____Date_____

Number_____Date_____

Number_____Date_____

Number_____Date_____

PART 4 – The Contractor proposes to provide all of the necessary labor, materials, equipment, insurance and bonds for the Macklin Tower Roof Replacement & Limited HVAC Upgrades on the Rockville Campus located at 51 Mannakee Street, Maryland 20850, as specified in the RFP documents. The work to be performed by the Contractor shall include all items accepted by the College as part of the Contractor's submittal. It is understood that Montgomery College (hereinafter referred to as College) will be the sole judge as to the acceptance of the proposals and award of the contract. All work shall be done in accordance with the accompanying Technical Specifications and Drawings for the amount listed on the Price Proposal Form, and accepted Alternates, if any, as applicable in accordance with the terms of the RFP documents**.** The Contractor is reasonably expected, given the existing conditions and required construction, to complete the Work within the completion date stated in the RFP documents**.**

PART 5 – TECHNICAL PROPOSAL SUBMITTAL ATTACHMENTS

Technical Proposal Form and all Attachments include:

A. Contractor's Qualification Statement with all required information/attachment, including but not limited to:

(1) the last two years of Financial Statements and a copy of Contractor's Maryland Business Registration and Contractor License

(2) three (3) Relevant Project References of Examples of similar scope, size and complexity completed within the past three year.

B. Contractor's Relevant Project Experience

C. Proposed Project Management/Supervisory Personnel List (including Construction Superintendent) and their Professional Qualifications and Technical Competence

D. Key Principal Subcontractor Information Form

E. Project Approach Statement

F. Administrative Process Methodology

G. Quality Control Program

H. Explain approach to achieving close coordination and highly collaborative construction process with another prime contractor/CMAR

I. Acknowledgement of Proposed Project Schedule

J. Verification of Examination of Site Conditions, Section 004400-1

K. Minority Participation Form, Section 004539-1

L. Conflict of Interest Form, Section 004541

M. Non-Debarment Acknowledgement, Section 004542

N. Acknowledgement of Receipt of Addenda, if applicable

O. Any exceptions to the Montgomery College General and Supplementary Conditions of the Contract, Standard Form of Contract, and/or any deviations to the other requirements of the RFP, if applicable

PART 6 – The undersigned agrees, if selected as the Contractor, to execute a Contract in accordance with the terms of this Request for Proposal and Contract documents**,** within five (5) days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the College.

PART 7 - The undersigned further certifies under the penalties of perjury that this proposal is in every respect bona-fide, fair and made without collusion or fraud with another person, joint venture, corporation, partnership or other business or legal entity**.**

PART 8 - The undersigned acknowledges the right of the College in its sole discretion to accept any Proposal or to reject any or all Proposals.

PART 9 - SIGNATURES:

_____ _____
(Date) **(Company Name)**

_____
(Address)

_____
(Telephone Number)

_____
(Facsimile Number)

By: _____
SEAL IF A CORPORATION **Authorized Agent & Title (Print)**

_____
Signature

_____
(F.E.I.N.)

_____
(Contractor License Number)

_____
(Contact E-mail Address)

BE SURE TO SIGN YOUR PROPOSAL

PRICE PROPOSAL FORM

To: Montgomery College

Re: RFP No.: 626-003
Macklin Tower Roof Replacement & Limited HVAC Upgrades
Rockville Campus

Attn.: Procurement Office
Montgomery College
9221 Corporate Boulevard
Rockville, Maryland 20850

From: _____
(Provide Your Company's Name)

PART 1 - Contractor must submit **one (1) original plus one photocopy,** marked "Original "or "Copy" accordingly, of the Price Proposal Form and all attachments.

PART 2 - Please read the questions, note what is requested, then provide appropriate responses. Failure to answer any of the applicable questions contained in this section will make the proposal non-responsive and be grounds for rejection of the entire proposal. **Conditional proposals will not be accepted**. In order to be considered for the award, Contractor must bid all items and fill out all the following blanks. Failure to do so may deem a Contractor non-responsive.

PART 3- Contractor acknowledges receipt of the following Addenda:

Number_____Date_____

Number_____Date_____

Number_____Date_____

Number_____Date_____

Number_____Date_____

Number_____Date_____

PART 4 - BASE PRICE TOTAL (State amounts in both words and numbers where indicated)

The proposed total contract amount to complete the construction services for the **Macklin Tower Roof Replacement project on the Rockville Campus**, per terms, conditions, drawings and specifications, including all costs associated with the requirements specified in the RFP documents, and having examined both the site of the Work and all matters referred to in the RFP documents, is:

(In Words): _____Dollars

(In Numbers): $ _____

Item #	Description	Dollar Amount ($)
1	Division 01 General Conditions	
2	Division 02 Existing Conditions	
	- Roof Demolition	
	- Ceiling Demolition	
	- Wall Demolition	
	- Flooring Demolition	
	- Asbestos Abatement	
	- Misc. work	
3	Division 03 Concrete	
4	Division 04 Masonry	
	- Facade Repairs /Repointing	
	- Facade Vertical Control Joints	
	- Masonry Associated to Roof Work	
	- Masonry Associated to Shelf Angles through Wall Flashing	
	- Masonry Replacement	
	- Masonry Power Washing	
	- Misc. work	
5	Division 05 Metals	
	- Metal Railing – Terrace 3	
	- Steel Decking	
	- Steel Stair – RTU / Tower	
	- Prefabricated Steel Stair RTU / Library	
	- Prefabricated Safety Rail / Library	
	- Misc. work	
6	Division 06 Wood, Plastics, and Composites	
	- Roof Carpentry	
	- Millwork	
	- Misc. work	
7	Division 07 Thermal and Moisture Protection	
	- Roofing Membrane - Roofs	
	- Roofing Membrane - Terraces	

	- Roofing Insulation	
	- Roofing Flashing	
	- Roofing Coping	
	- HVAC Insulation	
	- Knee Wall Insulation	
	- Through-Wall Flashing at Façade Shelf Angles	
	- Below Grade Waterproofing	
	- Vegetated Roof – Tray Assembly	
	- Composite Wall Panels (Roof)	
	- Roof Walkways	
	- Roof Curbs	
	- Sealants - Roof	
	- Sealants - Facade	
	- Misc. work	
8	Division 08 Openings	
	- Curtainwall – 3rd Floor Terrace / Doors Infill	
	- Curtainwall – Glass / Gaskets Replacement	
	- New Roof Doors	
	- Glazing	
	- Misc. work	
9	Division 09 Finishes	
	- Ceiling	
	- Partitions	
	- Kneewall	
	- Flooring	
	- Paint	
	- Misc. work	
10	Division 10 Specialties	
	- Signage	
	- Fire Protection	
	- Accessories / Emergency Aid Cabinets	
	- Misc. work	
11	Division 12 Furnishings	
	- Blinds	
	- Countertops	
	- Misc. work	
12	Division 21 Fire Suppression	
	- Sprinkler work	
	- Misc. work	
13	Division 22 Plumbing	
	- Plumbing Demolition	
	- Drinking Fountains / Sinks	

	- Roof Drains	
	- Misc. work	
14	Division 23 HVAC	
	- HVAC Demolition	
	- VAV Replacement	
	- Registers	
	- Duct Work	
	- Controls	
	- Testing	
	- Misc. work	
15	Division 26 Electrical	
	- Electrical Demolition	
	- Lighting	
	- Lighting controls	
	- Lightning Protection	
	- Misc. work	
16	Division 28 Electronic Safety and Security	
	- Fire Detection / Fire Alarm	
	- Misc. work	
17	Division 31 Earthwork	
	- Underground wall waterproofing	
	- Lightning protection	
	- Misc. work	
18	Division 32 Exterior Improvements	
	- Pavers / Artificial Turf	
	- Furniture / Planters	
	- Sod / Grass	
	- Misc. work	
19	Allowances	
20	Profit and Overhead	
21	Insurance, Performance & Payment Bonds	
22	**Base Price Total (Sum of Item 1-21)**	

PART 5 - SPECIAL PRICING REQUIREMENTS (State amounts in both words and numbers)

A. ALLOWANCES (SEE PART 5.B BELOW)

B. UNIT PRICES AND ALLOWANCES

Provide unit prices to establish a fixed basis for costs for adding or changing specified quantities of work from those indicated in the contract drawings and specifications, when directed in writing by the College to make such changes. The unit prices shall include all labor, materials, equipment,

overhead, bonds, insurance and profit and shall either be added to or subtracted from the quantity of this type of work specified as the result of field conditions. Provide allowance for quantities indicated below.

1. **Concrete Repair - Partial Depth Horizontal Repair - See Detail A/S-800**
   a. Unit Cost per SF is: $_____ (In Numbers).
      (In Words): _____ Dollars.
   b. Allowance to include 2,000 SF is: $_____ (In Numbers).
      (In Words): _____ Dollars

2. **Concrete Repair - Vertical or Overhead Patch Repair – See Detail B/S-800**
   a. Unit Cost per SF is: $_____ (In Numbers).
      (In Words): _____ Dollars.
   b. Allowance to include 500 SF is: $_____ (In Numbers).
      (In Words): _____ Dollars

3. **Concrete Repair – Partial Depth Overhead or Vertical - See Detail C/S-800**
   a. Unit Cost per SF is: $_____ (In Numbers).
      (In Words): _____ Dollars.
   b. Allowance to include 50 SF is: $_____ (In Numbers).
      (In Words): _____ Dollars

4. **Concrete Repair - Honeycomb Patch Repair - See Detail D/S-800**
   a. Unit Cost per SF is: $_____ (In Numbers).
      (In Words): _____ Dollars.
   b. Allowance to include 100 SF is: $_____ (In Numbers).
      (In Words): _____ Dollars

5. **Concrete Repair - Lap Splice Rebar Repair - See Detail F/S-800**
   a. Unit Cost per SF is: $_____(In Numbers).
      (In Words): _____Dollars.
   b. Allowance to include 50 SF is: $_____ (In Numbers).
      (In Words): _____Dollars

6. **Cabling and junction box supports above ceiling.**
   a. Allowance to include : **$10,000** (In Numbers).
      (In Words): **Ten Thousand** Dollars

7. **Replacement of BX/Armored Cable and miscellaneous deficiencies in the ceiling space.**
   b. Allowance to include : **$60,000** (In Numbers).
      (In Words): **Sixty Thousand** Dollars

C. ALTERNATES

Complete scope of work on the following alternates as per terms, conditions, drawings and specifications, including all costs associated with the requirements specified in the RFP documents, and having examined both the site of the Work and all matters referred to in the RFP documents.

Alternate 1: Replacement of the structural slab at Terrace #3, including associated architectural and MEP work.
See Structural, MEP, and Architectural documents, including drawings S-230, S-810, S-811, EP-101, AD-102, AQ-102, A-102, A-1Q1, AG-010, and AG-102.
(In Words): _____Dollars

(In Numbers): $_____

Alternate 2: Not Used
(In Words): _____Dollars

(In Numbers): $_____

Alternate 3: Replacement of the exterior underground HVAC piping.
See Civil and MEP documents, including drawings CD-101, CS-101, VF-101, M-002, M-003, and M-501
(In Words): _____Dollars

(In Numbers): $_____

Alternate 4: Door & Hardware Replacement (frame/panel/hardware).
See Architectural documents - Including drawings A-601, A-602
(In Words): _____Dollars

(In Numbers): $_____

D. SEPARATELY IDENTIFIED PRICES – NOT USED

PART 6 - BID SURETY

A. The bid surety attached in the sum of _____ Dollars ($_____) is to become the property of the College in the event the Contract and Bond are not executed with the time set forth, as liquidated damages for the delay and additional expense to the College caused thereby.

B. The undersigned includes the following submissions as part of the Price Proposal Form:

- Bid Bond (AIA Document A310-2010, "Bid Bond") if the total bid amount exceeding $100,000.
- Bonding Company Letter

PART 7 – PRICE PROPOSAL SUBMITTAL ATTACHMENTS

A. AIA Document A310-2010, Bid Bond or Certified Check in an amount **not less than 5%** of the Total Bid Amount, including all add alternates, but excluding all deduct alternates, if applicable.

B. Bonding Company Letter Guaranteeing the Required 100% Performance, Labor and Material Payment Bonds.

PART 8 – The undersigned agrees, if selected as the Contractor, to execute a Contract in accordance with the terms of this Request for Proposals and the Contract Documents**,** within five (5) days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the College.

PART 9 – Upon contract award, the undersigned agrees to hold prices firm for the duration of the overall contract term.

PART 10 - The undersigned acknowledges the right of the College in its sole discretion to accept any Proposal or to reject any or all Proposals.

PART 11 - The undersigned further certifies under the penalties of perjury that this proposal is in every respect bona-fide, fair and made without collusion or fraud with another person, joint venture, corporation, partnership or other business or legal entity**.**

PART 12 - SIGNATURES:

_____ _____
(Date) **(Company Name)**

_____
(Address)

_____
(Telephone Number)

_____
(Facsimile Number)

By:
SEAL IF A CORPORATION

_____
Authorized Agent & Title (Print)

_____
Signature

_____
(F.E.I.N.)

_____
(Contractor License Number)

_____
(Contact E-mail Address)

BE SURE TO SIGN YOUR BID

BID BOND

Macklin Tower Roof Replacement & Limited HVAC Upgrades
Rockville Campus

Use AIA Document A310-2010, Bid Bond

VERIFICATION OF EXAMINATION OF SITE CONDITIONS

This form must be completed and included with the Technical Proposal submission.

The undersigned hereby certifies the completion of examination of the site conditions on _____, 2025.

Date	**Company Name**
	Address
	Telephone Number
	Facsimile Number
	Name & Title (Print)
	Email Address
	Signature

Site examination inspection confirmed by College Representative:

Date	**College Representative Name & Position**
	Signature

CONTRACTOR'S QUALIFICATION STATEMENT

Use **AIA Document A305, Contractor's Qualification Statement**, latest edition, or Montgomery College's "**Contractor's Qualification Statement**", unless otherwise indicated. A copy of the Montgomery College form and the supplemental instructions are included with this section.

Contractor's Qualification Statement

Preparing the Contractor's Qualification Statement for Review by Montgomery College

Most contractors maintain a generic AIA A305 form. The effort contractors spend adapting the document to our specific interests is noticed and appreciated. The suggestions provided here are intended to help improve your chances of being responsive to our requests for technical information. Our preferences are fairly specific and adherence to these preferences will expedite the review process.

Contractor qualification statements are generally reviewed by a panel consisting of five members. The purpose in using our own form is to obtain objective data in a consistent format that can be easily processed by our panel members. Unfortunately, it has been our experience that many contractors attempt to use the AIA A305 as a way to direct us to a variety of attachments that are in a unique format which are inconsistent or non-responsive to the type of information we are seeking. So, for example when the form requests the value of the contractor's current work (part 3), a somewhat typical response is "see attachment 6" which is a list of projects that may or may not be tabulated. Actually, what we are looking for in that particular space is a dollar amount, not a list. The numbers are certainly not the full story regarding contractor qualifications, but when we ask for a number, our panel members would like to see a current and accurate number in that space.

Where we do ask for project lists, we have found that some lists are more helpful than others. Although we do not require contractors to provide information in a specific format, we do expect the lists to respond to our request for certain basic information. The preferred format and content for our purposes is as follows:

1. A short, descriptive project title, e.g. "new" student center, or "addition to" or "repairs to library building", etc.
2. Owner and location of the work.
3. The name of the architect/engineer.
4. The construction contract value.
5. The year when the project was completed.

The following should be taken into consideration when compiling the project lists:

a) Since we are a college, we are particularly interested in academic institutional project experience. Highlighting those types of projects is beneficial.
b) If your project involvement was other than as the sole general contractor or construction manager, please make that clear. Thus, if you are one of multiple primes, or a member of a joint venture, or a subcontractor on the project, please make that distinction in the project title and contract value. Do not claim credit for the entire work.
c) The project lists serve as client references for our purposes. References are more highly valued when the client is a college, university or other public entity. Local references and recent references are the most relevant.
d) Project experience becomes increasingly less relevant as the projects become remote in time or distance. We would prefer a short, current and relevant project list.
e) Failure to provide the requested financials is frequently a cause for disqualification.
f) We encourage all companies to provide full and accurate information which best presents their qualifications, but please be concise. Too much data or poorly organized data can impede our review and will ultimately be counterproductive.

Finally, the presentation of material including tabs, indexes, and logical organization makes a difference to panel members who are struggling with a large volume of paper. So prepare the submittal accordingly.

Office of Facilities
Montgomery College

Contractor's Qualification Statement

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading. Information provided in this statement is for the express purpose of assisting Montgomery College in its assessment of the Offeror's suitability for providing services as a General Contractor for the referenced project.

SUBMITTED TO: Office of Procurement
MONTGOMERY COLLEGE

ADDRESS: 9221 Corporate Boulevard
Rockville, Maryland 20850

SUBMITTED BY:
TITLE:

COMPANY NAME:
ADDRESS:

NAME OF PROJECT: **Macklin Tower Roof Replacement & Limited HVAC Upgrades**
Rockville Campus

Type of Work (select one):
[ ] General Construction
[ ] HVAC
[ ] Electrical
[ ] Plumbing
[ ] Other (please specify)

1.0 ORGANIZATION

1.1 How many years has your organization been in business as a Contractor?

1.2 How many years has your organization been in business under its present business name?

1.2.1 Under what other or former names has your organization operated?

1.3 Describe the form of your organization (i.e. corporation, partnership, individual, or other) and name the principal(s):

2.0 BUSINESS REGISTRATION & LICENSING

2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business:

2.2 Provide a copy of your business registration and applicable license(s) as an attachment to this form.

3.0 EXPERIENCE

3.1 List the categories of work that your organization normally performs with its own forces:

3.2 On a separate sheet, list the similar construction projects your organization has completed in the last three years, giving the name of the project, owner, architect, the contract amount, date of completion and percentage of cost of the work performed with your own forces.

3.3 State average annual amount of construction work performed in the last three years:

3.4 Has your organization ever failed to complete any work awarded to it?

[ ] NO [ ] YES *(attach details)*

3.5 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

[ ] NO [ ] YES *(attach details)*

3.6 Has your organization filed any law suits or requested arbitration with regards to construction contracts within the last five years?

[ ] NO [ ] YES *(attach details)*

3.7 Has your organization ever been debarred from bidding on State Contracts by the Board of Public Works, or on any other Local, Municipal, County, State or Federal project?

[ ] NO [ ] YES *(attach details)*

3.8 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

[ ] NO [ ] YES *(attach details)*

3.9 Has your organization ever filed for bankruptcy, receivership or any other similar legal protection to protect it from default? (If the answer is yes, please attach details.)

[ ] NO [ ] YES *(attach details)*

3.10 Include a brief description of **three (3) projects** in Section 3.2 listing each project's size, relevant features, construction cost (including general conditions, OH&P), change order value (excluding or annotating Owner directed scope changes), anticipated schedule, actual schedule and an Owner's reference contact person's name and current telephone number.

4.0 FINANCIAL STATUS

4.1 Financial Statement

Attach copies of financial statements for the **last two years**, preferably audited, including your organization's balance sheet and income statement showing Current Assets, Net Fixed Assets, Other Assets, Current Liabilities and Other Liabilities. Include name and address of firm preparing attached financial statement(s), and date(s) thereof.

5.0 SIGNATURE

5.1 Dated this ____ day of _____, 2025.

Name of Organization:

_____

By:

Title:

6.0 NOTARY

6.1 _____ being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this _____ day of _____, 2025.

_____

Notary Public:

My Commission Expires:

SUBCONTRACTOR INFORMATION FORM

(Use one form for each subcontractor)

Trade: _____

Name: _____

Address: _____

_____

Telephone: _____

Contact: _____

Average Annual Work performed, in dollars, in the last three years: _____

List three representative projects of comparable size, scope and complexity, completed within the last five years. For each project, indicate client name, project location, completion date, size, cost and major features:

Project # 1 _____

_____

_____

_____

_____

Project # 2 _____

_____

_____

_____

_____

Project # 3 _____

_____

_____

_____

_____

MINORITY PARTICIPATION FORM

CONTRACTORS SHALL COMPLETE THE FOLLOWING:

I HEREBY REPRESENT THAT OUR/MY FIRM IS _____

IS NOT _____

IF YES, SELECT MINORITY CLASSIFICATION FROM THE LIST BELOW (check one):

_____ African American _____ Hispanic _____ Native American

_____ Alaskan American _____ Asian _____ Pacific Islander

_____ Woman _____ Disabled _____ Veteran

_____ LGBTQIA+ _____Other: _____

INDICATE EXPECTED MINORITY PARTICIPATION FROM SELF-PERFORMED WORK, AND/OR WORK PERFORMED BY SUBCONTRACTORS AND/OR VENDORS AS A PERCENTAGE OF TOTAL CONTRACT PRICE:

Minority Participation Expectation: _____ % of Base Price Total

I hereby certify that the above information is true and correct, to the best of my knowledge and belief.

_____
Firm Name

_____
Signed Date

_____
Type or Print Name

_____
Title

PROCUREMENT OFFICE QUESTIONNAIRE

RFP Number: 626-003

RFP Title: Macklin Tower Roof Replacement & Limited HVAC Upgrades Rockville Campus

Please be advised that our company **does not** wish to submit a proposal in response to the above-captioned Request for Proposal for the following reasons:

- ☐ Too Busy at this time
- ☐ Not engaged in this type of work
- ☐ Project too large/ small
- ☐ Cannot meet mandatory specifications (Please specify below)
- ☐ Other (Please specify)

_____

_____
SIGNATURE

_____
PRINTED NAME

_____
TITLE

_____
DATE

_____
COMPANY

_____
Address

Please return to:

Montgomery College
Procurement Office
9221 Corporate Boulevard
Rockville, Maryland 20850

CONFLICT OF INTEREST STATEMENT

The undersigned hereby affirms and attests that to the best of its knowledge, no Montgomery College trustee, or employee, or spouse, parent, child, brother, sister of the trustee or employee, own assets in this business, and of this date are NOT employed by Montgomery College.

Company Name:	
Printed Name:	
Title:	
Signature:	
Date:	

NON-DEBARMENT ACKNOWLEDGEMENT

_____ I acknowledge that my firm has NO pending litigation and/or debarment from doing business with the State of Maryland or any of its subordinate government units and/or federal government within the past five (5) years.

_____ I acknowledge that my firm has **pending litigation or has been debarred** from doing business with the State of Maryland or any of its subordinate government units and/or federal government, within the past five (5) years. If so, please provide an attachment describing the pending litigation or debarment **(if you do not have any pending litigation mark "N/A" or "No")**.

_____ I acknowledge none of this company's officers, directors, partners, or its employees have been convicted of bribery, attempted bribery, or conspiracy to bribe under the laws of any state or federal government; and that no member of the Montgomery College Board of Trustees or any employees of the College has any interest in the bidding company except as follows:

_____

_____

_____

As the duly authorized representative of the Offeror, I hereby certify that the above information is correct and that I will advise Montgomery College should there be a change in status.

By (Signature) _____

Name and Title _____

Witness Name and Title _____

CONTRACT
BETWEEN
MONTGOMERY COLLEGE
AND
_____

Board of Trustees
Montgomery College
Rockville, Maryland 20850

Project Title: Macklin Tower Roof Replacement & Limited HVAC Upgrades
Rockville Campus

Contract No.: _____

Account No.: _____

This **AGREEMENT** made this _____ day of _____ , 2025, by and between the Board of Trustees of **MONTGOMERY COLLEGE**, a public institution of higher education, hereinafter called the "College", and _____, a _____, registered in the State of _____, located at _____ , hereinafter called the "Contractor".

WITNESSETH, that the College and the Contractor for the consideration named agree as follows:

1 QUALIFICATIONS OF THE CONTRACTOR

The Contractor hereby assures the College that the Contractor is qualified to perform the services provided for in this Agreement in accordance with all applicable laws, orders, rules and regulations. The Contractor further assures the College that the Contractor is free from any financial interests which may conflict with the proper performance of this Agreement.

2 DEFINITION OF THE PROJECT

The Contractor agrees to provide all of the necessary labor, materials, equipment and insurance to perform all of the Work described in the Contract Documents. The Work to be performed by the Contractor shall include all items accepted by the College as part of the Contractor's bid submittal, base bid and alternate prices.

3 TIME OF COMPLETION

The Work to be performed under this Agreement shall be in accordance with the Preliminary Project Schedule contained in the Contract Documents. It is agreed that time is of the essence and therefore the College will suffer substantial damages if the Work is not completed within the time stated in the Preliminary Project Schedule contained in the Contract Documents.

SAMPLE

4 LIQUIDATED DAMAGES

It is agreed that time is of the essence and therefore the College will suffer substantial damages if the Work is not completed within the time stated in the Preliminary Project Schedule contained in the Contract Documents. If the Contractor fails to achieve Substantial Completion of its Work on or before the date set for Substantial Completion of the Contract and as a result causes the Project to be completed after the date set for Substantial Completion of the Project as set forth in the Preliminary Project Schedule, liquidated damages shall be assessed against the Contractor in the amount of **$ 1,000** per day for each calendar day that the Contractor delays Substantial Completion of the Project. These assessed damages shall not be considered as a penalty but as mutually agreed upon as the ascertained damages suffered by the College because of the delay. Where, under the contract, additional time is allowed for the completion of the work, the new time limits will be the essence of the contract.

5 CONTRACT DOCUMENTS

The Contract Documents are the Agreement, the Request for Bid/Proposal, Instructions for Bidders/Offerors, the General Conditions of the Contract, Supplementary Information and Conditions, Preliminary Project Schedule, Drawings, Specifications, Addenda issued prior to execution of the Contract, Modifications issued after execution of the Contract, the Performance Bond, the Labor and Material Payment Bond, the Contractor's Bid Form and all attachments thereto received from the Contractor. The term "Contract" when used in the Specifications or Drawings shall be considered as synonymous with the term "Contract Documents".

6 CHANGES TO THE CONTRACT

The College may make any alterations, deviations, additions or omissions to the Contract Documents which it deems to be in the best interest of the College without otherwise affecting the obligations of the Contractor or making void this Agreement. Any alterations, deviations, additions or omissions shall be processed as a change order in the Work and shall be prepared in accordance with the procedure set forth for issuing changes in the Work in the Contract Documents.

7 CONTRACT SUM

The College shall pay the Contractor the Contract Sum of _____Dollars ($ _____.00) for the Work performed strictly in accordance with the requirements of this Agreement. All invoices submitted for Work performed under this Agreement shall include the College's project title, contract number and account number. The Contract Sum is a firm lump sum paid in accordance with the General Conditions of this Agreement.

8 PROGRESS PAYMENTS

Payments shall be made to the Contractor on a monthly basis provided that the Contractor submits Applications for Payments which are prepared in accordance with the General Conditions and supported by such data as the College may reasonably require. The College shall have the right to audit the Contractor's records to verify the payment request. Payment shall be made within thirty (30) calendar days after the requisition, properly prepared and authorized by the College representative, is received in the Finance Office.

SAMPLE

9 ACCEPTANCE AND FINAL PAYMENT

9.1 Upon receipt of written notice from the Contractor that the Work is ready for final inspection and acceptance, the College and/or its representatives shall promptly make such final inspection. When the College Representative finds the Work fully acceptable under the Agreement and the Agreement fully performed, the College Representative shall issue a final certificate stating that the Work provided for in this Agreement has been completed and is acceptable under the terms and conditions thereof and that the entire balance found to be due to the Contractor and noted in the final certificate is due and payable. Before issuance of a final certificate, the Contractor shall submit such evidence the College deems necessary to ensure that all payrolls, materials bills and other indebtedness connected with the Work have been paid. Final payment shall be made within (15) fifteen calendar days after the issuance of a final certificate from the College's Representative that the Work has been fully completed and the Agreement fully performed.

9.2 Neither the acceptance by the College or any representative of the College nor any payment for or acceptance of the whole or any part of the Work, nor any extension of time, nor any possession taken by the College, shall operate as a waiver of any portion of the Agreement or of any power reserved to the College or any right to recover damages. The waiver of any breach of the Agreement shall not be held to be a waiver of any other prior or subsequent breach.

10 NOTICES

Any notice to be provided shall be sent by first class mail and shall be addressed as follows or as may be later designated in writing:

a) For the College:

Ms. Carla Pullen
Vice President of Facilities Management, Capital Planning, and Sustainability
Montgomery College
9221 Corporate Boulevard
Rockville, Maryland 20850

b) For the Contractor:

_____
_____
_____
_____
_____

11 INTERPRETATION OF CONTRACT

This Agreement is a contract under seal and shall be construed and interpreted according to the laws of the State of Maryland, without regard to principles of conflicts of law.

SAMPLE

12 COMPLIANCE WITH LAWS

The Contractor agrees to comply, at no additional expense, with all applicable Executive Orders, Federal, State, county, bi-county, regional and local laws, ordinances, rules and regulations in effect as of the date of this Agreement and as they may be amended from time to time, including but not limited to the equal opportunity clause set forth in 41 CFR 60-250.4 as amended. The Contractor shall further agree to comply with any special provisions or requirements, including more stringent provisions, mandated by any entity having jurisdiction.

13 INDEPENDENT CONTRACTOR

The Contractor shall perform the Contract as an independent contractor and shall not be considered as an agent of the College nor shall any employee or agent of the Contractor be considered subagents of the College. Nothing in this Contract shall be construed as constituting a partnership, joint venture, or agency between the College and Contractor. Other than duties of the Construction Manager based on authority granted to the Construction Manager by the College, no acts performed or representations, whether oral or written, made by or with respect to third parties and the Contractor shall be binding on the College.

14 NONDISCRIMINATION

14.1 The Contractor assures the College that, in accordance with applicable law, it does not, and agrees that it will not discriminate in any manner on the basis of sex, race, age, color, creed, national origin, religious belief, pregnancy, handicap, marital status or status as a disabled veteran or veteran of the Vietnam era. The Contractor further agrees to post in conspicuous places notices setting for the provisions of the non-discrimination clause and to take affirmative action in accordance with applicable law to implement these provisions.

14.2 The Contractor further assures the College that, in accordance with the Immigration Reform and Control Act of 1986, it does not and will not discriminate against an individual with respect to hiring, or recruitment or referral for a fee, of the individual for employment or the discharging of the individual from employment because of such individual's national origin or in the case of a citizen or intending citizen, because of such individual's citizenship status.

14.3 The College is committed to providing a work and study environment that is free from discrimination and harassment on the basis of sex, race, age, color, creed, national origin, religious belief, pregnancy, handicap, marital status or status as a disabled veteran or veteran of the Vietnam era. Behavior contrary to this philosophy, which has the purpose or effect of creating an intimidating, hostile, or offensive environment, will not be tolerated by the College, and it is the Contractor's responsibility to ensure that such behavior by its employees, agents and subcontractors does not occur.

14.4 This policy extends to maintaining an environment free from sexual harassment. Therefore, sexual advances or sexual remarks, requests for sexual favors, and other verbal or physical conduct of a sexual nature must not be condoned or permitted by the Contractor. This prohibition extends to such harassment within the employment context as well as harassment of students, staff and visitors of the College. It should be assumed that all sexual behavior by the Contractor's employees, agents and subcontractors on any campus or facility of the College is improper and unwelcome.

SAMPLE

15 COMPLIANCE WITH THE IMMIGRATION REFORM AND CONTROL ACT OF 1986

The Contractor warrants that both the Contractor and/or any subcontractor of the Contractor do not and shall not hire, recruit or refer for a fee, for employment under this Agreement or any subcontract, an alien knowing the alien is an unauthorized alien and hire any individual without complying with the requirements of the Immigration Reform and Control Act of 1986 (hereinafter referred to as "IRCA"), including but not limited to any verification and record keeping requirements. The Contractor agrees to indemnify and save the College, its employees and/or trustees harmless from any loss, costs, damages or other expenses suffered or incurred by the College, its employees and/or trustees by reason of the Contractor's or any subcontractor of the Contractor's noncompliance with "IRCA." The Contractor agrees to defend the College, its employees and/or trustees in any proceeding, action or suit brought against the College, including but not limited to administrative and judicial proceedings, arising out of or alleging noncompliance of the Contractor with "IRCA." The Contractor recognizes that it is the Contractor's responsibility to ensure that all certifications and verifications as required by law are obtained and maintained for the applicable time period.

16 ASSURANCE OF NONCONVICTION OF BRIBERY

The Contractor hereby declares and affirms that, to its best knowledge, none of its officers, directors or partners and none of its employees directly involved in obtaining contracts has been convicted of bribery, attempted bribery or conspiracy to bribe under the laws of any state or the Federal Government.

17 CONFLICT OF INTEREST

No employee of the College or of the State of Maryland, or any department, commission, agency or branch thereof whose duties as such employee include matters relating to or affecting the subject matter of this Agreement shall, until such time as the Contractor receives final payment, become or be an employee of the party or parties hereby contracting with the College, the State of Maryland, or any department, commission, agency or branch thereof.

18 ASSIGNMENT AND SUBCONTRACTING

18.1 Neither the College nor the Contractor shall sell, transfer, assign or otherwise dispose of this Agreement or any portion thereof, or its right, title or interest therein, or its obligations there under, without the written consent of the other. A change in membership of the Contractor’s firm of one or more officers shall not constitute an assignment.

18.2 The Contractor shall not make any contracts for professional services with any other party for furnishing any of the work or services to be performed under this Agreement without the written approval of the College; however, this provision shall not be taken as requiring the approval of the contract of employment between the Contractor and its personnel assigned for the purposes of performing this Agreement.

SAMPLE

19 INSURANCE

19.1 The Contractor shall maintain in force at all times during the term of this Agreement, with an insurance carrier licensed to do business in the State of Maryland acceptable to the College, the following minimum insurance coverage. This insurance must be kept in full force and effect during the term of this contract, including all extensions. The insurance must be evidenced by a certificate of insurance, and if requested by the College, the proposed awardees/Contractor shall provide a copy of the insurance policies. The Contractor's insurance shall be primary.

a) Worker's Compensation Insurance covering the Contractor's employees as required by State of Maryland law with the following minimum limits:

Bodily Injury by Accident	$ 100,000 each accident
Bodily Injury by Disease	$ 500,000 policy limit
Bodily Injury by Disease	$ 100,000 each employee.

b) Commercial General Liability Insurance, excluding automobiles owned or hired by the Contractor, with limits as follows

Bodily Injury and Property Damage:	$ 10,000,000 combined single limit of bodily injury and property damage per occurrence

c) Comprehensive Automobile Liability Insurance, providing bodily injury and property damage coverage for owned vehicles, hired vehicles and non-owned vehicles with limits as follows:

Bodily Injury:	$ 1,000,000 each person $ 2,000,000 each occurrence
Property Damage:	$ 2,000,000 each occurrence

d) Builder’s Risk Insurance, providing property damage coverage and theft replacement coverage for goods provided and services rendered during construction. For renovation projects, when custody of the building is turned over to the Contractor, the Builder’s Risk policy must additionally include building replacement value.

e) Insured - The College, its elected and appointed officials, officers, consultants, agents and employees must be named as additional insured and loss payee on Contractor's Commercial and Excess/Umbrella Insurance for liability arising out of Contractor's products, goods and services provided under this Agreement.

19.2 At the time this Agreement is made, the Contractor shall provide the College with evidence of payment for the above insurance coverage as resulted by this Agreement. Any request for extension of time of this Agreement shall also include evidence of payment for the above insurance coverage as required by an extension of time for this Agreement.

19.3 These coverages and limits are to be considered minimum requirements under this Agreement and shall in no way limit the liability or obligations of the Contractor. The insurance shall provide that policy coverage will not be canceled, altered or materially changed without sixty (60) calendar days’ prior notice to the College by registered or certified mail. The insurance shall not be limited to claims made only while the policy is in effect.

SAMPLE

19.4 The Contractor shall furnish the College with a certificate of insurance as evidence of the required coverage. The certificates of insurance must name the College as an additional insured.

19.5 In the event that the Contractor's insurance is terminated, the Contractor shall immediately obtain other coverage and any lack of insurance shall be grounds for immediate termination of this Agreement.

19.6 For the purposes of this article, the word "licensed" shall be deemed to mean an insurance carrier either licensed or approved to do business in the State of Maryland.

20 SAVE HARMLESS

20.1 The Contractor shall be responsible for any property damage, loss, personal injury, death and/or any other damage which may occur by reason of the Contractor's acts, negligence, willfulness or failure to perform any of the obligations required by this Agreement. The Contractor agrees to indemnify and save harmless the College and its respective employees, volunteers, students, and trustees, as applicable, (the “Indemnitees”) from any claims, loss, costs, damages or other expenses suffered or incurred by the Indemnitees, including attorney’s fees and costs, by reason of the Contractor's acts, negligence, willfulness or failure to perform any of the obligations required by this Agreement. The Contractor at its own expense shall defend the Indemnitees in any action or suit brought against any of the Indemnitees arising out of the Contractor's acts, negligence, willfulness or failure to perform any of the obligations required by this Agreement. Any acts, negligence, willfulness or failure to perform any of the obligations required by this Agreement on the part of any agent, servant, employee or Subcontractor of the Contractor, or any Subcontractor's agent, servant or employee, are deemed to be the Contractor's acts, negligence, willfulness or failure to perform any of the obligations defined by this Agreement.

20.2 In claims against any person or entity indemnified under subsection 21.1 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under subsection 21.1 shall not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers or workmen's compensation acts, disability benefit acts or other employee benefit acts.

20.3 The College may retain such moneys due or to become due the Contractor under this Agreement as it considers necessary until such suits or claims for damages have been settled or otherwise disposed of and satisfactory evidence to that effect has been furnished to the College.

20.4 The provisions of this Article shall survive the termination of this Agreement.

21 DISPUTES

Any dispute concerning a question of fact arising under this Agreement which is not disposed of by agreement shall be decided by the President of the College or his designee. Pending the final decision of the dispute, the Contractor shall proceed diligently with the Agreement performance. Nothing hereunder shall be interpreted to preclude the parties from seeking, after completion of the Agreement, any and all remedies provided by law.

22 TERMINATION FOR THE CONVENIENCE OF THE COLLEGE

The performance of the work or services under this Agreement may be terminated by the College, in whole or in part, whenever the President of the College shall deem that termination is in the best interest of the College.

SAMPLE

In such event, the College shall be liable only for payment in accordance with the payment provisions of this Agreement for work or services performed of furnished prior to the effective date of termination, plus reasonable costs of termination, if any, which costs shall be specifically approved by the College in writing. The Contractor shall not be reimbursed for anticipatory profits. Termination hereunder shall become effective by delivering to the Contractor a written notice of termination upon which date the termination shall become effective.

23 TERMINATION FOR DEFAULT

The performance of the work or services under this Agreement may be terminated by the College, in whole or in part, from time to time, effective upon receipt of notice, whenever the Contractor shall default in the performance of this Agreement and fails to make progress in the prosecution of the contract work or endangers such performance and shall fail to cure such default within ten (10) calendar days period after receipt of written notification from the College specifying the default. Should the Agreement be terminated by the College for failure to perform on the part of the Contractor, no additional compensation shall be paid.

24 DELAY

24.1 In the event the performance of work or services under this Agreement is delayed by causes beyond the control of and without the fault or negligence of the Contractor, the College shall have the option to:

a.) Terminate the Agreement, or

b.) Allow the President of the College or his designee to extend the time for performance. No monetary compensation will be awarded for the time extension.

24.2 Any changes made in this Agreement as a result of delay shall be in writing. In the event the time for performance of this Agreement is extended beyond the term provided for, all other terms and conditions shall remain in full force and effect.

25 WORK UNDER CONTRACT

Work may not commence under this Contract until all conditions for commencement are met, including execution of the Contract by both parties, compliance with insurance requirements and issuance of any required notice to proceed.

26 CONTINGENT FEES

The Contractor hereby declares and affirms that neither it nor any of its representatives has employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee or agent working for the Contractor, to solicit or secure this Agreement, and that it has not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee or agent, any fee or any other consideration contingent on the making of this Agreement.

27 CAPTIONS

The captions and headings contained herein are solely for convenience and reference and do not constitute a part of this Agreement.

SAMPLE

28 ENTIRE AGREEMENT

This Agreement and the other items identified as Contract Documents constitute the entire agreement between the parties except that any change orders issued by the College shall automatically be deemed to be part of this Agreement. Any other changes or additions hereto shall not become binding upon any parties until reduced to writing and signed by both parties.

28 AUDIT

The Contractor shall permit audit and fiscal and programmatic monitoring of the Work performed under this Agreement. The College shall have access to and the right to examine and/or audit any records, books, documents and papers of Contractor and any Subcontractor involving transactions related to this Agreement during the term of this Agreement and for a period of three (3) years after final payment under this Agreement, whether or not disputes (including litigation) exist between the parties.

29 REGISTRATION FOR CORPORATIONS NOT INCORPORATED IN THE STATE OF MARYLAND

Pursuant to 7-201 et seq. of the Corporation and Associations Article of the Annotated Code of Maryland, corporations not incorporated in the State of Maryland shall be registered with the State Department of Assessments and Taxation, 301 West Preston Street, Baltimore, Maryland 21201, before doing any interstate or foreign business in this State. By signing this agreement, the Contractor certifies that it has qualified with the Department of Assessments and Taxation.

30 SEVERABILITY

If any provision of this Agreement shall be held illegal, unenforceable, or in conflict with any law governing this Agreement, the validity of the remaining portions shall not be affected thereby.

SAMPLE

IN WITNESS WHERETO, the Contractor and the College have hereunto set their hands and seals the day and year first above written.

Montgomery College

_____
Witness

By: _____
Dr. Jermaine F. Williams
President

Date: _____

Contractor

_____
Witness

By: _____

Date: _____

Fed Tax I.D. No.: _____

SAMPLE

This contract is executed by the Montgomery College Board of Trustees pursuant to Board Resolution No. _____, dated _____.

Certify that this Contract has been prepared in accordance with College Policy and Procedures and certify as Account Manager for this account.

_____
Carla Pullen.
Vice President of Facilities Management, Capital Planning, and Sustainability

_____
Date

Certify that funds are available for this Contract.

_____
Sherwin A. Collette
Sr. Vice President for Administrative and Fiscal Services

Contract No.
Account No
Amount:

_____
Date

End of Form of Contract

SAMPLE

Montgomery College
Standard Performance Bond

Any singular reference to Contract, Surety, Owner or Other Party shall be considered plural where applicable.

CONTRACTOR (*Name and Address)*:

SURETY *(Name and Principle Place of Business)*:

OWNER *(Name and Address)*:

CONSTRUCTION CONTRACT
Date:
Amount:
Description (Name and Location):

BOND
Date (Not earlier than Construction Contract Dated):
Amount:
Modifications to this Bond: □ None □ See Page 3

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corporate Seal)	Company:	(Corporate Seal)
Signature:_____		Signature:_____	
Name and Title:		Name and Title:	

(Any additional signatures appear on the last page)

(FOR INFORMATION ONLY – Name, Address and Telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE (Architect, Engineer or other party)

1 The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, and administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2 If the Contractor performs the Construction Contract in accordance with its terms, the Surety and the Contractor shall have no obligation under this Bond.

3 Whenever the Contractor shall be declared by the Owner to be in default under the Contract, the Surety shall, at its sole expense, within 15 days after Owner having mailed to Surety a copy of the notice of default sent to Contractor, take one of the following actions:

3.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract; or

3.2 Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or

3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or

3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefor to the Owner; or

.2 Deny liability in whole or in part and notify the Owner citing reasons therefor.

4 If the Surety does not proceed as provided in Paragraph 3, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Subparagraph 3.4, and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

5 After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 3.2 or 3.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract. The Surety is obligated without duplication for:

5.1 The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

5.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 3;

5.3 Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor, and

5.4 All other costs and damages permitted to be recovered by the Owner under the Construction Contractor at law.

6 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

7 Any proceeding, legal or equitable, under this Bond may be instituted only in the Circuit Court for Montgomery County, Maryland and the Surety waives venue in any other court.

8 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page.

9 This Bond had been furnished to comply with a statutory or other legal requirement of the State of Maryland. Any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

10 DEFINITIONS

10.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

10.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

10.3 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		SURETY	
Company:	(Corporate Seal)	Company:	(Corporate Seal)
Signature:_____		Signature:_____	
Name and Title:		Name and Title:	
Address:		Address:	

PAYMENT BOND

Macklin Tower Roof Replacement & Limited HVAC Upgrades
Rockville Campus

RFP No.: 626-003

Use AIA Document A312-2010, Payment Bond

APPLICATION AND CERTIFICATE FOR PAYMENT

Use AIA Document G702, Application and Certificate for Payment, latest edition, and relevant attachments, unless otherwise indicated.

MONTGOMERY COLLEGE
GENERAL CONDITIONS OF THE CONTRACT

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ARTICLE 1 – GENERAL PROVISIONS

1.1. DEFINITIONS

1.1.1. The "Agreement" is the written contract between the College and the Contractor.

1.1.2. The "College" is Montgomery Community College or Montgomery College Foundation, Inc.

1.1.3. The "Contractor" is the person or organization having a direct contractual relationship with the College for the execution of the Work under the Contract Documents.

1.1.4. The “Contract Documents” are the Agreement, the Request for Bid or Request for Proposal, Instructions to Bidders/Offerors, Supplementary Instructions, the General Conditions, Supplementary Conditions, Preliminary Project Schedule, Drawings, Specifications, Addenda issued prior to execution of the Contract, Modifications issued after execution of the Contract, the Performance Bond, the Labor and Material Payment Bond, accepted Contractor's Bid or Proposal Form(s) and all attachments thereto received from the Contractor. The term "Contract" when used in the Specifications or Drawings shall be considered as synonymous with the term "Contract Documents".

1.1.5. The "Specifications" are the portion of the Contract Documents included in the Project Manual consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.

1.1.6. The "Drawings" are those enumerated in the Specifications and those incorporated in the Contract Documents as the Work progresses.

1.1.7. The "Project Manual" is the volume that includes the Specifications as well as Bidding or Proposal Requirements, Contract Form, General Conditions and Supplementary Conditions.

1.1.8. The term "Work" means all of the obligations undertaken by the Contractor pursuant to the Contract Documents. Work includes, unless specifically excepted, the furnishing of all material, labor, equipment, supplies, plant, tools, scaffolding, transportation, supervision, insurance, taxes and all other services, facilities and expenses necessary for the full performance and completion of the requirements of the Contract Documents. "Work" also means that which is produced, constructed, or built pursuant to the Contract Documents.

1.1.9. The term “Project” is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the College or by separate contractors.

1.1.10. The term "Subcontractor" means any individual, partnership, firm, corporation or business entity other than an employee of the Contractor, who has a contract with the Contractor to furnish labor, or labor and materials for the Work. The term also includes Subcontractors of a Subcontractor. The term does not include vendors who furnish materials not worked to a special design according to the Drawings and Specifications.

1.1.11. The term "Site" or "Premises" means the area or areas indicated and such additional areas or locations upon which or in which Work under this Contract is being performed together with such areas adjacent thereto, as may be designated for the Contractor's use for a specified, limited period of time by the College.

1.1.12. The "Architect/Engineer" is the person commissioned by the College to design the Work and/or provide construction-phase architectural or engineering services. If the design was performed by the College, "Architect/Engineer" shall refer to the College.

1.1.13. The term "Contract Time" or "Time" and "Completion Date" is the number of calendar days (including weekends and holidays) shown in the Contract Documents as the time allowed for completion of the Work. If a calendar date of completion is shown in the Contract Documents in lieu of the number of calendar days, the Work shall be completed on or before that date.

1.1.14. The term "Contract Sum" refers to the total sum, including authorized adjustments, allotted in the Contract Documents for the services performed by the Contractor for satisfactory completion of all of the Work required by the Contract Documents.

1.1.15. “Shop Drawings" are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

1.1.16. “Product Data" are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor or a Subcontractor, manufacturer, supplier or distributor to illustrate materials or equipment for some portion of the Work.

1.1.17. “Samples" are natural materials, fabricated items, equipment, devices, appliances or parts thereof as called for in the Specifications, and any other samples as may be required by the College to determine whether the kind, quality, construction, workmanship, finish, color and other characteristics of the materials, etc., proposed by the Contractor conform to the requirements of the Contract Documents. Samples shall establish the kind, quality and other required characteristics of the various parts of the Work, and all Work shall be in accordance with the accepted samples.

1.1.18. The term "Request for Information" refers to a written instrument submitted by the Contractor requesting that a clarification with respect to the Contract Documents be provided by the Architect/Engineer.

1.1.19. The term "Change Order" refers to a written instrument signed by the College which describes a directive by the College which is a change in the Work.

1.1.20. The "College's Representative" is the Vice President of Facilities Management, Capital Planning, and Sustainability or their designee.

1.1.21 The “College’s Project Manager” is(are) the person(s) or entity(ies) employed or retained by the College to provide project and construction management services, including administration of the Contract as described in Article 2. The College may exercise any power or authority of the College’s Project Manager under the Contract.

1.1.22. "Day" means a calendar day unless otherwise designated.

1.1.23. "Notice to Proceed" means a written notice to the Contractor of the date on which it shall begin the prosecution of the Work. The Contract Time shall begin to run from the starting date established in the Notice to Proceed. Notice to Proceed will be timely provided upon receipt of Contractor materials required before the start of work, including but not limited to performance, payment, labor and material bonds and insurance certificates.

1.1.24. "Written Notice" means giving of notice under the Contract by one party to the other. Unless otherwise indicated in the Contract Documents, Written Notice shall be deemed to have been duly served on the Contractor if delivered in person to the individual or to the member of the firm or to an office of the corporation to whom it is directed, or if delivered by regular or certified mail to the last business address known to the College. Written Notice shall be deemed to have been given to the College upon actual receipt of Written Notice by the College.

1.2. CONTRACT DOCUMENTS

1.2.1. Correlation and Intent of Contract Documents

1.2.1.1. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Their intent is to include in the scope of the Contract, at no additional cost to the College, all Work necessary for proper completion of the Work ready for continual efficient operation that is reasonably inferable from the Documents.

1.2.1.2. Prior to submitting its price, the Contractor shall obtain from the College, clarification of all questions which may have arisen as to the intent of the Contract Documents, or any conflict between two or more items in the Contract Documents. Should the Contractor fail to obtain clarification, then the College may direct that the Work proceed by any method indicated, specified or required by the Contract Documents, in the judgment of the College. The direction by the College shall not constitute the basis for a claim for extra costs by the Contractor. The Contractor acknowledges that it had the opportunity to request clarification prior to submitting its price to the College and that it is not entitled to claim extra costs as a result of failure to request such clarification.

1.2.1.3. The College's Project Manager shall make recommendations regarding the amount, quality, acceptability and fitness of the several kinds of Work and materials which are to be paid for under this Contract and shall make recommendations regarding all questions which may arise in relation to the Work and the construction thereof. The College's decision, based on the College's Project Manager's recommendation, shall be final and conclusive, except as herein otherwise expressly provided. In case any question shall arise between the parties relative to the Contract Documents, the determination or decision of the College shall be a condition precedent to the right of the Contractor to receive payment for the Work under the Contract related to such questions.

1.2.1.4. In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the more restrictive condition in consideration of following priorities:

(1) The Request for Bid or Request for Proposal
(2) Any modifications to the Contract Documents executed after the date of the Contract, with the Modifications having the latest date having the greatest authority.
(3) The Contract.
(4) Supplementary Conditions.
(5) General Conditions.
(5) Drawings and Specifications.
(6) The Contractor's Proposal accepted by the College.

In the event of a conflict or discrepancy within the Specifications or the Drawings, or between the Drawings and the Specifications, the better quality or greater quantity of Work shall be provided in accordance with the College's interpretation.

1.2.1.5. The College's Project Manager and Architect/Engineer shall make recommendations to the College to clarify the meaning and intent of the Specifications and the Drawings where the same may be found unclear or be in dispute.

1.2.1.6. The Contractor is responsible for coordinating and completing the various parts of the Work. No part of the Work shall be left in an unfinished or incomplete condition because of a disagreement between the Contractor and Subcontractors, or between Subcontractors and the Contractor as to where the Work of one begins and ends in relation to the Work of the other. Any adjustments due to differences or conflicts which may arise between the Work of the Contractor under this Contract and the work of other contractors performing work for the College shall be determined by the College and the College's Project Manager.

1.2.1.7. Generally, the Specifications describe Work which cannot be readily indicated on the Drawings and indicate types, qualities and methods of installation of the various materials and

equipment required for the Work. The Specifications are not intended to mention every item of Work which can be adequately shown on the Drawings. The Drawings are not intended to show all items of Work described or required by the Specifications even if they are of such nature that they could have been shown thereon. All materials or labor for Work which are shown on the Drawings, or are reasonably inferable there from as being necessary to produce a finished Work, shall be provided by the Contractor whether or not the Work is also expressly covered in the Specifications.

1.2.2. Specification Format

1.2.2.1. The Specifications are separated into titled sections for convenience only and not to identify the trade or craft responsible to perform the Work. The titled section shall not operate to make the College an arbitrator for the division of responsibility between Contractor and its Subcontractors, and between its Subcontractors, nor shall such sections relieve the Contractor from the responsibility for the satisfactory completion of the entire Work regardless of the division.

1.2.2.2. The General Conditions are a part of each and every section of the Specifications.

1.2.2.3. The Specifications may be abbreviated and include incomplete sentences. Omissions of words or phrases such as "the Contractor shall", "shall be", etc., are intentional; nevertheless, the requirements of the Specifications are mandatory. Omitted words or phrases shall be supplied by inference in the same manner, as they are when a "note" occurs on the Drawings.

1.2.2.4. Words in the singular shall include the plural whenever applicable, or the context so indicates.

1.2.2.5. Where "as shown", "as indicated", "as detailed" or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where "as directed", "as required", "as permitted", "as authorized", "as approved", as accepted", "as selected", or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance or selection by the College is intended unless otherwise stated. As used herein, "provide" means "provided complete in place", that is, furnished and installed and ready for operation and/or use.

1.2.3. Standard Specifications

1.2.3.1. Any reference to standard specifications of any society, institute, association or governmental authority is a reference to the standard specifications of such organization and to their methods of installation of the various materials and equipment required for the Work which are in effect at the time prices are due. It is not intended to mention every item of work described or required by the standard specifications even if they are of such nature that they could have been shown thereon. All materials or labor for work which are inferable there from, as the Contractor shall provide being necessary to produce a finished job at the date of the Contractor's price. If such specifications are revised prior to completion of any part of the work to which such revision would pertain, the Contractor may, if acceptable to the College, perform such work in accordance with the revised specifications.

1.2.3.2. The standard specifications, except as modified in the Specifications for the Project, shall have full force and effect as though printed in the Specifications.

1.2.4. Ownership

1.2.4.1. The Drawings, Specifications and other documents prepared by the Architect/Engineer, are owned by the College. Copies thereof furnished to the Contractor, are for use solely with respect to this Project.

ARTICLE 2 – COLLEGE AND COLLEGE'S AGENTS

2.1. AUTHORITY OF COLLEGE'S PROJECT MANAGER

2.1.1. The College's Project Manager has the authority to perform all of the College's functions pertaining to the conduct and administration of the Work, except as indicated in 2.1.2.

2.1.2. Unless otherwise indicated in the Contract Documents, the College's Project Manager is NOT authorized to make determinations (as opposed to recommendations) that:

2.1.2.1. Alter or modify the Contract Documents;

2.1.2.2. Alter the Contract schedule;

2.1.2.3. Approve Contract change orders;

2.1.2.4. Terminate or cancel the Contracts.

2.1.3. Unless otherwise indicated in the Contract Documents, recommendations made by the College's Project Manager, pertaining to determinations listed in 2.1.2, are changes in the work that require review, approval and further authorizing action from the College as indicated in Article 6.

2.2. RESPONSIBILITIES OF THE COLLEGE'S PROJECT MANAGER

2.2.1. The College's Project Manager shall be an agent of the College to the extent set forth in the Contract Documents. Any non-College employee in such role shall not be deemed to be the employee of the College for any purpose in connection therewith. Subject to subsection 2.1.2, the College's Project Manager shall have full authority to act, or to cause others to act, on behalf of the College to assure that the Work is carried out in full compliance with the requirements of the Contract, and to otherwise generally protect the College's interests.

2.2.2. The College's Project Manager will determine in general that the Work of the Contractor is being performed in accordance with the Contract Documents, and will use his best efforts to guard the College against defects and deficiencies in the Work of the Contractor.

2.2.3. The College's Project Manager shall provide administrative management and related services as required to coordinate the Work of the Contractor and separate contractors with each other and with the activities of the Architect/Engineer to complete the Project in accordance with the College's objectives for cost, time and quality.

2.3. RESPONSIBILITIES OF THE COLLEGE DEPARTMENT OF ENVIRONMENTAL SAFETY

2.3.1. The Montgomery College Office of Facilities and Public Safety Department of Environmental Safety is responsible for promoting a safe and healthful work environment for the Project and for verifying the Contractor's compliance with Federal and State environmental protection regulations and College safety and health practices. To carry out these responsibilities, the Department of Environmental Safety is authorized to inspect the Project, all work done and being done, and all material to be furnished and being furnished. In the event that the Department learns of an unsafe condition, the Environmental Safety Manager is authorized to suspend work (after notice to the College Project Manager and the Office of Facilities Management) until the unsafe condition is cured by the Contractor. "Unsafe condition" means any practice that represents a significant risk of injury or health hazard to College employees, a significant adverse environmental impact, or a physical hazard which could result in damage to College property and/or the public. The authority of Department of Environmental Safety is in addition to any other rights of the College set forth herein.

2.4. RESPONSIBILITIES OF THE ARCHITECT/ENGINEER

2.4.1. Architect/Engineer's Status

2.4.1.1. The College may maintain staff personnel from the Office of Facilities and Public Safety, or as separate architectural and/or engineering services retained by the College, at the site of the Work for field observation and day-to-day monitoring of the Work.

2.4.1.2. The Architect/Engineer shall assist the College during the construction period and with the College's Project Manager shall observe the Work in process on behalf of the College. The Architect/Engineer will not be responsible for construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work. The Architect/Engineer shall have authority to act on behalf of the College only to the extent expressly provided in the Contract Documents or otherwise in writing.

2.4.1.3. With the College's Project Manager the Architect/Engineer may advise the College with respect to claims of the College or the Contractor, on matters relating to the execution and progress of the Work and on the interpretation of the Contract Documents.

2.4.1.4. Together with the College's Project Manager the Architect/Engineer shall certify applications for progress payments and final payment that the Contractor has complied with the requirements of the Contract Documents.

2.4.1.5. Together with the College's Project Manager the Architect/Engineer shall determine Contractor's achievement of Substantial Completion and Final Completion milestones, and issue relevant certificates, in accordance with the requirements of the Contract Documents.

2.5. COLLEGE'S RIGHT TO STOP OR SUSPEND WORK

2.5.1. Stopping of the Work

2.5.1.1. Subject to concurrence by the College, the College's Project Manager may stop all or part of the Contractor's Work, if in the opinion of the College's Project Manager the Contractor has performed Work not in conformance with the Contract Documents. The Work may be stopped until such time that the defective conditions have been corrected. All costs related to the stoppage of the Work shall be borne by the Contractor.

2.5.2. Suspension of the Work

2.5.2.1. The College unilaterally may order the Contractor in writing to suspend, delay or interrupt all or any part of the Work for a period of time as it may determine to be appropriate.

2.5.2.2. If the performance of all or any part of the Work is for an unreasonable period of time suspended, delayed or interrupted by an act or omission of the College in the administration of the Contract, an adjustment shall be made for any increase in the cost of performance of the Contract (excluding profit) necessarily caused by an unreasonable suspension, delay or interruption and the Contract modified in writing accordingly. No adjustment shall be made under this subsection for any suspension, delay or interruption to the extent (1) that performance would have been so suspended, delayed or interrupted by any other cause, including the fault or negligence of the Contractor; or (2) for which an equitable adjustment is provided for or excluded under any other provision in this Contract.

ARTICLE 3 – CONTRACTOR

3.1. RESPONSIBILITIES OF THE CONTRACTOR

3.1.1. The Contractor shall furnish all labor, materials, equipment, tools, construction equipment, machinery, plant, supplies, utilities, telephone, transportation, supervision, temporary construction, permits, insurance, taxes, bonds, contributions and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work, as described in the Contract Documents.

3.1.2. Montgomery County or City of Rockville Complex Structures processes may apply to the Project. When applicable, Contractor shall fulfill any necessary obligations related to that process.

3.2. CONTRACTOR'S ADMINISTRATION AND SUPERVISION OF THE WORK

3.2.1. Staff

3.2.1.1. The Contractor shall furnish a competent, qualified and adequate staff as necessary to administer coordinate, supervise and superintend the Work; to organize the procurement of all materials and equipment so that they will be available at the time they are needed for the Work; and to keep an adequate force of skilled workers on the job to complete the Work in accordance with all requirements of the Contract Documents and to the entire satisfaction of the College's Project Manager. Key members of the staff shall not be changed without the consent of the College's Project Manager.

3.2.1.2. Prior to commencement of the Work, the Contractor shall select a project representative who will have full responsibility for the prosecution of the Work, with full authority to act in all matters as necessary for the proper coordination, direction and technical administration of the Work and who shall attend meetings at such place or places as determined by the College's Project Manager in order to render reports on the progress of the Work.

3.2.2. Supervision

3.2.2.1. The Contractor shall efficiently supervise the Work, using its best skill and attention. It shall carefully study and compare all drawings, specifications and other instructions and shall at once report to the College's Project Manager any error or omission which it may discover, and shall subsequently proceed with the Work in accordance with instructions from the College's Project Manager concerning such error or omission.

3.2.2.2. The Contractor shall assign to the Project throughout its duration a well-qualified, competent superintendent and any necessary assistants, all of whom must be satisfactory to the College's Project Manager. The superintendent shall represent the Contractor in its absence and all directions given to him shall be as binding as if given to the Contractor. Important directions shall be confirmed in writing to the Contractor. Other directions shall be so confirmed on written request in each case.

3.2.2.3. The College's Project Manager shall not supervise the Work. The means, methods, techniques, sequences, procedures and safety measures utilized in the performance of the Work are the sole responsibility of the Contractor, subject to overall coordination of the College's Project Manager. Any means, method, techniques, sequences or procedures set forth in the Contract Documents are solely to specify the desired end product; and if the means, methods, techniques, sequences or procedures will not result in the desired end product or is unsafe or illegal because of some inherent defect in the Specifications or the particular conditions under which the Work is being performed, it is the Contractor's responsibility to select a correct means, method, technique, sequence or procedure. Nothing in the College's Project Manager's review of the general quality and progress of the Work, including acceptance of submittals and Work, shall be construed as the assumption of authority or supervision over the performance of the Work, or relieves the Contractor from its obligation to comply with the requirements of the Contract Documents.

3.2.3 Subcontracts

3.2.3.1. The Contractor shall, prior to the execution of the Contract, notify the College in writing of the names of Subcontractors, if any, proposed for the principal parts of the Work and for such other parts of the Work as the College's Project Manager may direct. The Contractor shall not employ any Subcontractor that the College may, within a reasonable time, object to for any reason.

3.2.3.2. The Contractor is as fully responsible to the College for the performance, management, acts and omissions of its Subcontractors and of persons either directly or indirectly employed by them, as it is for the performance, management, acts and omissions of persons directly employed by it.

3.2.3.3. Nothing contained in the Contract Documents shall create any contractual obligation between any Subcontractor and the College.

3.2.3.4. The Contractor agrees to bind every Subcontractor, and every Subcontractor agrees to be bound by the terms of the Contract, the Drawings and the Specifications as far as applicable to its Work, including the following provisions, unless specifically noted to the contrary in a subcontract approved in writing as adequate by the College.

3.2.3.5. The Subcontractor agrees:
(1) To be bound to the Contractor by the terms of the Contract, the Drawings and the Specifications, and to assume toward the Contractor all the obligations and responsibilities that it, by those documents, assumes toward the College.
(2) To submit to the Contractor applications for payment in such reasonable time as to enable the Contractor to apply for payment.

3.2.3.6. The Contractor agrees to place in its subcontracts with Subcontractors:
(1) To be bound to the Subcontractor by all the obligations that the College assumes to the Contractor under the Contract, the Drawings and the Specifications, and by all the provisions thereof affording remedies and redress to the Contractor from the College.
(2) To pay the Subcontractor, upon the payment of certificates, if listed in the Schedule of Values the amount allowed to the Contractor on account of the Subcontractor's Work to the extent of the Subcontractor's interest therein.
(3) To make no demand for liquidated damages for delay in any sum in excess of such amount as may be specifically named in the subcontract.
(4) That no claims for services rendered or materials furnished by the Contractor to the Subcontractor shall be valid unless written notice thereof is given by the Contractor to the Subcontractor during the first ten days of the calendar month following that in which the claim originated.
(5) To give to the Subcontractor an opportunity to be present and to submit evidence in any decision involving its rights.

3.2.4. Behavior of Contractor's Employees, Agents and Subcontractors

3.2.4.1. The College is committed to providing a work and study environment that is free from discrimination and harassment on the basis of race, color, religious creed, ancestry, national origin, age, sex, marital status, handicap, pregnancy or status as a disabled veteran or veteran of the Vietnam Era. Behavior contrary to this philosophy, which has the purpose or effect of creating an intimidating, hostile, or offensive environment, will not be tolerated by the College, and it is the Contractor's responsibility to ensure that such behavior by its employees, agents and Subcontractors does not occur.

3.2.4.2. This policy extends to maintaining an environment free from sexual harassment. Therefore, sexual advances, sexual remarks, requests for sexual favors, and other verbal or physical conduct of a sexual nature must not be condoned or permitted by the Contractor. This prohibition extends

to such harassment within the employment context as well as harassment of students, staff and visitors of the College. It should be assumed that all sexual behaviors by the Contractor's employees, agents or subcontractors on any campus or facility of the College, whether owned, operated, maintained or leased by the College, is improper and unwelcome.

3.2.4.3. Montgomery College is a tobacco free institution. Use of tobacco products is prohibited in all indoor and outdoor College-owned facilities and facilities leased and controlled by the College as well as at meetings or conferences sponsored by the College. This use prohibition extends to Contractors' employees, agents, subcontractors and vendors.

3.3. MATERIALS, LABOR, EQUIPMENT AND PROCESSES

3.3.1. Proposals

3.3.1.1. Proposals shall be based upon the materials, equipment or processes specifically named, implied in or reasonably inferable from the Contract Documents.

3.3.1.2. In cases where Work is to be performed in an existing building, proposals shall be based on Contractor's review of existing conditions by means including but not limited to: site inspection and review of existing College documentation, if any, including data from the Environmental Safety Office. Failure or omission of the Contractor to inspect the site and examine available documents shall in no way relieve the Contractor from obligations with respect to its price, nor constitute grounds for a subsequent claim.

3.3.1.3. Certain Project proposals shall be based on Prevailing Wage Rate schedule provided by and the reporting requirements of the State of Maryland's Department of Labor, Licensing and Regulation (DLLR). If guidance regarding applicability of Prevailing Wage Rates is not otherwise included in the Contract Documents, Contractor shall request a determination of applicability from the College prior to submitting a proposal.

3.3.2. Labor, Materials and Equipment

3.3.2.1. The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract.

3.3.2.2. The Contractor shall furnish sufficient forces to ensure the prosecution of the Work within the time stated in the Contract.

3.3.2.3. The Contractor shall comply with the provisions of Sections 17208 entitled Prevailing Wage Rates, when applicable, and 17301 through and including 17306 of the State Finance and Procurement Article of the Annotated Code of Maryland (as amended from time to time) entitled "Steel Procurement for Public Works."

3.3.2.4. Unless otherwise specified, all materials and equipment to be permanently installed in the Work shall be new and shall be of such quality as required to satisfy the standards of the Contract Documents. The Contractor shall, if required, furnish satisfactory evidence as to kind and quality of all materials and equipment.

3.3.2.5. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. All labor shall be performed by workers skilled in their respective trades, and Work produced shall be of good quality so that first class Work in accordance with the standards of construction set forth in the Contract Documents will result.

3.3.3. Use of Named Materials

3.3.3.1. Where materials are specified by a name, or several names are specified, without the words 'or equal' following such name(s) the Contractor shall use and/or supply the named material that meets all the requirements of the Specifications.

3.3.4. Use of Equivalent Materials

3.3.4.1. Where the words ‘or equal’ are included, at the Contractor's sole risk, the Contractor may submit a material it considers to be equal in quality, capacity, size, or other determining criteria. The burden of submitting adequate information to the College to prove equality of materials shall be the responsibility of the Contractor. A direct comparison of features and fit with the specified item must be included. Whether an equal or specified product is proposed, all of the units of a given type required for and used in the Work must be the same in material and manufacture. The decision of the College with regard to quality of materials shall be final. The College may reject a proposed equal without cause and the Contractor shall not be entitled to additional compensation.

3.3.5. Substitutions

3.3.5.1. Substitutions requests will be considered only under the following circumstances:
(1) When the specified product is not available; or
(2) When, if a certain product or process is specified and a guarantee of performance is required and, in the judgment of the Contractor, the specified product or process will not produce the desired results; or
(3) When a substitution, in the opinion of the College is in its best interest.

3.3.5.2. Requests for substitutions of products, materials or processes other than those specified shall be submitted in writing to the College’s Project Manager and be accompanied by evidence that the proposed substitution: (1) is equal in quality and service-ability to the specified item; (2) will not entail changes in details and construction of related work; and (3) will be acceptable in consideration of the required design and artistic effect. The Contractor will furnish with its request such drawings, specifications, samples, performance data and other information as may be required of it to assist the College in determining whether the proposed substitution is acceptable. A direct comparison of features and fit with the specified item must be included. The substitution request shall state the credit or extra, if any, involved with the use of such material. The burden of proof shall be upon the Contractor.

3.3.5.3. Regardless of the evidence submitted or any review or independent investigation by the College, a request for a substitution of products, materials or processes is a warranty by the Contractor to the College that (1) the requested substitution is equal in quality and serviceability to the specific item; (2) will not entail changes in details and construction of related work; (3) will be acceptable in consideration of the required design and artistic effect; (4) will not involve any additional cost to the College other than that specified in an accompanying request for a change order; and (5) the Contractor will provide the same or better warranty for the substitution that the Contractor would for that specified.

3.3.5.4. The College’s acceptance of a substitution does not relieve the Contractor of responsibility for any unforeseen consequences and/or costs associated with the substitution.

3.3.5.5. The College may reject a proposed substitution without cause.

3.3.6. Required List of Materials and Equipment

3.3.6.1. Unless otherwise indicated in the Contract Documents, the Contractor shall submit to the College’s Project Manager a comprehensive list of the manufacturer's products proposed for this

Work as soon as practicable and within thirty (30) calendar days after receipt of notice to proceed. The list shall include information on materials, equipment and fixtures as may be required for the College's Project Manager's preliminary review; partial lists will not be considered. Acceptance of this list of products shall not be construed as a substitute for the shop drawings, manufacturer's descriptive data and samples which are required by the Contract Documents, but rather as a base from which more detailed submittals shall be developed for the College's final review.

3.3.7. Tariffs

The Contractor's Contract Sum shall be presumed to include all tariffs levied on materials, supplies, equipment or other property incorporated into or used on the Project, whether the tariff is imposed before or after the Contract is signed.

3.4. WARRANTY/GUARANTEES

3.4.1. Except to the extent that the Contract Documents impose greater warranty obligations on the Contractor for all or any part of the Work, the Contractor warrants:

3.4.1.1. That the materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents;

3.4.1.2. That the Work contains no faulty or imperfect material or equipment or any imperfect, careless or unskilled workmanship;

3.4.1.3. That all mechanical and electrical equipment, machines, devices, etc., shall be adequate for the use to which they are intended and shall operate with ordinary care and attention in a satisfactory and efficient manner; and

3.4.1.4. That the entire Work shall be watertight and leak proof in every particular.

3.4.1.5. Unless otherwise indicated in the Contract Documents, for a period of one year commencing on the date of Substantial Completion or such other date agreed upon, the Contractor shall schedule, manage and monitor all warranty call-backs requested by the College and re-execute, correct, repair, or remove and replace with proper Work, without cost to the College, any Work found not to be as guaranteed by this section or otherwise not in conformity with the Contract and that it will make good all damages or cost to other Work or materials in the process of complying with this section in accordance with Article 10, Correction of Work. The Contractor shall pay for tests and inspections made necessary by faulty Work. The correction period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation shall survive Final Completion of the Work under the Contract and the Contract Close Out.

3.4.2. Nothing contained in Subsection 3.4.1.5 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of time period of one year as described in Subsection 3.4.1.5 relates only to the specific obligation of the Contractor to correct the Work and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

3.4.3. The Contractor shall cause to be assigned to the College all warranties/guarantees furnished by manufacturers and suppliers of equipment and supplies for the Work. The assignment shall not affect Contractor's warranty obligations to the College.

3.5. TAXES

3.5.1. The College is not exempt from payment of Maryland State Sales Tax and Municipal Occupation (Sales) and/or Use Taxes on materials purchased for this Work.

3.5.2. The Contractor and Subcontractors shall pay sales, consumer, use, unemployment, old age pension and/or other taxes imposed by local, state and/or the Federal government, except taxes and assessments on the real property comprising the Work site. The Contractor is to include such expenses in its proposal.

3.6. PERMITS AND LICENSES

3.6.1. The College will file for the building permit, if one is necessary, with the local authority. The Contractor shall obtain and pay for any and all permits (other than the building permit), and for all licenses and certificates of inspection necessary for the execution and completion of the Work as called for in the Contract Documents. The Contractor will be required to pay all necessary fees to local authorities for permits and inspections and it shall include the cost of the fees in its base price. The College shall not be responsible for the actions or interpretations of county, municipal or other local agencies or officials with respect to the application of Federal, State or local laws, rules, ordinances, regulations, codes or policies to the Work.

3.6.2. The Contractor must be licensed as required by Title XVII, Subtitle VI or Title VIII of the Business Regulation Article, Annotated Code of Maryland.

3.7. PROSECUTION AND PROGRESS OF THE WORK

3.7.1. Notice to Proceed

3.7.1.1. After the Contract has been executed, the College's Project Manager will issue to the Contractor a "Notice to Proceed" and this notice will stipulate the date on or before which the Contractor is expected to begin Work. The specified Contract time shall begin on the starting date stated in the "Notice to Proceed." Any Work started or materials ordered before the starting date stated in the "Notice to Proceed" shall be at the risk of the Contractor.

3.7.1.2. Notice to Proceed will not be issued until the College receives from the Contractor performance, labor and material payment bonds, insurance certificates and other documents which are required by the Contract. The Contractor is prohibited from performing any Work on the site until proof of the insurance required by the Contract is provided to the College.

3.7.2. Hours of Work

3.7.2.1. The Work shall be performed during regular working hours except in the event of emergency, or when required to complete the Work within the time stated in the Contract. What constitutes regular working hours will be agreed upon at the preconstruction conference.

3.7.2.2. The Work shall be suspended on the College's Commencement Day (typically the third Friday in May) unless otherwise agreed to by the College.

3.7.2.3. The Work may be performed on night shifts, overtime, Sundays and holidays when permission to do so has been obtained from the College, at no additional cost to the College, and provided that Contractor complies with any additional regulations regarding off-hours work mandated by regulatory authorities.

3.7.3. Construction Schedule

3.7.3.1. Time

(1) All time limits in the Contract Documents are of the essence of the Contract.

Contractor and the College agree that the time stated in the Contract for the completion of the Work is a reasonable time, considering the usual climatic range and the usual business conditions prevailing in the locality of the Project. The Contract time shall be the full time allowed or required for completion of every task involved in completion of the Work, including lead-time for ordering and fabrication of equipment and materials.

(2) The College is not obligated (a) to accept an early completion schedule from the Contractor, or (b) to accept the Project prior to the completion date stated in the Contract. The College will not be liable for any claims based on the Contractor's assertion of an intention to finish early.

3.7.3.2. Preliminary Schedule

(1) The Contractor shall agree to comply with the Preliminary Project Schedule prepared by the College and included in the Contract Documents or with the Contractor's Proposed Project Schedule, if one was required as part of the Contractor's proposal submission. Agreement by the Contractor to comply with the Preliminary Project Schedule or Contractor's Proposed Project Schedule also means agreement by the Contractor to comply with subsequent reasonable updates prepared or requested by the College.

(2) Within 14 days of the execution of the Contract, Contractor must submit for approval, Preliminary Schedule information outlining all activities for the Contractor's work as may be reasonably requested by the College's Project Manager. Coordinate schedule information with milestones indicated in the Preliminary Project Schedule. This preliminary information must be approved prior to the first Application for Payment being processed. Include each significant construction activity, coordinate each activity with other activities and schedule each construction activity in proper sequence. The College's Project Manager may decline to issue a Notice to Proceed until Contractor has submitted the required schedule information and it is approved by the College's Project Manager. Nothing in this section shall be construed to require the College's Project Manager to issue a Notice to Proceed when the required schedule information has been submitted and approved.

(3) With submission of the preliminary schedule information, include a listing by date of submission of all submittals required. Identify those required to maintain orderly progress of the Work, and those required early because of long lead time for manufacture or fabrication.

3.7.3.3. Completion Schedule

(1) Within 30 days after Contract execution and at such other times as required by subsections 3.7.3.4 and 3.7.3.8, the Contractor shall submit for approval, updated schedule information indicating the time allocated by the Contractor for the performance of each portion of the Work and the submittal information required by subsection 3.7.3.2 (3), properly and reasonably sequenced for achieving each task shown on the schedule. Coordinate schedule with milestones indicated in the Preliminary Project Schedule.

(2) The Contractor's construction schedule shall begin with the date of issuance of Notice to Proceed and conclude with the required date of final completion of the project as stated in the Contract Documents. Float or slack time available in the schedule at any time shall not be for the exclusive use or benefit of either the Contractor or the College, but is jointly owned.

(3) The Contractor's schedule information shall include a complete itemized breakdown of the Work, listed by activity or event number, including items related to the General Conditions, all necessary dates for submittal, review and response, and re-submittal (if necessary), and for each activity shall show at a minimum: (1) a sequence of operations; (2) the dates of commencement and completion of each item of the Work; and (3) delivery for material and equipment. Unless otherwise indicated in the

Contract Documents or agreed upon by the College's Project Manager the duration of each activity shall be twenty-one calendar days or less.

(4) Contractor shall submit with each Application for Payment revised schedule information accurately updated to reflect all: (1) revisions to the schedule (2) changes made or planned in the construction sequence; (3) actual construction activities to date including (i) commencement and completion dates for activities started or completed during the reporting period; and (ii) current progress of activities started in prior reporting periods including completion dates for activities completed during the reporting period; (4) delays and their effects on the critical path; (5) extensions of time granted by the College and (6) the Contractor's planned schedule or recovery schedule for completing remaining activities. This required schedule information update shall be furnished monthly whether or not Contractor submits an application for payment in that month.

(5) In the event that there are change orders, they shall be reflected as new activities, or as changes in logic and/or time framing of existing activities. They shall be introduced at the next updating after receipt of a change order, and shall be subject to the approval of the College's Project Manager. Change order logic shall affect only those intermediate activities and performance dates directly concerned. Adjustments required in completion dates for those intermediate dates, or for the Contract as a whole, will be considered only to the extent that there is not sufficient remaining float to absorb the additional time which may be authorized for completion of individual activities.

(6) Whenever the Project shall be behind schedule or alleged by either party to be behind schedule, the College may require the Contractor to furnish, at no additional cost to the College revised schedule information (hereinafter called a "recovery schedule") showing how the Contractor will finish their work by the Contract completion date.

(7) All of Contractor's schedule information, including monthly schedule information updates and any recovery schedule information required shall be subject to review and approval by the College's Project Manager.

(8) The Contractor shall cooperate with the College's Project Manager in scheduling and performing the Contractor's Work to avoid conflict, delay in or interference with the Work of other contractors or the construction or operation of College's own forces. The Contractor shall participate with other contractors and the College's Project Manager and College in reviewing schedules when directed to do so. The Contractor shall make any revisions to their construction schedule information deemed necessary after a joint review.

(9) Approval by the College's Project Manager of any schedule information submitted shall constitute approval of the schedule information only for general conformity with Contract requirements and shall not constitute approval, acceptance or admission of the reasonableness, accuracy, achievability, or feasibility of the schedule information or of the Contractor's ability to meet the schedule, or waiver or excuse of default or delay by the Contractor, extension of the time for completion, waiver or modification of Contract requirements, admission of fault or responsibility for delay on the part of the College or acceptance or admission on the part of the College of any liability or responsibility for the schedule or for acceleration or other costs or delay damages of the Contractor which are inferable from the Contractor's schedule information or update.

(10) The College is not obligated to pay the Contractor for Work completed until proper, accurate schedule information, and updates are furnished as required and it is not liable for and Contractor is not entitled to damages, compensation, or time extensions for delays starting, occurring or continuing during the period when an accurate and reasonable schedule information or update was due but not furnished by the Contractor.

3.7.3.4. All schedule information, including initial schedule information, recovery schedule information and monthly updates, shall be submitted in three (3) paper copies and one (1) electronic copy in Portable Document Format (PDF), unless otherwise indicated.

3.7.4. Progress Meetings

3.7.4.1. Contractor shall plan and participate in routine Project progress meetings to brief College's Project Manager and Architect/Engineer on the status of the Project. Frequency of meetings shall be determined at a preconstruction conference, but shall typically occur not less than every two weeks. Primary agenda topics shall include reporting status of: Regulatory Approvals, Submittals, RFIs, Commissioning, Safety, Security and Housekeeping, Schedule, Contracts/Finance and Close-Out. Unless otherwise indicated in the Contract Documents, record meeting minutes will be prepared by the Contractor.

3.7.4.2. Contractor shall provide reasonable advance notice to the College's Project Manager and Architect/Engineer regarding scheduling of pre-construction and pre-installation conferences with subcontractors. At a minimum, Contractor should anticipate College's participation in conferences related to underground work, demolition work, primary structural work, all building enclosure work, MEP and telecommunications, AV and security systems work.

3.7.5. Progress Meeting Documentation and Reports

3.7.5.1. Contractor shall prepare, maintain, monitor and make available to the College, reasonable Project progress documentation including, but not limited to:

(1) Contractor's Daily Reports: listing weather conditions, trades on site, manpower, brief description of activities underway, quality control issues raised, commissioning activities underway and any safety or security issues encountered. Append Daily Reports from Subcontractors to the Contractor's Daily Report.
(2) Minutes from Pre-Construction and Pre-Installation conferences.
(3) Minutes from Contractor's Subcontractor and/or Foreman's meetings: including agenda topics, brief summary of issues discussed resolutions discussed and issues requiring attention.
(4) Inspection reports provided by Independent Testing Agencies and/or Laboratories, when applicable.
(5) Inspection reports provided by any authorities having jurisdiction on the Project.

3.8. REFERENCE DOCUMENTS FOR THE WORK

3.8.1. Conformance Documents

3.8.1.1. The College may issue conformance documents, incorporating all Addenda issued during the bid/proposal period into the Contract Documents, for the Contractor's convenience at the start of Work. It is the Contractor's sole responsibility to verify the accuracy of the conformance documents. At the Contractor's election, conformance documents may serve as the basis for Progress Documents. Use of such documentation shall not in any way relieve the Contractor from its responsibility to perform the Work in accordance with the Contract Documents. In the event of a discrepancy between the conformance documents and the Contract Documents, the Contract Documents shall govern.

3.8.2. Progress Documents

3.8.2.1. The Contractor shall keep one complete set of all Drawings, Specifications, Construction Progress Schedule, and shop drawings at the job-site current and in good order. As the Work progresses, the Contractor shall keep a complete and accurate record of all changes or deviations from the Contract Documents, indicating the Work as actually installed. All underground utility locations associated with the scope of work, or revealed during the conduct of the work, shall be recorded by the Contractor's surveyor and referenced to a campus benchmark provided by the

College. All such changes shall be neatly and correctly shown on black line prints of the drawings affected, or in the Specifications, with appropriate supplementary notes. This record set of prints of Drawings, shop drawings and Specifications shall be kept at the job site for inspection by the College's Project Manager and Architect/Engineer.

3.8.3. Record Documents

3.8.3.1. At the completion of the Work, the Contractor shall certify by endorsement thereof, that each of the revised prints of the Drawings and Specifications is complete and accurate. Prior to the Contractor's Application for Final Payment, and as a condition to its approval by the College, the Contractor shall assemble its record drawings and specifications, review them for completeness and submit them to the College's Project Manager. The Contractor shall provide suitable transfer cases and deliver the records therein, indexed and marked for each division of the Work.

3.8.3.2. No review or receipt of such records by the College's Project Manager shall be a waiver of any deviation from the Contract Documents or the Shop Drawings or in any way relieve the Contractor from its responsibility to perform the Work in accordance with the Contract Documents and the Shop Drawings to the extent they are in accordance with the Contract Documents.

3.9. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

3.9.1. After checking and verifying all field measurements and after complying with applicable procedures specified in the Contract Documents, Contractor shall submit to the College's Project Manager and Architect/Engineer, in accordance with the Contractor's schedule, Shop Drawings and other submittals which will bear a stamp or specific written indication that the Contractor has satisfied its responsibility under the Contract Documents with respect to the review of such submissions. The data on the Shop Drawings or submittal must be complete with respect to quantities, dimensions, specified performance and/or design criteria, materials and similar data to enable the Architect/Engineer to review the information as required. These documents shall be prepared in conformity with the best practice and standards for the trade concerned. Due regard shall be given to speed and economy of fabrication and erection.

3.9.2. Obtaining electronic documentation to aid in the preparation of Shop Drawings and submittals shall be the sole responsibility of the Contractor and may be subject to certain terms and conditions required by the Architect/Engineer and/or College. The College cannot guarantee that electronic documentation prepared by the Architect/Engineer will be made available to the Contractor. If provided, Contractor shall not be entitled to rely on such documentation for accuracy and use of such documentation shall not in any way relieve the Contractor from its responsibility to perform the Work in accordance with the Contract Documents.

3.9.3. The Contractor shall prepare and routinely update a submittal log indicating the status of submittals.

3.9.4. Unless otherwise indicated in the Contract Documents or agreed to by the College in writing, the Contractor shall send the College one copy of all Shop Drawings and product data coincident with the initial and any subsequent submissions to the Architect/Engineer. The College will forward any comments it desires to make to the Architect/Engineer within the designated review time.

3.9.5. In addition to the items noted in the Specifications as requiring Shop Drawings or other details, Shop Drawings and details shall be required for all items which are specifically fabricated for the Work or when the assembly of several items is required for a working unit.

3.9.6. The College's Project Manager and Architect/Engineer will examine the Shop Drawings and product data submittals with reasonable promptness. The College's Project Manager and Architect/Engineer will note whether they are approved, approved with corrections and/or conditions, or rejected. The Architect/Engineer will return the Shop Drawings and project data submittals with the final action to the

Contractor and also provide one copy each to the College and College's Project Manager.

3.9.7. The Contractor must allow the Architect/Engineer, College's Project Manager at least fourteen calendar days following receipt of each submittal or re-submittal of Shop Drawings and product data submittals to review the documents and respond to the Contractor. Items requiring longer than fourteen calendar days of review time will be identified in the Specifications. The minimum time allowed for the Architect/Engineer, College's Project Manager to review the submittal shall be increased to the extent that additional time for review is needed due to the fault or the responsibility of the Contractor or its Subcontractors and suppliers. The Contractor will be notified of the cause of the delay and advised of how long it will take to complete the review; provided, however, that mere failure to give the Contractor such notice shall not entitle the Contractor to compensation or a time extension.

3.9.8. When the Architect/Engineer, College's Project Manager or the College desires corrections, or rejects the Shop Drawings, the Contractor shall resubmit the Shop Drawings with the required corrections in a timely manner.

3.9.9. Unless the Contractor has, in writing, at the time of the submissions, expressly notified the Architect/Engineer, College's Project Manager and the College to the contrary, the College and the Architect/Engineer may assume that Shop Drawings and other submittals from the Contractor are in conformity with the Contract Documents and do not involve any change in the Contract price, or any change which will alter the space within the structure, or alter the nature of the building or Work from that contemplated by the Contract Documents, or constitute a substitution of material or equipment or a change in the Contract or the scope of Work. If the Contractor fails to give notice strictly in accordance with this subsection, approval of any Shop Drawing or submittal shall not be binding on the College.

3.9.10. The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, product data, samples and similar submittals until the respective submittal has been approved by the Architect/Engineer. Such Work shall be in accordance with accepted submittals. Work performed without approval shall be at the Contractor's risk.

3.9.11. Shop Drawings, product data, samples and similar submittals shall be marked, tagged, or otherwise properly identified with the name of the Contractor, the name of the Project, the purpose for which the samples are submitted, and the date and shall be accompanied by a letter of transmittal containing similar information, together with the Specification section number for identification of each item. Each tag or sticker shall have clear space for the stamps of the Contractor, College's Project Manager and the Architect/Engineer.

3.9.12. Samples of materials which are generally furnished in containers bearing the manufacturers' descriptive labels and printed application instructions shall, if not submitted in the standard containers, be supplied with such labels and application standards.

3.9.13. Should the Contractor consider any rejection or notation on the Shop Drawings or other submittals by the College's Project Manager or Architect/Engineer or any other action or inaction of the College's Project Manager or the Architect/Engineer to cause a change in the scope of the Work from that required by the Contract Documents, whether or not such change may affect contract price or time, then the Contractor shall desist from further action relative to the item in question and shall in writing (1) immediately notify the Architect/Engineer, the College and College's Project Manager requesting clarification; and (2) furnish them, within seven (7) days, with a notice explaining the nature of the change and whether increased or decreased cost and/or time is anticipated. No Work concerning the Shop Drawing or other submittal in question shall be executed until the entire matter is clarified and the Contractor is ordered by the College to proceed. Failure of the Contractor to serve written notice as required above shall constitute a waiver of any claim in relation thereto.

3.10. SITE INFORMATION, ACCESS, USE AND RESTRICTIONS

3.10.1. Site Information

3.10.1.1. Contractor shall review existing conditions and related College record information to become completely familiar with site and adjacent conditions. Contractor shall make arrangements to review available documentation and undertake explanatory site visits with College's Project Manager and Campus Facilities Office.

3.10.2. Campus Coordination Requirements

3.10.2.1. Contractor shall furnish a Site Mobilization Plan to the College's Project Manager for review and approval prior to the start of Work. Plan shall indicate features including proposed construction delivery route, materials and trash storage areas, site office and toilet facility locations, fencing, erosion control measures, tree and plant protection, temporary lighting, temporary traffic control measures and signage.

3.10.2.2. Contractor shall meet with Campus Facilities and Security Offices prior to the start of Work to review Contractor's proposed Site Mobilization Plan, and to coordinate Project needs with Campus Operations and Maintenance, House and Grounds-keeping and Security operations.

3.10.2.3. In the event that Contractor's operations affect or disrupt campus access roads and/or building entrances or exits, Contractor shall coordinate maintaining or re-directing access in accordance with the Contract Documents and following the direction and policies of the Campus Security Office and any affected emergency service providers.

3.10.2.4. Contractor shall meet with College's Environmental Safety Office prior to the start of Work for projects where Hazardous Materials Abatement or use of Hazardous or Toxic Substances is expected.

3.10.2.5. Any Utility shut down required must be scheduled with relevant utility Owner and Campus Facilities at least 5 days in advance.

3.10.2.6. Unless otherwise indicated in the Contract Documents, vehicular and pedestrian access to properties shall be maintained operational to the maximum possible extent. Driveways to private properties shall not be blocked. Sidewalks and crossings shall be kept open for the passage of pedestrians. Streets shall not be unnecessarily obstructed and, unless the College shall authorize the complete closing of a street, the Contractor shall take such measures as may be necessary to keep the street open for traffic. The Contractor shall provide and maintain suitable and sufficient provisions, including but not limited to flag persons, barricades, warning signs and detour signs, necessary for the protection of the work and safety of the public. All barricades, obstructions and signage shall be illuminated from sunset to sunrise, daily.

3.10.2.7. Parking at all campus locations is limited. Other than one or two spaces for supervisory personnel, parking space for construction site personnel in campus parking lots should not be anticipated. For Projects where Work is confined within a site construction fence, Contractor may provide limited parking for construction personnel within that fenced area as long as parking does not impede progress of the Work or impede access by emergency or campus service vehicles.

3.10.3. Coordination where Work is in or adjacent to an Occupied Existing Building

3.10.3.1. In cases where Work is scheduled to take place in or adjacent to occupied existing buildings, Contractor shall coordinate the Work as reasonably directed by the College's Project Manager to reduce impact of construction operations on building occupants.

3.10.3.2. Noise that disrupts classes cannot generally be tolerated. The Contractor shall notify the College's Project Manager before starting any Work which might disrupt classes. Notification shall be given well in advance of any such situation in order that the Contractor and College's Project Manager
together can reach a mutually agreeable time in which the Work can be accomplished. Noise of a brief/infrequent nature may not be found necessary to reschedule. Always contact the College's Project Manager if in doubt. Any rescheduling required due to noise aversion will not be a cause for either a delay or cost claim.

3.10.3.3. When requested, Contractor shall provide a detailed adjacent Work coordination plan indicating information including schedule of activities, limits of disturbance, sequence of construction, access points and their management, barriers, interface with controls such as fire alarm, security or building automation systems operation, for areas that directly interface with or are affected by the Work.

3.10.4. Temporary Facilities

Unless otherwise indicated in the Contract Documents:

3.10.4.1. The Contractor shall be responsible for arranging with the College's Project Manager for general services and temporary facilities as required for the proper and expeditious prosecution of the Work; including but not limited to: use of toilets; temporary storage; temporary electrical power; and temporary water.

3.10.4.2. The Contractor shall, at its own expense, make all temporary connections to utilities and services in locations acceptable to the College's Project Manager and local authorities having jurisdiction thereof; furnish all necessary labor and materials, and make all installations in a manner subject to the acceptance of such authorities and the College's Project Manager; separately meter and pay for utilities (electricity, water, sewer, and telephone) consumed; maintain such connections; remove the temporary installation and connections when no longer required; restore the services and sources of supply to proper operating conditions.

3.10.4.3. The Contractor shall supply and maintain an office trailer or shed and a telephone, telefax, and/or computer on the site for the purpose of facilitating construction coordination and communication.

3.10.4.4. At the completion of the Work, Contractor's onsite facilities shall be removed, and the site restored to conditions that meet or exceed those existing at the start of Work.

3.10.5. Existing Utilities

3.10.5.1. The attention of the Contractor is directed to the likely presence of existing underground utilities and overhead utilities and poles located within the Work site. The Contractor is cautioned that some utilities may not be catalogued on College or utility service provider record documents. Further, due to depth and/or types of materials used, some utilities may not be identifiable using traditional utility service locating methods.

3.10.5.2. Where any underground services are expected to be encountered during construction, prior to the start of work, the Contractor shall:

(1) Review College record documents pertaining to affected underground services.
(2) Interview Campus Facilities office with regard to affected underground services.
(3) Call "Miss Utility" at least 48 hours in advance of construction for marking of public utilities.
(4) Be responsible for costs and coordination of utility locator services necessary to locate and mark any private utility services within the Work site, whether or not indicated on record or Contract Documents.

(5) Notify the College's Project Manager, Campus Facilities office, electric utility company, natural gas supplier, providers of communications, and any affected utility or other organization with a right-of way in or immediately adjacent to the Work area at least one week prior to starting work in the areas in which services are located and cooperate with any organization who elects to have a representative present during the conduct of the Work.

3.10.5.3. The Contractor shall exercise special care not to damage or disturb the utility infrastructure in any way.

3.10.5.4. The Contractor shall carefully hand dig representative test pits across the full width of anticipated trenches to confirm utility locations and to reveal any unknown utility conditions for assessment prior to permitting use of mechanical excavation equipment.

3.10.5.5. All underground utility locations associated with the scope of Work, or revealed during the conduct of the Work, including the location, size and material of all water, sanitary sewer, storm sewer, gas, electric, telephone, data, fiber, cable television, duct banks, steam and chilled water utilities within the project area, shall be recorded by the Contractor's surveyor and referenced to a campus benchmark provided by the College, which is in Maryland State Plane NAD83(NSRS2007) horizontal datum; NAVD88 vertical datum.

Indicate rim and invert elevation of sanitary sewers, storm sewers and storm water management structures. For all sub-surface utility lines on the site, locate the first connection to the off-site system. The horizontal and vertical location of all subsurface utilities must be measured directly prior to backfill. Locations shall be recorded on project progress documents. Electronic record documentation, in AutoCAD format, is required at project close-out.

3.10.5.6. Contractor shall maintain utility paint marks and flags, showing utility location and depth, until work is complete and survey information is transferred to project progress documents.

3.10.5.7. Contractor shall notify the College's Project Manager and Campus Facilities Office when underground utilities are discovered that are not identified by prevailing industry standard marking methods (e.g. color-coded tape and trace wires for non-metallic utilities). Campus Facilities Office will coordinate proper marking of utilities prior to Contractor's completion of the Work.

3.10.5.8. In the event that utility service is damaged during the conduct of the Work, Contractor shall notify the College's Project Manager and Campus Facilities and Security Offices. Repair of damages resulting from Contractor's actions shall be the responsibility of the Contractor. Regardless of responsibility, Contractor shall immediately undertake necessary repairs, including conducting Work off-hours and/or on weekends, to ensure prompt restoration of service in order to minimize impact of unplanned utility outages on College operations.

3.10.6. Erosion Control

3.10.6.1. The Contractor shall incorporate all permanent erosion control features, where applicable, into the Work at the earliest practicable time and shall maintain them in proper condition during the course of the Contract.

3.10.6.2. Temporary measures shall be used to control conditions that develop prior to installation of permanent control features, or that are needed to temporarily control erosion resulting from normal construction practices. Temporary controls may include off site control measures where such Work is necessary as a direct result of Contractor's construction activity.

3.10.7. Tree and Plant Protection

3.10.7.1. Unless otherwise shown in the Contract Documents, the Contractor shall protect all trees and plants which are liable to injury by construction operations and/or site mobilization plan.

3.10.7.2. Trees may not be used for any attachment or anchorage. Tree root zones shall be protected from overburden from construction traffic or storage of materials.

3.10.8. Snow and Ice Removal

3.10.8.1. Contractor shall provide snow and ice removal from within the project site area and from pedestrian or vehicular routes providing immediate access to or routing around the project site.

3.10.8.2. When the College is officially closed due to snow and ice conditions and the Contractor plans to work, it is the Contractor's responsibility to provide additional snow and ice removal, including removal beyond the site project limits, as necessary to provide access required by its Workers, Subcontractors and/or suppliers.
3.10.8.3. At all times, Contractor shall cooperate and coordinate his snow and ice removal activities with College's snow and ice removal activities.

3.10.9. Trash Removal: Salvage and Recycling

Unless otherwise indicated in the Contract Documents:

3.10.9.1. Salvage rights belong to the Contractor when the Project scope of Work includes demolition and removal of existing materials or equipment.

3.10.9.2. Contractor shall implement best recycling practices as part of its trash removal protocol, with particular attention to sorting and recycling corrugated cardboard packaging materials, wood pallets, paper products and metal products.

3.10.10. Project Signage

3.10.10.1. Contractor may place his identification signage for promotional purposes at the Project site, subject to review and approval by the College's Project Manager.

3.11 HAZARDOUS AND TOXIC SUBSTANCES

3.11.1. Hazardous and Toxic Substances

3.11.1.1. The Contractor shall comply with all applicable federal, state, bi-county and local laws, ordinances and regulations relating to hazardous and toxic substances, including such laws, ordinances and regulations pertaining to access to information about hazardous and toxic substances, in effect on the date of the Contract and as amended from time to time. The Contractor shall further comply with any special provisions or requirements, including more stringent provisions, mandated by any entity having jurisdiction, including but not limited to the Montgomery County Department of Environmental Protection.

3.11.1.2. At least ten (10) calendar days prior to commencing any on-site Work required by these Contract Documents, the Contractor shall compile, maintain and submit to the College's Project Manager a "Chemical Information List" which shall contain the following information for each hazardous and toxic substance used, manufactured, processed, formulated, packaged, repackaged, handled, reacted, transferred, or stored at the job site: the common name, the chemical name, and identification of the Work area in which the hazardous chemical is found. A copy of this list shall be posted at all times at the Contractor's on-site project office. This list shall be updated

and maintained in a current status by the Contractor as to the hazardous and toxic substance used, manufactured, processed, formulated, packaged, repackaged, handled, reacted, transferred or stored at the job site. The Contractor shall submit to the College's Project Manager an updated Chemical Information List at least 48-hours prior to the introduction of any additional hazardous and toxic substance not listed on the current Chemical Information List which is to be used, manufactured, processed, formulated, packaged, repackaged, handled, reacted, transferred or stored at the job site.

3.11.1.3. The Contractor shall provide the College's Project Manager at least 48-hours prior to commencing Work requiring the use of a hazardous and toxic substance with a "Material Safety Data Sheet" or, in the case of a controlled hazardous waste substance, a hazardous waste manifest, for each hazardous and toxic substance listed or subsequently added to the Chemical Information List in compliance with applicable laws, ordinances and regulations.

3.11.2. Asbestos-Containing Materials

3.11.2.1. The Contractor shall not use, install, or apply any asbestos-containing building materials on any Work. Any exception to this requirement must be requested in writing by the Contractor with an explanation of Work requirements. The College will review any such request and must approve in writing the use of any asbestos-containing building materials on any Work prior to use, installation or application. Upon completion of the Project and before final acceptance is issued by the College, the Contractor shall provide the College's Project Manager with written and notarized certification that it did not use, install or apply asbestos-containing materials.

3.11.3. Environmental Litigation

3.11.3.1. If the performance of all or any part of the Work is suspended, delayed or interrupted due to an order of a court of competent jurisdiction as a result of environmental litigation as defined below, or by the order of any state or federal agency or official enforcing applicable laws, such expense, delay or interruption shall be considered as if ordered by the College under Article 2, College's Right To Stop Or Suspend Work. If it is determined that the suspension, delay, or interruption is due wholly or in part to acts or omissions of the Contractor or breach or violation of the terms of this Contract or acts of the Contractor not required by this Contract, the Contractor shall be responsible for all additional costs and delays resulting from such acts or omissions. The term "environmental litigation" as used herein means a complaint filed in court alleging that the Work will have an adverse effect on the environment and that the College has not duly considered, either substantively or procedurally, the effect of the Work on the environment.

3.12. CUTTING AND PATCHING

3.12.1. The Contractor shall be responsible for any cutting, fitting, or patching, required to complete the Work or to make its parts fit together properly.

3.12.2. The Contractor shall not damage or endanger a portion of the Work or other construction of the College or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the College or a separate contractor except with written consent of the College and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the College or a separate contractor the Contractor's consent to cutting or otherwise altering its Work.

3.13. CLEANING

3.13.1. Progress Cleaning

3.13.1.1. The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract, and shall remove and

dispose of waste materials or rubbish prior to the end of each working day.

3.13.1.2. If the Contractor fails to clean up as provided in the Contract Documents, the College's Project Manager may do so and the cost thereof shall be charged to the Contractor.

3.13.2. Final Cleaning

3.13.2.1. At completion of the Work the Contractor shall remove from and about the Work waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials.

3.13.2.2. Contractor shall wet clean all floors and surfaces or otherwise clean any equipment and materials installed in accordance with manufacturer's instructions.

3.14. ROYALTIES, PATENTS AND LICENSE FEES

3.14.1. The Contractor assumes the risk that any materials, equipment, processes or other items required under the Contract or furnished by the Contractor are subject to any patent, copyright, mark, secret or other property right of another. The Contractor shall pay for all royalties and license fees and shall obtain all necessary licenses or permits to permit use of any such item by the College. Contractor shall defend all suits or claims of infringement of any patent, copyright, mark, secret or other property right of another and shall save the College harmless from loss or expense on account thereof.

3.14.2. When an item specified by the College or furnished by the Contractor infringes or is alleged to infringe any patent, copyright, mark, secret or other property right of another, the Contractor will, at its option, and at no additional cost to the College, (1) procure for the College the right to use the item; (2) replace the item with an approved, non-infringing equal; or (3) modify the item so that it becomes non-infringing and performs substantially the same as the original item.

3.14.3. The review by the College of any method of construction, invention, appliance, process, article, device or material of any kind shall be for its adequacy for the Work, and shall not be an approval of the use thereof by the Contractor in violation of any patent or other rights or any third person.

3.15. INDEMNIFICATION

3.15.1 The Contractor shall be responsible for any property damage, loss, personal injury, death and/or any other damage which may occur by reason of the Contractor's acts, negligence, willfulness or failure to perform any of the obligations required by this Agreement. The Contractor agrees to indemnify and save harmless the College and its respective employees, volunteers, students, and trustees, as applicable, (the "Indemnitees") from any claims, loss, costs, damages or other expenses suffered or incurred by the Indemnitees, including attorney's fees and costs, by reason of the Contractor's acts, negligence, willfulness or failure to perform any of the obligations required by this Agreement. The Contractor at its own expense shall defend the Indemnitees in any action or suit brought against any of the Indemnitees arising out of the Contractor's acts, negligence, willfulness or failure to perform any of the obligations required by this Agreement. Any acts, negligence, willfulness or failure to perform any of the obligations required by this Agreement on the part of any agent, servant, employee or Subcontractor of the Contractor, or any Subcontractor's agent, servant or employee, are deemed to be the Contractor's acts, negligence, willfulness or failure to perform any of the obligations defined by this Agreement.

3.15.2 In claims against any person or entity indemnified under subsection 3.15.1 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under subsection 3.15.1 shall not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers or workmen's compensation acts, disability benefit acts or other employee benefit acts.

3.15.3. The College may retain such moneys due or to become due the Contractor under this Agreement as it considers necessary until such suits or claims for damages have been settled or otherwise disposed of and satisfactory evidence to that effect has been furnished to the College.

3.15.4. The provisions of this Article shall survive the termination of the Agreement.

ARTICLE 4 – ADMINISTRATION OF THE CONTRACT

4.1. CLARIFYING INSTRUCTIONS

4.1.1. The College shall be the final interpreter of the Contract Documents. Through the College's Project Manager, the College will furnish, with reasonable promptness, such clarifications as it may deem necessary for the proper execution of the Work. Except as otherwise expressly provided in the Contract Documents, all recommendations by the Architect/Engineer and/or College's Project Manager with cost or schedule ramifications are subject to approval by the College. The Work shall be executed in conformity therewith and the Contractor shall do no Work without proper drawings and instructions. The Architect/Engineer and/or College's Project Manager have no authority to waive or change the requirements of the Contract Documents except to make minor changes in the Work which do not result in a claim for extra cost or time, and which are consistent with the intent of the Contract Documents.

4.1.2. Wherever typical parts or sections of the Work are completely detailed on the drawings and other parts or sections which are essentially of the same construction are shown in outline only, the complete details shall apply to the Work which is shown in outline.

4.1.3. Dimensions of Work shall not be determined by scale or rule. Figured dimensions shall be followed at all times. If figured dimensions are lacking on drawings, the Architect/Engineer shall supply them on request to the Contractor.

4.2. REQUESTS FOR INFORMATION

4.2.1. In the event that the Contractor requires clarifications on or discovers conflicts or discrepancies in the Contract Documents, the Contractor shall submit a "Request for Information", in a format suitable to the College's Project Manager and Architect/Engineer prior to proceeding with the Work.

4.2.2. Unless otherwise indicated in the Contract Documents, the Contractor shall prepare and routinely update an RFI log indicating the status of RFIs.

4.2.3. The Contractor must allow the Architect/Engineer, College's Project Manager and the College a reasonable time following receipt of each RFI to review the documents and respond to the Contractor. To the extent that additional time for review is needed to clarify the information submitted by the Contractor or its Subcontractors and suppliers, the Contractor will be notified of the cause of the delay and advised of how long it will take to complete the review; provided, however, that mere failure to give the Contractor such notice shall not entitle the Contractor to make a claim for additional compensation or a time extension. The Architect/Engineer will return the completed RFI response to the Contractor and also provide one copy each to the College and College's Project Manager.

4.2.4. The Contractor shall perform no portion of the Work requiring RFI response until the respective RFI response has been issued by the Architect/Engineer. Work performed without a response shall be at the Contractor's risk.

4.2.5. Should the Contractor consider any RFI response to cause a change in the scope of the Work from that required by the Contract Documents, whether or not such change may affect contract price or time, then the Contractor shall desist from further action relative to the item in question and shall in writing (1) immediately notify the Architect/Engineer, the College and College's Project Manager requesting clarification; and (2) furnish them, within seven (7) days, with a notice explaining the nature of the change

and whether increased or decreased cost and/or time is anticipated. No Work related to the RFI shall be executed until the entire matter is clarified and the Contractor is ordered by the College to proceed. Failure of the Contractor to serve written notice as required herein shall constitute a waiver of any claim in relation thereto.

4.3. SITE VISITS AND OBSERVATIONS

4.3.1. The College's Project Manager, and Architect/Engineer, shall at all times have access to the Work wherever it is in progress. The Contractor shall provide proper and safe facilities for such access and for visits at the place of manufacture or elsewhere.

4.3.2. Inspections by the College's Project Manager, or Architect/Engineer, are for the sole benefit of the College. If the Contract Documents, the College Project Manager's, or Architect/Engineer's instructions, or laws, ordinances or any public authority require any Work to be specially tested or reviewed, the Contractor shall give the College's Project Manager timely notice of the Work's readiness for inspection. If the Work is scheduled to be inspected by an authority other than the College's Project Manager, and Architect/Engineer, the Contractor shall inform the College's Project Manager of the date fixed for such inspection. Required certificates of inspection shall be secured by the Contractor. Inspections by the College's Project Manager and Architect/Engineer shall be made promptly and where practicable, inspections may be made at the source of supply.

4.3.3. If any Work has been covered up contrary to the requirements of the Contract Documents or instructions of the College's Project Manager or Architect/Engineer before it has been observed, such Work must, if required by the College's Project Manager and/or Architect/Engineer, be uncovered for observation and replaced and/or recovered, at the Contractor's expense.

4.3.4. If any questioned Work has been covered up which is not required to be observed by the College's Project Manager and/or Architect/Engineer prior to being covered, the College's Project Manager and/or Architect/Engineer may request to see the Work in question and it shall be uncovered by the Contractor as directed. If such Work is found to be in accordance with the requirements of the Contract Documents, the College shall reimburse the Contractor for the cost of such uncovering and recovering. Such reimbursement shall be limited to the direct cost incurred plus the Contract's approved percentage for overhead and profit. If the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall pay all costs associated with uncovering, correcting and recovering the Work.

4.3.5. The Contractor shall place its field engineers at the College's Project Manager's or Architect/Engineer's disposal for field checking during any inspection period. When layouts of the building and site work are to be made, the Contractor shall notify the College's Project Manager and Architect/Engineer in sufficient time so that the College's Project Manager and Architect/Engineer may be present.

4.3.6. Neither the presence nor the absence of the College's Project Manager or Architect/Engineer on the job shall relieve the Contractor from responsibility to comply with the provisions of the Contract Documents, nor from responsibility to remove and replace Work not in accordance therewith.

4.4. CLAIMS AND DISPUTES

4.4.1. Definition of Claim

4.4.1.1. A claim is a demand or assertion by one of the parties seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time, or other relief with respect to the terms of the Contract. The term "claim" also includes other disputes and matters in question between the College and Contractor arising out of or relating to the Contract. Claims must be made by written notice. The responsibility to substantiate claims shall rest with the party making the claim.

4.4.2. Claims for Concealed or Unknown Conditions

4.4.2.1. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature which differ materially from those ordinarily found

to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then the Contractor shall give notice to the College's Project Manager promptly before conditions are disturbed and in no event later than fifteen (15) calendar days after first observance of the conditions. Upon receipt of such notice the College's Project Manager and Architect/Engineer will promptly investigate such conditions and if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work will determine an equitable adjustment in the Contract Sum or Contract time or both. No change in the Contract Sum or Contract time or both will be allowed except by formal approval of the College. If it is determined that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the College's Project Manager shall so notify the Contractor in writing stating the reasons. Claims by Contractor which dispute such a determination must be made in accordance with subsection 4.4.5.

4.4.3. Claims for Extension of Time

4.4.3.1. If the Contractor is delayed at any time in the progress of the Work by any act or omission of the College, or its employees or by any other contractor employed by the College, or by changes ordered in the Work, or by strikes, lockouts, fire, unavoidable casualties, or any causes beyond the Contractor's control, or by delay authorized by the College pending a decision, or by any cause which the College shall decide to justify the delay, the time of completion shall be extended for such reasonable time as the College may decide.

4.4.3.2. The Contractor may be entitled to a time extension, but no additional compensation, if the delay in the completion of the Work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, acts of the public enemy, acts of another contractor in the performance of a contract with the College, fires, floods, epidemics, quarantine restrictions, strikes, foreign embargoes, unusually severe weather, or delays of Subcontractors or suppliers arising from unforeseeable causes beyond the control and without the fault or negligence of both the Contractor and the Subcontractor or suppliers, the time of completion shall be extended for such reasonable time as the College may decide.

4.4.3.3. Claims for extension of time will be considered by the College only if made in writing to the College. Any claim for an extension of time must be made within seven (7) calendar days of the occurrence of conditions which in the opinion of the Contractor warrant such an extension. Failure to submit a claim for an extension of time within seven (7) calendar days shall constitute a waiver of Contractor's right to claim or receive a time extension. In the case of a continuing cause of delay, only one claim is necessary. Within thirty (30) days of filing a time extension claim notice, the Contractor shall submit a clear written statement and relevant supporting documentation substantiating the claim. The documentation shall include a revised schedule, which conforms to the schedules submitted each month with the payment requests and which shows the duration of the delay, its relation to other activities, and how the alleged delay was on the critical path. No time extension will be allowed except by formal approval of the College. The College with advice and assistance from the College's Project Manager shall ascertain the facts and the extent of the delay and extend the time for completing the Work, when in the College's judgment the findings of fact justify such an extension. The College's findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in section 4.5 of this Contract.

4.4.4. Claims for Equitable Adjustment for Delay

4.4.4.1 If a delay in completion of the Work is caused by the College and compensation is not provided for under Changes in the Work otherwise negotiated, and the Contractor's Work is materially affected by that delay, then the Contractor may be entitled to submit a claim for an equitable adjustment in compensation.

4.4.4.2 Schedule management within the Contract duration established at time of Bid/Proposal, including decisions that may alter sequencing of all or part the Work, does not constitute grounds for an equitable adjustment for delay claim from Contractor or its subcontractors or vendors. All prices are firm for the duration of the overall Contract term.

4.4.4.3 Only the following items may be recoverable by the Contractor as compensation or damages for delay:

(1) Direct costs, consisting of
   1. actual additional salaried and non-salaried on-site labor expenses;
   2. actual additional costs of materials;
   3. actual additional equipment costs, based solely on actual ownership costs of owned equipment or actual reasonable costs of rented or leased equipment;
   4. actual additional extended field office expenses, excluding those which are to be included in overhead;
   5. actual additional reasonable costs of Subcontractor and suppliers at any tier for which the Contractor is liable;

(2) actual additional costs proven by clear and convincing evidence, resulting from labor or other inefficiencies but only if proven by clear and convincing evidence; and

(3) an additional percentage for overhead and profit of 15% for actual additional Work performed by the Contractor's own forces and 5% for actual additional Work performed by a Subcontractor.

4.4.4.4. No claim under this subsection shall be allowed for any costs incurred more than twenty days before the Contractor shall have notified the College in writing of the delay.

4.4.4.5. No other compensation or damages are recoverable by Contractor for compensable delays or extensions of the completion time except as expressly stated herein. In particular, the College will not be liable for the following (by way of example and not of limitation) whether claimed by the Contractor or by a Subcontractor or supplier at any tier: (a) profit in excess of that provided herein; (b) loss of profit; (c) home office or other overhead in excess of that provided herein; (d) overhead calculated by use of the Eichleay formula or similar formulae; (e) consequential damages of any kind, including loss of additional bonding capacity, loss of bidding opportunities, and insolvency; (f) indirect costs or expenses of any nature except those expressly provided for herein; and (g) attorneys fees, costs of claims preparation and presentation, and costs of litigation.

4.4.4.6. There shall be deducted from the compensation payable to the Contractor under this section for delay any and all costs, expenses, and overhead recovered or recoverable by the Contractor under change orders issued to the Contractor or otherwise recovered or recoverable by the Contractor.

4.4.4.7. Contractor shall not be entitled to compensation or damages for delay unless, within seven (7) calendar days of the act, omission, occurrence, event or other factor alleged to have caused the delay, the Contractor notifies the College in writing of (a) the alleged delay and its anticipated duration; and (b) the act, omission, occurrence, event or other factor allegedly causing the delay. Knowledge on the part of the College or College's Project Manager of the act, omission, occurrence, event, or other factor or of the delay allegedly resulting there from, shall not excuse Contractor's failure to give the College the written notice required by this subsection.

4.4.5. Claims and Disputes Procedure

4.4.5.1. Unless a lesser period is prescribed by the Contract, the Contractor shall file a written notice of claim relating to the Contract, to the College's Project Manager within fifteen days after the basis of the claim is known or should have been known, whichever is earlier. Contemporaneously with, or within thirty days of filing of a notice of claim, but, as approved by College's Project Manager, no later than the date that final payment is made, the Contractor shall submit the claim to the College's Project Manager. The claim shall be in writing and shall contain:

(1) an explanation of the claim, including references to all Contract provisions upon which it is based;
(2) the amount of the claim;
(3) the facts upon which the claim is based;
(4) all pertinent data and correspondence that the Contractor relies upon to substantiate its claim. The Contractor shall submit such additional information as may be requested by the College's Project Manager; and
(5) a certification by a senior official, officer or general partner of the Contractor or the Subcontractor, as applicable, that, to the best of the person's knowledge and belief, the claim is made in good faith, supporting data are accurate and complete, and the amount requested accurately reflects the Contract adjustment for which the person believes the College is liable.

4.4.5.2. A notice of claim or a claim that is not filed within the time prescribed by subsection 4.4.5.1 or a lesser period prescribed elsewhere in the Contract shall be dismissed and the claim shall be considered to be waived.

4.4.5.3. Upon receipt of the Contractor's claim, the College's Project Manager, shall take steps deemed necessary to review and investigate the claim. These steps may include an investigation and review of the facts pertinent to the claim, requesting additional information or substantiation from the Contractor or anyone else and taking such other steps as the College's Project Manager may consider appropriate.

4.4.5.4. Following their investigation, the College's Project Manager shall issue a written opinion regarding the claim, which shall contain such information as they consider appropriate.

4.4.5.5. Pending resolution of a claim, the Contractor shall proceed diligently with the performance of the Contract in accordance with the College's Project Manager's opinion, order, finding or interpretation. The Contractor shall take all reasonable action to mitigate or to avoid costs or damages for which the College may be liable. The College Project Manager's decision shall be final and conclusive unless the Contractor files a written appeal to the Vice President of Facilities Management, Capital Planning, and Sustainability within fifteen days of the date of the College's Project Manager's opinion. The Contractor shall include in its appeal all of the information which it wants considered in the appeal. The Vice President of Facilities Management, Capital Planning, and Sustainability, in consultation with such other persons as deemed advisable, shall prepare and deliver a written decision to the Contractor. The Vice Presidents' response shall be the College's final decision.

4.4.5.6. If the Contractor does not appeal the College's Project Manager's decision to the Vice President of Facilities Management, Capital Planning, and Sustainability within the time required under subsection 4.4.5.5, then the College's Project Manager's opinion shall be considered to be final, conclusive and binding upon the Contractor and College. There shall be no further right of review either administratively or in the courts. If the Contractor's timely appeals the College's Project Manager's decision to the Vice President of Facilities Management, Capital Planning, and Sustainability, the Vice President of Facilities Management, Capital Planning, and Sustainability's decision shall be considered to be conclusive and final unless within thirty days from the date of the

Vice President of Facilities Management, Capital Planning, and Sustainability' decision the Contractor requests submitting the dispute to non-binding mediation as a condition precedent to commencing an action in the Circuit Court for Montgomery County. If no action is commenced within thirty days after the date of the Vice President of Facilities Management, Capital Planning, and Sustainability's decision, the Vice President of Facilities Management, Capital Planning, and Sustainability's decision shall be considered to be final, conclusive and binding on the Contractor and the College and the Contractor's right to appeal to the courts shall be waived.

4.4.5.7. If a court action is contemplated, all claims, disputes and other matters in question arising out of or related to the Contract or breach thereof shall first be submitted to non-binding mediation. Such mediation shall be in the nature of settlement discussions and privileged. The location of the mediation shall be in Rockville, Maryland.

4.4.5.8. The timely filing of a claim and the receipt of an opinion by the Contractor from the College's Project Manager, receipt of a decision from the College's Vice President of Facilities Management, Capital Planning, and Sustainability and pursuit of non-binding mediation are conditions precedent to filing an action in court. Any action which may be commenced against the College shall be filed in the appropriate state court in Montgomery County, Maryland. The Contract and disputes arising out of it shall be governed by the laws of the State of Maryland without regard to conflicts of laws provisions.

4.4.5.9. Claims by the College against the Contractor may be commenced at any time in any appropriate court without regard to the other provisions of the Contract Documents, including subsection 4.4. This right is in addition to all other rights which the College may have under the Contract Documents.

4.5. DELAYS AND DAMAGES

4.5.1. No Waiver of Delay

4.5.1.1. Except as may be expressly agreed otherwise by the College in writing, no action or inaction by the College or its Project Managers shall constitute a grant of an extension of the completion date or the waiver of a delay or other default by the Contractor, including: (1) schedule, a recovery schedule, or an anticipated completion date from Contractor; (2) allowance, approval or acceptance of any schedule; (3) failure to terminate for default at an earlier date; or (4) demand that the Contractor finish the project by the required completion date or by any subsequent date promised by the Contractor.

4.5.2. Mitigation of Delays and College Remedies.

4.5.2.1. If Contractor should at any time cause interference, stoppage or delay to the Project or any activity necessary to complete the Project by the time required by this Contract (collectively, "Delay"), Contractor shall take all reasonable action to avoid or mitigate the effects the Delays**,** including but not limited to: (1) rescheduling or re-sequencing the Work and (2) re-assigning personnel. When the Contractor is responsible for any Delay, the College may order the Contractor to accelerate construction, work overtime, add additional shifts or manpower, work on weekends, or to do anything else reasonably necessary in order to finish on time, at no additional cost to the College. The Contractor does not have the unilateral right to complete the Work late and pay liquidated or other damages.

4.5.2.2 If Contractor should at any time cause the Delays described in subsection 4.5.2.1, then in addition to any other remedies the College may have under the Contract, the College, after notifying Contractor that it has forty-eight (48) hours within which to cure the Delay, may attempt to remedy the Delay by whatever means the College may deem necessary or appropriate including, but not limited to, correcting, furnishing, performing or otherwise completing the Work, or any part thereof

by itself or through others, (utilizing where appropriate, any materials and equipment previously purchased for that purpose by Contractor), or by supplementing the Contractor's forces. The Contractor shall be liable to the College for all costs incurred by the College in attempting to remedy the Delay. The College may deduct the cost to remedy the Delay from any monies due or to become due to the Contractor.

4.5.3. Severe Weather Delays

4.5.3.1. "Unusually severe weather" is weather which is more severe than the historical average for the month as evidenced by the National Weather Service for the locality of the Work. Time extensions for unusually severe weather will be allowed on a tentative basis only and the final decision will be reserved until the Work is substantially completed. Weather conditions prevailing throughout the entire Contract period will be considered, including consideration for abnormally mild conditions to offset abnormally severe conditions. Extension of time due to abnormal weather conditions will be granted

on the basis of one (1) calendar day for each normal working day lost, or as mutually agreed upon by the College and the Contractor. No additional compensation will be provided to the Contractor.

4.5.3.2. The College and the Contractor shall use the following table labeled "Monthly Anticipated Adverse Weather Days (in workdays)" as the basis for determining the anticipated number of "unusually severe weather" workdays at the construction site:

Monthly Anticipated Adverse Weather Days (in work days)											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	5	4	5	5	3	3	3	2	4	4	4

A lost workday shall be considered a weather delay when unusually severe weather exists and when such weather conditions directly cause work to be delayed on the activity or activities which are on the critical path according to the latest accepted update of the schedule during that month. Weather-caused schedule losses shall be measured in half (0.5) workday increments if the unusually severe weather affects work at the site only for one half of a normal workday. If unusually severe weather occurs during the first half of a normal work and also delays work during the second half of the day (e.g., due to employees not being required to report to work due to unusually severe weather), the entire work day shall be considered a weather caused lost work day. The Contractor's request for weather caused time extensions during a given month shall be considered only for actual work days lost in excess of the number of work days listed in the table above and meeting the above criteria. The Contractor shall meet the submission and notification requirements and follow the procedures for requesting time adjustments to the schedule as described in Section 4.4.3.

4.5.4. Liquidated Damages

4.5.4.1. It is agreed that time is of the essence and therefore the College will suffer substantial damages if the Work is not completed within the time stated in the Preliminary Project Schedule contained in the Contract Documents. For each day that the Work shall be uncompleted after the date set for Substantial Completion, the Contractor may be liable for liquidated damages in the amount specified in the Contract Documents. Prior to and after expiration of the Contract completion time, the College may withhold an amount equal to liquidated damages whenever the progress of construction is such that, due to the fault or responsibility of the Contractor, the Contractor, in the judgment of the College is behind schedule so as not reasonably to be able to permit completion of the Project on time. Due account shall be taken of excusable delays, any extensions of time reasonably due the Contractor for completion of additional Work under change orders, and for delays for which the College is responsible, provided that the Contractor has properly requested time extensions therefore. After submission of a price, the Contractor may not contest the

reasonableness of the amount of liquidated damages stated in the Contract. These assessed damages shall not be considered as a penalty, but as mutually agreed upon as the ascertained damages suffered by the College because of the delay.

4.5.5. Waiver of Consequential Damages

4.5.5.1 The Contractor waives claims against the College for consequential damages arising out of or relating to this Contract. The waiver includes but is not limited to damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit of any type.

This waiver is applicable, without limitation, to all consequential damages due to Contractor in accordance with Article 12 of this Contract.

ARTICLE 5 – CONSTRUCTION BY COLLEGE OR BY SEPARATE CONTRACTORS

5.1 SEPARATE CONTRACTS

5.1.1. The College reserves the right to let other contracts in connection with the Project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and for the execution of their work, and shall properly connect and coordinate its Work with theirs. The Contractor shall work harmoniously with other contractors. The Contractor is not entitled to overhead, profit, or other compensation for work done for the College by other contractors.

5.1.2. If any part of the Contractor's Work depends on the proper execution or completion of any other contractor's work, the Contractor shall inspect and measure the work of the other contractor(s) and promptly report to the College's Project Manager any defects or discrepancies in such work. The Contractor's failure to inspect and make such a report shall constitute an acceptance of the other contractor's work as fit and proper for the proper execution of its Work, except as to latent defects.

5.1.3. The College's Project Manager will schedule and coordinate the Work of the Contractor with the work of all separate contractors on the Project including use of the site by the Contractor and the separate contractors. The College's Project Manager will keep the Contractor informed of the progress schedule to enable the Contractor to reasonably plan and perform its Work properly. The College's Project Manager may issue appropriate directions and require the Contractor to take such other measures as may be necessary to timely coordinate and progress the Work. Any neglect or refusal by the Contractor to comply with directions issued by the College's Project Manager shall constitute a failure to perform the Work in accordance with the Contract requirements and will justify action from withholding of payments otherwise due up to and including termination of the Contract.

5.1.4. The College and College's Project Manager do not guarantee the unimpeded operations of the Contractor. The Contractor acknowledges that the award of more than one contract for a Project necessitates the proper scheduling and sequencing of the Work with the work of all other contractors, and may lead to inherent delays in the progress of the Work. The Contractor agrees to re-sequence its Work as may be reasonably directed by the College's Project Manager from time to time. The Contractor hereby agrees to make no claim for delays caused by the presence or operations of other contractors engaged on the Project.

5.1.5. Should the Contractor sustain any damage through any act or omission of any other contractor having a contract with the College for the performance of work on the Project, or through any act or omission of a subcontractor of such other contractor, the Contractor shall make no claim against the College or its consultants (including but not limited to the Architect/Engineer and College's Project Manager) for such damage, but shall have a right to recover such damage from the other contractor under a provision similar to subparagraph 5.1.6 which has been or will be inserted in all contracts with such other contractors. The Contractor hereby releases the College, College's Project Manager and Architect/Engineer and their

respective officers and employees from all damages to the Contractor caused by other contractors on the Project.

5.1.6. Should any other contractor under contract with the College for performance of work on the Project sustain any damage through any act or omission of the Contractor hereunder, or through any act or omission of a Contractor's subcontractor of any tier, the Contractor agrees to reimburse such other contractor for all such damages and to indemnify and hold the College, College's Project Manager and Architect/Engineer harmless from all such claims, including attorneys' fees, to the fullest extent permitted by law.

5.1.7. The Contractor agrees that in the event of a dispute as to cooperation or coordination with other contractors on the Project, the College's Project Manager will act as mediator and decisions made by the College's Project Manager will be binding.

5.1.8. The Contractor shall fully cooperate and coordinate its Work with other contractors working on separate projects for other buildings, road work, and the like in accordance with College's Project Manager's direction.

5.1.9. Wherever work being done by any contractors or subcontractors is contiguous to Work covered by the Contract Documents, the respective rights of the parties shall be established by the College's Project Manager to secure the completion of the various portions of the Work in general harmony.

5.1.10. If a dispute arises among the Contractor and other contractors as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in these General Conditions, the College's Project Manager may direct who shall perform the cleanup. The College's Project Manager reserves the right to clean up and allocate the cost in a timely manner among those responsible as the College's Project Manager determines to be just.

ARTICLE 6 – CHANGES IN THE WORK

6.1. CHANGES IN THE WORK

6.1.1. Changes

6.1.1.1. The College unilaterally may, at any time, without notice to the sureties, if any, and without invalidating the Contract Documents, by written order designated or indicated to be an order, make any change in the Work including but not limited to changes in the Specifications, Drawings in the method or manner of performance of the Work, the College-furnished facilities, equipment, materials, services, or site or directing acceleration in the performance of the Work. Any other written order or an oral order, including a direction, instruction, interpretation, or determination from the College that causes or constitutes any such change shall be treated as a change order under this section provided that before performing the Work directed by the change that the Contractor gives the College's Project Manager written notice stating the date, circumstances and source of the order and that the Contractor regards the order as a change order. The Contractor shall not proceed to perform the Work described in the written or oral order unless the College's Project Manager acknowledges in writing to the Contractor that the order is a change order and that the Contractor is to proceed with the Work as a change.

6.1.1.2. If any change under this subsection causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the Work under the Contract, whether or not changed by an order, an equitable adjustment shall be made and the Contract modified in writing accordingly; provided, however, except for claims based on defective Specifications or Drawings, that no claim for any order under subsection 6.1.1.1 above shall be allowed for any cost incurred more than twenty days before the Contractor gives written notice as therein required. In the case of defective Specifications or Drawings for which the College is responsible, the equitable

adjustment shall include any increased costs reasonably incurred by the Contractor in attempting to comply with such defective Specifications or Drawings. The Contractor shall submit to the College Project Manager within ten (10) days after every ninety (90) days from the order to proceed with the Work a detailed list of all costs incurred attempting to comply with defective Specifications or Drawings during the immediately preceding ninety (90) day period until the effect of the defects are overcome. Costs included more than ninety (90) days old in a detailed list of costs are waived and will not be paid.

6.1.1.3. If the Contractor intends to assert a claim for an equitable adjustment under subsection 6.1.1, it shall, within thirty days after receipt of an order for the furnishing of written notice under subsection 6.1.1.1 submit to the College's Project Manager a written statement setting forth the general nature of the monetary extent of the claim.

6.1.2. Disputed Work

6.1.2.1. In the event of a dispute between the College and the Contractor as to whether any Work is included in the scope of the Contract, such that the Contractor will be obligated to provide that Work at no additional cost to the College, the College's Project Manager may order the Contractor in writing under this section to perform the Work. If the Contractor considers such an order to be a change in the scope of the Contract entitling the Contractor to additional compensation, a time extension, or other relief, the Contractor must provide notice within seven days (7) from receipt of the College's Project Manager's written order under the section to perform the Work and to initiate a claim therefore in accordance with Contract requirements.

6.1.2.2. A request by the Contractor for additional time or additional costs caused by the impact of an order of the College on the critical path for completion must be accompanied by (a) a reasonably detailed description of the effect of the order on the adjusted critical path and (b) supporting documentation. The mere existence of a change order does not entitle the Contractor to an extension of time, compensation for delay or damages or costs associated with delay. Contractor's entitlement thereto shall depend upon the effect of the change order on the adjusted critical path for completion and shall be subject to the requirements of Article 3.7, Prosecution and Progress of the Work.

6.1.2.3. Upon receipt of a signed written order of the College's Project Manager under this subsection, the Contractor shall comply with the order promptly, within the requirements of the completion schedule, whether or not the Contractor signs or accepts the change order. Failure to comply with the order in a timely manner shall constitute a breach of the Contract and grounds for termination for default or any other remedy available to the College.

6.1.3. Modification of Contract Sum

6.1.3.1. When changes in the Work may require a modification of the Contract Sum, the Contractor shall provide to the College's Project Manager, within thirty (30) days of its receipt of a proposal request, an itemized breakdown showing quantities, unit costs, hours and rates of labor, and other costs in such detail as may be required to allow the reasonableness of the cost to be established. Similar cost information covering Subcontractor's Work shall be included as part of the Contractor's proposal. Minimum charges for "handling" will not be acceptable. Charges for general supervision and management will not be acceptable.

6.1.3.2. Modification of the Contract Sum, when required, shall be determined as follows:
(1) When applicable unit prices are stated in the Contract or have been subsequently agreed upon, by application of such unit prices.
(2) A lump sum price agreed upon by the College and the Contractor.
(3) If job conditions or circumstances or the extent or nature of the change, or failure of the

College and the Contractor to agree upon a lump sum price or the application of unit prices, prevent the determination of the cost of any proposed change, the Work shall be paid pursuant to subsection 6.1.3.4.

(4) If a change involves a credit to the College, unless the amount must be determined by the application of unit prices, the amount of the credit shall be the greater of (a) the alternate or other itemized price for such Work stated in Contractor's price or (b) a reasonable price, including profit and overhead.

(5) If the change involves both a credit and a debit, the sums shall be shown and the two sums balanced to determine the adjusted total cost or credit.

(6) The mark up allowable to the Contractor for combined overhead and profit for Work performed solely by the Contractor with its own forces shall be a reasonable amount, but not to exceed 15% of the Contractor's costs (excluding items includable in overhead).

(7) The mark up allowable to a Subcontractor for combined overhead and profit for Work performed solely with its own forces shall be a reasonable amount, but not to exceed 15% of the Subcontractor's cost of labor and materials and equipment. Mark ups for Sub-subcontractors or suppliers, if required, must be provided from within the markup allowance provided to the Subcontractor. No additional markup allowance will be allowed for Sub-subcontractors or suppliers. For Work performed by a Subcontractor solely with its own forces, the Contractor is entitled to a reasonable mark up for combined overhead and profit, but not to exceed 5% of the Subcontractor's labor, materials and equipment cost.

Sample Maximum Mark-Up Calculation:

A.	Subcontractor's cost (LME) *(includes direct costs of Subsubcontractors and/or suppliers)*	= A
B.	Subcontractor's combined OH&P	= 15% of A
C.	Subcontractor's Bonds and Builder's Risk Insurance if required	= as a % of A+B
D.	Contractor's combined OH&P	= 5% of A
E.	Contractor's Bonds and Builder's Risk Insurance if required	= as a % of A+B+C+D
F.	Total Maximum Modification of Contract Sum:	= A+B+C+D+E

(8) The Contractor shall be allowed the actual, reasonable additional cost for rental of machine power tools or special equipment, including fuel and lubricants which are necessary to execute the Work required on the change, but no percentage shall be added to this cost.

(9) The Contractor and separately bonded subcontractors, if any, shall be allowed the actual, reasonable additional cost for Bonds and Builder's Risk Insurance, if required.

6.1.3.3. The allowable percentages for cost and overhead and profit as provided in subsections 6.1.3.2 (6) and (7) and elsewhere are deemed to include but not be limited to all costs and expenses of the following kinds: project management, supervision and coordination; job supervision and field office expenses required by the Contract; expenses for supervisors, superintendents, managers, timekeepers, clerks and watchmen; cost of correspondence of any kind; insurance not specifically mentioned herein; all expenses in connection with the maintenance and operation of the field office, use of small tools, cost of vehicles generally used for transporting either Workers, materials, tools or equipment to job location and incidental job burdens; and all expenses or maintenance for operation of Contractor's regularly established principle office, branch office, similar facilities and all other costs and expenses customarily classified as overhead or general conditions. The Contractor's entitlement to compensation or additional time for delays for which the College is responsible or for which an extension is due to the Contractor is also subject to section 4.5.

6.1.3.4. If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the College on the basis

of reasonable expenditures and savings of those performing the Work attributable to the change, including in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit as stated in subsection 6.1.3.2 (6) and (7). In such a case, the Contractor shall keep and present in such form as the College's Project Manager may prescribe an itemized accounting together with appropriate supporting data. The itemized accounting shall be prepared daily and presented to the College's Project Manager at the conclusion of each day. Unless otherwise provided in the Contract Documents, reimbursable costs to the Contractor shall be limited to the following:

(1) Costs of labor, including Social Security, old age and unemployment insurance, fringe benefits required by agreement or custom and Workers' compensation insurance;
(2) Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
(3) Rental costs of machinery and equipment exclusive of hand tools, whether rented from the Contractor or others; and
(4) Cost of premiums for all bonds and insurance and permit fees related to the Work, provided that, the penal sum of the surety bond has been increased and the surety has increased the premium cost to the Contractor.
(5) Pending final determination of the costs accumulated pursuant to subsection 6.1.3.4, amounts not in dispute may be included in an Application for Payment.

6.1.3.5. The College's Project Manager will review and make a recommendation regarding the adjustment in Contract Sum and/or Time proposed by the Contractor to the College. Only the College is authorized to approve adjustments in Contract Sum and/or Time. Approval by the College requires review and administrative processing, based on claim value, in accordance with the Board of Trustees Policy and Procedures, and the following schedule:

- Claims less than $ 99,999 require review and approval by the College's Vice President of Facilities Management, Capital Planning, and Sustainability.
- Claims between $ 100,000 and $ 249,999 require review and approval by the College's Senior Vice President for Administrative and Fiscal Services.
- Claims $ 250,000 and greater require approval by the College's Board of Trustees as an action item at a monthly business meeting. Items requiring such approval must follow Board of Trustees agenda action item submission requirements. (Normally, action items are placed on the Board meeting agenda at least one month prior to the scheduled meeting date to allow time to conduct necessary internal administrative reviews prior to the Board meeting.)

6.1.4. Minor Changes in the Work

6.1.4.1. The College's Project Manager will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order of the College's Project Manager and shall be binding on the College and Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 7 – PAYMENTS AND COMPLETION

7.1. SCHEDULE OF VALUES

7.1.1. To facilitate checking the Work performed, the Contractor shall furnish to the College's Project Manager a detailed Schedule of Values of the various parts of the Work, including quantities, aggregating to the Contract Sum. The schedule shall be divided so as to facilitate payments to Subcontractors, if any, made out in the form prescribed by the College's Project Manager, and, if required, supported by such evidence of its correctness as the College's Project Manager may direct. The Schedule of Values cost breakdown shall be used as a basis for Certificates of Payment unless it is found to be in error.

7.1.2. The Schedule of Values shall be submitted as soon as possible, but not less than fifteen (15) days prior to the first scheduled Application for Payment described in the General Conditions.

7.2. PROGRESS PAYMENTS

7.2.1. Application for Payment

7.2.1.1. No later than the 25th day of each month, the Contractor shall submit to the College's Project Manager an original and accurate Application for Payment dated the last day of the month in the form prescribed by the Contract Documents together with the supporting documentation listed herein. Applications for Payment received after the 25th day of each month, or not submitted on an original, or containing erroneous information, or missing the required supporting documentation, shall not be processed during that month's payment cycle. Payments shall be made on the value of Work expected to be completed up to and including the last day of the month based upon the labor and materials incorporated in the Work; and of materials suitably stored at the site; less the aggregate of any previous payments, retainages and amounts withheld under subsection 7.2.1.9. The Applications for Payment, including final payment, shall be reviewed and certified by the College's Project Manager. After reviewing and certifying the amounts due the Contractor, the College's Project Manager will submit the Project Application and the Project Certificate for Payment, along with the Contractor's Applications and Certificates for Payment, to the Architect/Engineer. Based on the Architect/Engineer's observations and valuations of Contractor's Applications for Payment, and the Certifications of the College's Project Manager, the Architect/Engineer will review and certify the amounts due the Contractor and will issue a Project Certificate for Payment.

(1) The Contractor shall promptly pay each Subcontractor, if any, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which each Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of the Subcontractor's Work. The Contractor may not withhold from the Subcontractor any portion of the payment due to any cause unrelated to the Subcontractor's performance of the Work on the Project, notwithstanding any prior agreement between Contractor and Subcontractor to the contrary.

7.2.1.2. No later than the 25th day of each month, each Application for Payment shall be supported by the following documentation, each in a form prescribed by the College, or in the case no form is prescribed, on a form provided by the Contractor and approved by the College's Project Manager:

(1) Updated schedule information of Contractor's progress to date, including assessment of progress compared to scheduled completion date.
(2) Subcontractors' certificates, statements and affidavits showing that portions of the Work covered by the Application for Payment have been completed and material included therein have been and will be delivered.
(3) Affidavit from Contractor and Subcontractor on forms prescribed by the College, stating respectively that their work force, subcontractors, vendors and material suppliers have been paid from the proceeds of the last Application for Payment, and will be paid from the current Application for Payment, and that there are no outstanding claims for payment.

7.2.1.3. That part of the payment which is requested on account of materials delivered and suitably stored at the site or other approved location but not incorporated in the Work shall, if required by the College's Project Manager, be conditioned upon submission by the Contractor of bills of sale or upon such other procedure as will establish the College's title to such material or otherwise adequately protect the College's interest as determined by the College's Project Manager, including applicable insurance coverage and cost of transportation to the Project site for those materials and equipment stored off the site.

7.2.1.4. Provided that the Contractor has furnished acceptable payment and performance security equal to 100% of the Contract Sum, from each Application for Payment the College shall withhold

as retainage no more than 5% of the amount earned. Unless otherwise agreed to by the College in writing, the retainage withheld shall be paid within 120 days after satisfactory completion of the Contract or within 120 days after resolution of a dispute or contract claim concerning the satisfactory completion of the Contract, whichever is later. The College reserves the right to withhold from payments otherwise due the Contractor any amount that the College reasonably believes necessary to protect its interest, including, but not limited to, the College concluding in its sole judgment that the Work may not be completed by the date required by the Contract or the Work is otherwise not in conformance with the requirements of the Contract Documents. Following Substantial Completion of the Project, the College in its sole discretion, may authorize reduction of retainage withheld to an amount not less than two (2) times the College's Project Manager's estimate of the value of the Contractor's punch list items.

7.2.1.5. Application for Payment shall be in the format required by the Contract Documents and the College's Project Manager. The Application shall include an itemized breakdown of the various items of the Work based on the previously submitted Schedule of Values.

7.2.1.6. The provisions for payment, withholding, retainage and Certificates of Payments are solely for the benefit of the College, and no other party (including sureties of the Contractor) may assert any claim for negligence or other action against the College, or anyone acting on behalf of the College for waiving or misapplying these provisions.

7.2.1.7. No Certificate issued nor payment made to the Contractor may be construed as an acceptance of the Work or be construed or relied upon as any indication that the labor or materials are in accordance with the Contract Documents or that the amounts paid or certified therefore represent the correct cost or value of the Work or that such amounts are in fact or law due the Contractor.

7.2.1.8. Any Application for Payment which is based on a pending claim for additional compensation may be certified by the College's Project Manager and the Architect/Engineer to the extent that it is determined that the payments yet to be made under the Contract and/or the retainage are sufficient to protect the College. Nothing herein shall be construed as requiring the College's Project Manager and Architect/Engineer to certify such applications or to release retainage. All certifications and payments, including those pursuant to a pending claim, shall be tentative and conditional.

7.2.1.9. In addition to the College's general right to withhold payment as set forth in subsection 7.2.1.4, the College may withhold payment or, on account of subsequently discovered evidence, nullify or reduce the whole or part of any certificate or payment on account of:

(1) failure to update schedules properly as required by subsection 3.7;
(2) failure to furnish the documents required by subsection 7.2.1.1 and 7.2.1.2;
(3) liquidated damages which may be assessed under the Contract Documents or other damages or compensation due the College for claims of the College against the Contractor;
(4) the cost (measured by the contract value or fair market value whichever is greater) of completing unfinished or defective Work not remedied or deductions or amounts due the College under the Contract;
(5) failure of the Contractor to perform any material Contract requirements;
(6) claims filed or likely to be filed against the College for which the Contractor may be liable to the College;
(7) failure of the Contractor to make payments properly to Subcontractors or suppliers for material or labor or amounts claimed by the Contractor's surety or insurer under any right of subrogation;
(8) a reasonable doubt the Work can be completed for the residual balance of the Contract;
(9) damage to another Contractor;
(10) any claim of the College or debt owed to the College by the Contractor;
(11) failure to maintain as-built drawings; or
(12) the cost of completing unfinished warranty Work.

7.3. ACCEPTANCE OF THE WORK AND FINAL PAYMENT

7.3.1. Partial Acceptance

7.3.1.1. If, in its sole discretion, the College desires to occupy any portion of the Work, the College shall have the right to occupy and use those portions of the Work which in the opinion of the College can be used for their intended purpose; provided that the conditions of occupancy and use are established and the responsibilities for the Contractor and the College for maintenance, heat, light, utilities and insurance are mutually agreed to by the Contractor and the College. The College has no obligation to accept the Work in portions. Partial occupancy shall in no way relieve the Contractor of its responsibilities under the Contract.

7.3.1.2. When the College occupies the Work in portions or accepts the Work in portions, if the beneficial use of any accepted portion of the Work as a whole depends on Substantial Completion or beneficial use of any other portion, then, unless otherwise agreed to by the College in writing: (1) warranties on the accepted portions do not begin to run until substantial completion of all portions on which beneficial use of the whole Work depends, and (2) Substantial Completion of the whole Work shall not be deemed to be achieved until Substantial Completion of all portions on which beneficial use of the whole depends.

7.3.2. Substantial Completion and Final Inspection

7.3.2.1. When the Work is substantially completed, the Contractor shall notify the College's Project Manager and Architect/Engineer in writing that the Work will be ready for final inspection and testing on a definite date. Reasonable notice shall be given by the Contractor to permit the College's Project Manager and Architect/Engineer to schedule the final inspection.

7.3.2.1.1 "Substantial Completion" is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the College can occupy or utilize the Work for its intended use.

7.3.2.2. The inspection shall be conducted by the College's Project Manager and the Architect/Engineer. On the basis of the inspection, if it is determined that the Work appears to be substantially complete and the Work appears to be ready for occupancy and usable for its intended purpose, the College's Project Manager and Architect/Engineer shall establish the date of Substantial Completion, shall fix the times at which the warranties will begin, and the Architect/Engineer shall issue a Certificate of Substantial Completion.

7.3.2.3. If it is determined that Substantial Completion has been achieved, the College's Project Manager shall fix the time within which the Contractor shall complete any remaining items of Work which will be indicated on a list (the "punch list"). If the Contractor fails to complete the remaining items so listed in the time stipulated, the College shall have the undisputed right to complete the Work at the Contractor's expense. The Contractor may be required to complete multiple punch lists until the Contract is performed in its entirety. Failure to complete punch list work in a timely manner shall constitute grounds for termination of the Contract for default. Final payment shall not be made until all Contract Work, including all punch list Work, is complete to the satisfaction of the College's Project Manager.

7.3.2.4. Acceptance of the Work as substantially complete shall not excuse or waive any failure of the Contractor to complete the Contract as required by the Contract Documents. The Work shall not be considered substantially complete until (1) all electrical, mechanical, and life safety systems shall be completed and successfully tested and successfully inspected for conformity to all requirements of the Contract Documents and all applicable codes and standards, (2) a certificate of occupancy has been obtained for all parts of the Work and (3) all other requirements for Substantial

Completion are met.

7.3.2.5. Upon completion of the Work, the Contractor shall forward to the College's Project Manager a written notice that the Work is ready for final inspection and acceptance and shall also forward to the College's Project Manager a final Application for Payment. The final Application for Payment shall be processed in accordance with Subparagraph 7.3.3. Upon receipt, the College's Project Manager will forward the notice and Application to the Architect/Engineer who with the College's Project Manager will promptly make such inspection. When the Architect/Engineer, based on the recommendation of the College's Project Manager, finds the Work acceptable under the Contract Documents, the Architect/Engineer shall issue a Final Application and Certificate for Payment stating that the Work provided for in the Contract has been completed and is acceptable under the terms and conditions thereof and that the entire balance found to be due to the Contractor and noted in the final application is due and payable. The College's Project Manager and Architect/Engineer may not issue the Final Certificate and Application for Payment until all Work is fully completed and all other obligations of the Contractor under the Contract Documents have been completed.

7.3.3. Application for Final Payment

7.3.3.1. Upon completion of the Work, the Contractor shall prepare and submit to the College's Project Manager an Application for Final Payment. The College's Project Manager and Architect/Engineer will promptly proceed to make any necessary final surveys, to complete any necessary computations of quantities, and to complete other activities necessary to determine the Contractor's right to final payment. The College's Project Manager and Architect/Engineer will certify so much of the Contractor's Application for Final Payment as they consider due, The Contractor shall be informed of all deductions, damages, costs, back-charges, and other charges assessed against the Contractor by the College and the reasons therefore. Notwithstanding what is stated above, prior to or in the absence of a request from the Contractor for final payment, the College may determine the amount of the final payment it considers to be due to the Contractor.

7.3.3.2. If the Contractor disputes the amount determined by the College to be due it, it may initiate a claim under Article 4.4, Claims and Disputes.

7.3.3.3. Acceptance by the Contractor of any payment identified by the College as being a final payment shall operate as an accord and satisfaction and a general release of all claims of the Contractor against the College arising out of or connected with the Contract, except as may be expressly agreed otherwise in writing between the Contractor and the College. No claims by the Contractor may be asserted for the first time after the Contractor submits its Application for Final Payment or after final payment is made by the College.

7.3.3.4. Prior to final payment and before issuance of the College's Project Manager's and Architect/Engineer's final Certificates therefore, the Contractor shall fully comply with the following requirements:

(1) Cleanup the Work area in accordance with the Specifications and federal, state, bi-county, county and local rules and regulations.
(2) Provide a notarized affidavit stating that all monetary obligations to suppliers of material, services, labor and all Subcontractors have been completely fulfilled and discharged.
(3) Complete all punch list Work and furnish to the College's Project Manager all documents, manuals and record (as-built) documents, including all BIM documents, if any.

7.4. ASSIGNMENT OF CONTRACT MONIES

7.4.1. The Contractor shall not assign any monies due to it under the Contract without the consent of the College, and the assignee in such case shall acquire no rights against the College.

7.5. AUDIT

7.5.1. If the Contractor has submitted any claim or request for additional payment exceeding $50,000, or If the Contractor has submitted cost or pricing data in connection with the pricing of any modification to this Contract, the College shall have the right to examine and audit all books, records, documents, and other data of the Contractor (including computations and projections) related to negotiating, pricing or performing the modification or claim in order to evaluate the accuracy, completeness, and currency of the cost or pricing data. In addition to the above, the Contractor shall make available to the College the original project price estimate and backup takeoffs and records, and the actual monthly or periodic job cost records. If the Contractor fails or refuses to comply with applicable provisions concerning the Contract changes or claims, the College shall have no obligation to make payment to the Contractor for the change or claim.

7.5.2. The Contractor shall permit audit and fiscal and programmatic monitoring of the Work performed under this Contract. The Contractor shall make available at its office at all reasonable times, the materials described in subsection 7.5.1, for examination, audit or reproduction, for 3 years after final payment under the Contract.

7.5.3. If the Contract is completely or partially terminated, the records relating to the Work terminated shall be made available for 3 years after any resulting final termination settlement.

7.5.4. Records pertaining to claims, contract disputes, or to litigation or the settlement of claims arising under or relating to the performance of the Contract shall be made available until final disposition of such appeals, litigation, or claims.

ARTICLE 8 – PROTECTION OF PERSONS AND PROPERTY

8.1. SAFETY PRECAUTIONS AND PROGRAMS

8.1.1. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss.
8.1.2. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. Contractor shall comply and cooperate with College safety and security programs.

8.1.3. Except as otherwise directed by the Contract Documents, in the event the Contractor encounters on the site material reasonably believed to be hazardous, including but not limited to asbestos or polychlorinated biphenyl (PCB), which has not been rendered harmless, the Contractor shall immediately stop Work in the area affected and report the condition to the College's Project Manager in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the College's Project Manager and Contractor if in fact the material is hazardous and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of hazardous material.

8.2. PROTECTION OF PERSONS AND PROPERTY

8.2.1. The Contractor shall take all necessary precautions to ensure the safety of the public and of workers on the job, and to prevent accidents or injury to any persons on, about, or adjacent to the premises where the Work is being performed. The Contractor shall comply with the "Williams-Steiger Occupational Safety and Health Act of 1970, as amended, and all laws, ordinances, codes, rules and regulations relative to safety and the prevention of accidents, and shall also comply with the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America and with the applicable provisions of the American Standard Safety Code for Building Construction, ANSI A 10 Series, unless prevention of accidents is regulated by a more stringent local, State or Federal code, ordinance or law. The Contractor shall erect and properly maintain at all times, as required by laws and regulations and the conditions and progress of the Work, proper safeguards, including minimum provision of six (6) foot fall protection, for the protection of Workers and the public and shall post signs and other warnings against the dangers created by openings, stairways, falling materials, open excavations and all other hazardous or unsafe conditions. It shall be the

Contractor's exclusive responsibility to take all safety precautions which may be necessary to protect all persons and property from injury or damage.

8.2.2. Contractor shall request permission in writing of the College's Project Manager, and have received written permission from the College's Project Manager, prior to the storage, use, or transportation onto the campus of explosives or other hazardous materials or equipment required for the execution of the Work. The Contractor is prohibited from storing, using or transporting hazardous materials or equipment not required for the execution of the Work onto the campus. The Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel if such written permission has been granted.

8.2.3. All damage or loss to any property referred to in this section, caused in whole or in part by the Contractor, and Subcontractor, and sub-subcontractor, or anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable, shall be remedied by the Contractor, except damage or loss attributable solely due to faulty Drawings or Specifications or to the acts or omissions of the College or Architect/Engineer or anyone employed by either of them or for whose acts either of them may be liable, and not also attributable to the fault or negligence of the Contractor.

8.2.4. The Contractor shall designate a responsible member of its organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to the College's Project Manager.

8.2.5. Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

8.2.6. In any emergency affecting the safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency Work shall be determined as provided for in these General Conditions.

8.2.7. The Contractor shall continuously protect the Work and the College's property from damage, injury or loss arising in connection with operations under the Contract Documents. It shall make good any such damage, injury or loss, except such as may be caused solely by agents or employees of the College.

8.2.8. The Contractor shall be solely responsible for all damage due to intrusion and for the proper protection of the Project site from damage due to fire, rain, wind or other causes. The Contractor shall provide sufficient security personnel as it deems necessary for proper protection of the Work and project site at all times. The Contractor shall provide temporary protection to prevent unauthorized persons from obtaining access to the site during the night and at other non-working hours.

8.2.9. The Contractor shall assume sole financial responsibility for vandalism or loss of materials and equipment not covered by Contractor's Builder's Risk insurance.

8.2.10. The Contractor shall protect all streets, sidewalks, light poles, hydrants and concealed or exposed utilities of every description affected by or adjacent to the Work and if such items are damaged by the Contractor or Subcontractors, the Contractor shall make all necessary repairs thereto or replacements thereof at no cost to the College.

8.2.11. Tight wood sheathing or plywood shall be laid under any materials that are stored on finished cement surfaces.

8.2.12. The Contractor shall at all times provide and maintain adequate protection against weather so as to preserve all Work, materials, equipment, apparatus and fixtures free from injury or damage.

8.2.13. The Contractor shall provide and maintain adequate protection for all properties adjacent to the site. When required by law or for the safety of the Work, the Contractor shall shore up, brace, underpin and

protect as necessary, foundations and other portions of existing structures which are in any way affected by the operations under the Contract Documents. The Contractor, before commencement of any part of the Work, shall give any notices required to be given to an adjoining landowner or other parties.

8.2.14. The Contractor shall confine its construction equipment, the storage of materials and the operations of workers to the limits indicated by laws, ordinances, permits and as may be established by the College, and shall not unreasonably encumber the premises with construction equipment or material.

8.2.15. The Contractor shall enforce the College's Project Manager's instructions regarding signs, advertisements, fires and smoking.

8.3. FIRE PROTECTION

8.3.1. Adequate precautions shall be taken against fire throughout all the Contractor's and Subcontractors' operations. Flammable material shall be kept at an absolute minimum, and, if any, shall be properly handled and stored. Except as otherwise provided herein, the Contractor shall not permit fires to be built or open salamanders to be used in any part of the Work.

8.3.2. Construction practices, including cutting and welding, and protection during construction shall be in accordance with the published standards of the Industrial Risk Insurers and the National Fire Protection Association; provide a sufficient number of approved portable fire extinguishers, distributed about the project; and use non-freeze type in cold weather.

8.3.3. Gasoline and other flammable liquids shall be stored in and dispensed from Underwriters' Laboratories listed safety containers in conformance with the National Fire Protection Association recommendations. Storage of any flammable liquids, however, shall not be within buildings.

8.3.4. All tarpaulins that may be used for any purpose during construction of the Work shall be made of material which is resistant to fire, water and weather. All tarpaulins shall have the Underwriters' Laboratories approval and shall comply with FS CCC-D-746.

8.3.5. The Contractor shall maintain emergency and fire exits from the Work area, or establish alternative exits satisfactory to the Fire Marshal.

8.3.6. Fire protection and safety during the execution of the Work are the exclusive responsibility of the Contractor.

8.4. EMERGENCIES

8.4.1. In an emergency affecting the safety of life, the Work or adjoining property, the Contractor, without special instructions or authorization from the College's Project Manager, is permitted to act at the Contractor's discretion to prevent such threatened loss or injury. In such an emergency the Contractor shall act prudently and expeditiously to prevent any threatened loss or injury and shall immediately notify the College's Project Manager and the Campus Security Office of such actions.

8.5. ACCIDENTS

8.5.1. The Contractor shall provide at the site, and make available to all workers, medical supplies and equipment necessary to supply first aid service to all persons injured in connection with the Work.

8.5.2. Contractor must promptly report in writing to the College's Project Manager and the Campus Security Office all accidents arising out of, or in connection with, the performance of the Work, whether on or off the site, which caused death, personal injury or property damage, giving full details and statements of witnesses. In addition, if death or serious damages are caused, the accident shall be reported immediately by telephone or messenger. If any claim is made by anyone against the Contractor or any Subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the College's Project

Manager and the Campus Security Office, giving full details of the claim.

ARTICLE 9 – INSURANCE AND BONDS

9.1. INSURANCE

9.1.1. Unless otherwise indicated in the Contract Documents, the Contractor shall maintain in force at all times during the term of this Agreement, with an insurance carrier licensed to do business in the State of Maryland acceptable to the College, the following minimum insurance coverage. This insurance must be kept in full force and effect during the term of this contract, including all extensions. The insurance must be evidenced by a certificate of insurance, and if requested by the College, the proposed awardees/Contractor shall provide a copy of the insurance policies. The Contractor's insurance shall be primary.

a) Worker's Compensation Insurance covering the Contractor's employees as required by State of Maryland law with the following minimum limits:

Bodily Injury by Accident	$ 100,000 each accident
Bodily Injury by Disease	$ 500,000 policy limit
Bodily Injury by Disease	$ 100,000 each employee.

b) Commercial General Liability Insurance, excluding automobiles owned or hired by the Contractor, with limits as follows:

Bodily Injury and Property Damage:	$ 10,000,000 combined single limit of bodily injury and property damage per occurrence

c) Comprehensive Automobile Liability Insurance, providing bodily injury and property damage coverage for owned vehicles, hired vehicles and non-owned vehicles with limits as follows:

Bodily Injury:	$ 1,000,000 each person
	$ 2,000,000 each occurrence
Property Damage:	$ 2,000,000 each occurrence

d) Builder’s Risk Insurance, providing property damage and theft replacement coverage for goods provided and services rendered during construction. For building renovation projects, when custody of the building is turned over to the Contractor, the Builder’s Risk policy must additionally include building replacement value.

e) Insured - The College, its elected and appointed officials, officers, consultants, agents and employees must be named as an additional insured and loss payee on Contractor's Commercial and Excess/Umbrella Insurance for liability arising out of Contractor's products, goods and services provided under this Agreement.

9.1.2. Prior to the College signing the Contract, the Contractor shall provide the College with evidence of payment for the above insurance coverage. Any agreement for an extension of time to the Contract shall also include evidence of payment for extending the above insurance coverage for that agreed upon period of time.

9.1.3. These coverages and limits are to be considered minimum requirements under this Agreement and shall in no way limit the liability or obligations of the Contractor. The insurance shall provide that policy coverage will not be canceled, altered or materially changed without sixty (60) calendar days’ prior notice to the College by registered or certified mail. The insurance shall not be limited to claims made only while the policy is in effect.

9.1.4. The Contractor shall furnish the College with a certificate of insurance as evidence of the required coverage. The certificates of insurance must name the College as an additional insured.

9.1.5. In the event that the Contractor's insurance is terminated, the Contractor shall immediately obtain other coverage and any lack of insurance shall be grounds for immediate termination of this Agreement.

9.1.6. For the purposes of this article, the word "licensed" shall be deemed to mean an insurance carrier either licensed or approved to do business in the State of Maryland.

9.2. PERFORMANCE, LABOR AND MATERIAL BONDS AND MAINTENANCE BOND

9.2.1. The College may require the Contractor to furnish bonds. The bonds furnished by the Contractor shall be issued by a surety licensed to conduct business in the State of Maryland. The surety shall be approved by the College. The bonds furnished shall comply in all respects with the requirements of Maryland's Little Miller Act and shall be in the form prescribed by the College.

9.2.2. Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall permit a copy to be made.

9.2.3. If at any time, the surety becomes insolvent, files for bankruptcy or for any reason whatsoever loses its right to do business in the State of Maryland, the Contractor shall, as soon as practicable but no later than within five calendar days, inform the College of this occurrence in writing.

9.2.4. If at any time, the surety becomes insolvent, files for bankruptcy or for any reason whatsoever loses its right to do business in the State of Maryland, the Contractor shall, within ten (10) calendar days after notice from the College to do so, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety as may be satisfactory to the College.

ARTICLE 10 – CORRECTION OF WORK

10.1. CORRECTION OF WORK

10.1.1. Correction of Work Before Final Payment

10.1.1.1. The Contractor shall promptly remove from the premises all materials, equipment (whether incorporated in the Work or not) and Work rejected by the College's Project Manager as failing to conform to the Contract Documents, and the Contractor shall promptly replace and re-execute all Work under its Contract in accordance with the Contract Documents and without expense to the College and shall bear the expense of making good all Work of other contractors destroyed or damaged by such removal or replacement.

10.1.1.2. If the Contractor fails to correct nonconforming Work and does not proceed with correction of such Work within a reasonable period fixed by written notice from College's Project Manager, the College's Project Manager may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten (10) calendar days after written notice, the College's Project Manager may upon ten (10) additional calendar days written notice sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the College's Project Manager's and Architect/Engineer's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract sum shall be reduced by the deficiency. If payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the College.

10.1.2. Correction of Work after Substantial Completion of Work

10.1.2.1. If, within one year, or other time period established in the Contract Documents, after the date of Substantial Completion of the Work or designated portion thereof, any of the Work is found to not be in accordance with the Contract Documents, the Contractor, at its own expense shall correct it promptly after receipt of written notice from the College to do so. The Contractor shall pay for such tests and inspections made necessary by the faulty Work. The Contractor shall pay the costs incurred by the College for professional services and expenses, including but not limited to design professional and College's Project Manager fees, required as a result of Work found not in accordance with the Contract Documents, during the correction period. The correction period shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work. This obligation shall survive Final Completion of the Work under the Contract and the Contract Closeout.

10.2. ACCEPTANCE OF NON-CONFORMING WORK

10.2.1. If, in the opinion of the College, it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the Work injured or not performed in accordance with the Contract Documents, the compensation to be paid to the Contractor hereunder shall be reduced by such amount as in the judgment of the College to be equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 11 – MISCELLANEOUS PROVISIONS

11.1. LEGAL OBLIGATIONS, RELATIONS AND RESPONSIBILITIES

11.1.1. Laws to be Observed

11.1.1.1. The Contractor shall keep fully informed of all Executive Orders, Federal, State, county, bi-county, regional and local laws, ordinances, rules and regulations and all orders and decrees of bodies of tribunals having any jurisdiction or authority, which in any matter affect those engaged or employed on the Work, or which in any way effect the conduct of the Work. It shall at all times observe and comply with all such laws, rules, ordinances, regulations, orders and decrees; it shall protect and indemnify the College and its Project Managers against any such claim or liability arising from or based on the violation of any law, ordinance, regulation, order, or decree, whether by itself or its employees, Subcontractors or suppliers at any tier. Whenever the Contract Documents require the Contractor to comply with provisions of Federal, State or local laws, regulations, ordinances or codes, the Contractor must comply whether such laws, regulations, ordinances or codes are expressly incorporated into the Contract or not.

11.1.1.2. The Contractor must comply with the provisions of the Workers' Compensation Act and Federal, State and local laws relating to hours of labor.

11.1.1.3. This Contract shall be construed and interpreted according to the laws of the State of Maryland, without regard to principles of conflicts of law.

11.1.1.4. If the Contractor observes that the Contract Documents are at variance with any applicable law, ordinance or regulation, it shall promptly notify the College's Project Manager, and any necessary change shall be adjusted as provided in the Contract for changes in the Work. If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice, it shall bear all costs arising therefrom.

11.1.2. Regulations

11.1.2.1. Wherever any provision of any section of the Specifications conflicts with any agreements or regulations of any kind at any time in force among members of any Associations, Unions or Councils, which regulate or distinguish what work shall or shall not be included in the work of any particular, the Contractor shall make all necessary arrangements to reconcile any such conflict without delay, damage or cost to the College and without recourse to the College.

11.1.2.2. In case the progress of the Work is affected by any undue delay in furnishing or installing any items of material or equipment required under the Contract because of a conflict involving any such agreement or regulation, the College's Project Manager and Architect/Engineer may require that other material or equipment of equal kind and quality be provided at no additional cost to the College.

11.2. INDEPENDENT CONTRACTOR

11.2.1. The Contractor shall perform the Contract as an independent contractor and shall not be considered as an agent of the College, nor shall any employee or agent of the Contractor be considered subagents of the College. Nothing in this Contract shall be construed as constituting a partnership, joint venture, or agency between the College and Contractor. Other than duties of the College's Project Manager based on authority granted to the College's Project Manager by the College, no acts performed or representations, whether oral or written, made by or with respect to third parties and the Contractor shall be binding on the College.

11.3. EQUAL OPPORTUNITY

11.3.1. During the performance of this Contract, and in accordance with applicable law, the Contractor shall not discriminate in any manner on the basis of age, sex, race, color, religious belief, national origin, creed, status as a qualified individual with a disability or handicap, pregnancy, marital status or status as a disabled veteran or veteran of the Vietnam era.

11.3.2. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated equally during employment without regard to their age, sex, race, color, religious belief, national origin, creed, status as a qualified individual with a disability or handicap, pregnancy, marital status or status as a disabled veteran or veteran of the Vietnam era. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this non-discrimination clause.

11.3.3. During the performance of this contract, the Contractor agrees that it shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants shall receive consideration for employment without regard to sex, race, age, color, creed, national origin, religious belief, handicap, marital status or status as a disabled veteran or veteran of the Vietnam era. The Contractor further assures the College that, in accordance with the Immigration Reform and Control Act of 1986, it does not and will not discriminate against an individual with respect to hiring, or recruitment or referral for a fee, of the individual for employment or the discharging of the individual from employment because of such individual's national origin or in the case of a citizen or intending citizen, because of such individual's citizenship status.

11.3.4. The Contractor shall comply with all provisions of Executive Order 11246, as amended and of the rules, regulations and relevant orders of the Secretary of Labor.

11.3.5. The Contractor shall furnish all information and reports required by Executive Order 11246, as amended and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and shall permit access to the Contractor's books, records and accounts by the contracting agency and the Secretary

of Labor for purposes of investigation to ascertain compliance with such rules, regulations and orders.

11.3.6. In the event of the Contractor's noncompliance with the nondiscrimination clauses of the Contract or with any of such rules, regulations or orders, this contract may be canceled, terminated or suspended in whole or in part, or the College may take such other action as may be necessary to obtain compliance. If such noncompliance appears continuing, the College may suspend all Contract payments until the noncompliance has ceased. Any delay in completion of the Contract as the result of the College taking action to obtain compliance with the nondiscrimination clauses of this Contract shall not preclude the imposition and collection of the liquidated damages for each day of delay in completion of the Work as provided for elsewhere in the Contract Documents. The Contractor may also be declared ineligible for further contracts with the College in accordance with procedures authorized in Executive Order 11246, as amended. The College's conceptual rights and remedies provided under this section are in addition to any other rights and remedies as provided in Executive Order 11246, as amended or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law or under this Contract.

11.3.7. Subcontractors shall not be approved by the College without first agreeing to the above terms and conditions, and the Contractor shall include the provisions of subsections (1) through (7) of this section in every subcontract or purchase order unless exempted by rules, regulations or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246, as amended, so that such provisions shall be binding upon each Subcontractor or vendor. The Contractor shall take such action with respect to any Subcontractor or purchase order as the College may direct as a means of enforcing such provisions including sanctions for noncompliance; provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or vendor as a result of such direction by the College, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

11.4. COMPLIANCE WITH THE IMMIGRATION REFORM AND CONTROL ACT OF 1986

11.4.1. The Contractor warrants that both the Contractor and/or any subcontractor of the Contractor do not and shall not hire, recruit or refer for a fee, for employment under this Agreement or any subcontract, an alien knowing the alien is an unauthorized alien and hire any individual without complying with the requirements of the Immigration Reform and Control Act of 1986 (hereinafter referred to as "IRCA"), including but not limited to any verification and record keeping requirements. The Contractor agrees to indemnify and save the College, its employees and/or trustees harmless from any loss, costs, damages or other expenses suffered or incurred by the College, its employees and/or trustees by reason of the Contractor's or any subcontractor of the Contractor's noncompliance with "IRCA." The Contractor agrees to defend the College, its employees and/or trustees in any proceeding, action or suit brought against the College, including but not limited to administrative and judicial proceedings, arising out of or alleging noncompliance of the Contractor with "IRCA." The Contractor recognizes that it is the Contractor's responsibility to ensure that all certifications and verifications as required by law are obtained and maintained for the applicable time period.

11.5. ASSURANCE OF NONCONVICTION OF BRIBERY

11.5.1. The Contractor hereby declares and affirms that, to its best knowledge, none of its officers, directors or partners and none of its employees directly involved in obtaining contracts has been convicted of bribery, attempted bribery or conspiracy to bribe under the laws of any state or the Federal Government.

11.6. CONFLICT OF INTEREST

11.6.1. No employee of the College or of the State of Maryland, or any department, commission, agency or branch thereof whose duties as such employee include matters relating to or affecting the subject matter of this Agreement shall, until such time as the Contractor receives final payment, become or be an employee of the party or parties hereby contracting with the College, the State of Maryland, or any department, commission, agency or branch thereof.

11.7. ASSIGNMENT AND SUBCONTRACTING

11.7.1. Neither the College nor the Contractor shall sell, transfer, assign or otherwise dispose of this Agreement or any portion thereof, or its right, title or interest therein, or its obligations there under, without the written consent of the other. A change in membership of the Contractor's firm of one or more officers shall not constitute an assignment.

11.7.2. The Contractor shall not make any contracts for professional services with any other party for furnishing any of the work or services to be performed under this Agreement without the written approval of the College; however, this provision shall not be taken as requiring the approval of the contract of employment between the Contractor and its personnel assigned for the purposes of performing this Agreement.

11.8. CONTINGENT FEES

11.8.1. The Contractor hereby declares and affirms that neither it nor any of its representatives has employed or retained any person, partnership, corporation, or other entity, other than a bona fide employee or agent working for the Contractor, to solicit or secure this Agreement, and that it has not paid or agreed to pay any person, partnership, corporation, or other entity, other than a bona fide employee or agent, any fee or any other consideration contingent on the making of this Agreement.

11.9. MARYLAND PUBLIC INFORMATION ACT

11.9.1. The College is subject to the Maryland Public Information Act, Title 4 of the General Provisions Article of the Annotated Code of Maryland. Contractor agrees that it will provide any justification as to why any material, in whole or in part, is deemed to be confidential, proprietary information or secrets and provide any justification of why such materials should not be disclosed pursuant to the Maryland Public Information Act.

11.10. TESTING AND INSPECTION

11.10.1. The College may retain, or may require the Contractor to retain, the services of testing/inspection laboratories/firms to perform the tests and make the required inspections and reports during the course of the Work as specified in the various sections of the Specifications or as required by the College in case of questions as to the strength or suitability of materials. However, for the purpose of preparing and testing design concrete mixes, the Contractor will retain the services of a testing laboratory which shall be other than that retained by the College. The Contractor shall also be responsible for all tests as indicated in the Specifications.

11.10.2. Testing/inspection laboratories/firms shall be responsible for conducting and interpreting the tests, shall state in each report whether or not the specimens tested conform to all requirements of the Contract Documents and shall specifically note deviations, if any, from said requirements. All testing/inspection laboratories/firms shall be subject to the College's approval.

11.10.3. The cost of testing services required solely for the convenience of the Contractor in its scheduling and performance of the Work, and the cost of testing services related to remedial operations performed to correct deficiencies in the Work shall be borne by the Contractor.

11.10.4. The Contractor shall furnish to the College's Project Manager samples of all materials and component parts of the Work required as test specimens in connection with the specified tests, and shall furnish labor and facilities at the site as necessary in connection with testing and inspection services whether such services are performed at the expense of the College or the Contractor.

11.10.5. The nature and scope of testing services performed by an agency retained by the Contractor shall be in accordance with requirements of governing authorities having jurisdiction over the Work and as otherwise specified, and shall be consistent with reasonable standards of engineering practice.

11.10.6. If, in the performance of any testing, control, balancing, adjusting or similar activities to be performed by the Contractor or an agent of the Contractor, it is the opinion of the College's Project Manager that the Contractor or said agent has failed to substantiate its ability to perform such work, the Contractor shall, at its expense, retain the services of a testing laboratory or service organization which is satisfactory to the College's Project Manager for the performance of such work.

11.11. NO WAIVER OF RIGHTS – COLLEGE'S REMEDIES CUMULATIVE – COLLEGE'S DAMAGES

11.11.1. The College shall not be precluded or estopped by any measurement, estimate, change order, contract modification, certificate of payment, or payment from showing the true amount and character of the Work furnished by the Contractor, or from showing that any measurement, estimate, change order, contract modification, certificate of payment, or payment is untrue or was incorrectly made, or from showing that the Work does not in fact conform to the Contract Documents. The College may recover from the Contractor or its sureties, or both, such damages, loss or additional expense incurred as a result of any such error or measurement, estimate, change order, contract modification, certificate of payment, or payment as a result of such failure to conform to the Contract Documents. The College's right in this respect shall not be waived or barred by any inspection, acceptance or approval of the Work, or by payment therefore, or by granting an extension of time, or by taking possession, or by execution of a change order based on the erroneous measurement, estimate, or change order, contract modification, certificate of payment or payment.

11.11.2. The activities of the College's Project Manager, Architect/Engineer and the College respecting this Contract, including inspection of the Work, review of submittals, monitoring of progress, and so forth, are for the benefit of the College only and are not for the benefit of the Contractor. The College's failure to bring to the attention of the Contractor deficiencies in the Work or in the Contractor's performance will not constitute a waiver or excuse of the Contractor's failure to comply strictly with contract requirements.

11.11.3. The waiver by the College of any breach of contract by the Contractor shall not operate as a waiver of any other or subsequent breach.

11.11.4. The rights and remedies of the College and the obligations of the Contractor under various provisions of the Contract Documents and under provisions of the law are cumulative and not exclusive.

11.11.5. For any claim or cause of action accruing to the College as a result of or arising out of this Contract, the College may collect damages of any kind, including consequential damages, or damages for purely economic loss.

11.12 REGISTRATION FOR CORPORATIONS NOT INCORPORATED IN THE STATE OF MARYLAND

Pursuant to 7-201 et seq. of the Corporation and Associations Article of the Annotated Code of Maryland, corporations not incorporated in the State of Maryland shall be registered with the State Department of Assessments and Taxation, 301 West Preston Street, Baltimore, Maryland 21201, before doing any interstate or foreign business in this State. By signing this agreement, the Contractor certifies that it has qualified with the Department of Assessments and Taxation.

ARTICLE 12 – TERMINATION OF THE CONTRACT

12.1. TERMINATION FOR DEFAULT

12.1.1. The performance of the Work or services under this Contract may be terminated by the College, in whole or in part, from time to time, effective upon receipt of notice, whenever the Contractor shall default in the performance of this Agreement and fails to make progress in the prosecution of the contract work or endangers such performance and shall fail to cure such default within ten (10) calendar days period after receipt of written notification from the College specifying the default.

12.1.2. The College may terminate the Contract if the Contractor;

12.1.2.1. persistently or repeatedly refuses or fails to supply enough properly skilled Workers or materials;

12.1.2.2. fails to make payment to Subcontractors for materials or labor in accordance with their respective agreements between the Contractor and the Subcontractors;

12.1.2.3. persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction;

12.1.2.4. refuses or fails to prosecute the Work, or any separable part thereof with such diligence as shall ensure its completion within the time specified in the Contract or in the extension thereof;

12.1.2.5. fails to complete the Work within the time allotted by the Contract; or

12.1.2.6. is in breach of any material obligation of the Contract, including a breach which may occur after Substantial Completion.

12.1.3. If any of the above reasons exist, the College may without prejudice to any other rights or remedies of the College and after giving the Contractor and the Contractor's surety, if any, seven days written notice, terminate the employment of the Contractor and may, subject to any rights of the surety:

12.1.3.1. take possession of the site and all materials, equipment, tools, and construction equipment and machinery owned by the Contractor; and

12.1.3.2. finish the Work by whatever reasonable means the College may deem is in its interests.

12.1.4. When the College terminates the Contract for one of the reasons stated herein, the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Sum exceeds the cost to finish the Work, such excess shall be applied to the Contractor's unreimbursed costs, if any, accrued from the last payment prior to termination to time of termination. This amount shall become due to the Contractor. Any unreimbursed costs exceeding the difference of unpaid balance of the Contract Sum and the cost to finish the Work shall be lost to the Contractor. If the cost to finish the Work exceeds the Contract Sum, the Contractor shall pay the difference to the College. The amount to be paid to the Contractor or College, as the case may be, shall survive termination of the Contract.

12.2. TERMINATION FOR CONVENIENCE

12.2.1. The College may, at any time, terminate the Contract in whole or in part for the College's convenience and without cause.

12.2.2. Upon receipt of written notice from the College of such termination for the College's convenience, the Contractor shall (1) cease operations as directed by the College in the notice; (2) take actions necessary, or that the College may direct, for the protection and preservation of the Work; and (3) except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

12.2.3. In the case of such termination for the College's convenience, the Contractor shall be entitled to receive payment from the College for all expenses incurred by it for satisfactory work, including reasonable termination expenses. Upon satisfactory proof that the Contractor would have earned a profit for Work performed prior to the date of termination, the Contractor shall be paid a reasonable amount for profit not to exceed 10% of the Contractor's costs incurred. Under no circumstances shall the Contractor be entitled to

payment for anticipated but unearned profit, overhead, and damages. In no event shall the Contractor's cost of the Work and profit, if any, to be reimbursed exceed the Contract Sum as adjusted by approved change orders.

END OF GENERAL CONDITIONS

SUPPLEMENTARY CONDITIONS OF THE CONTRACT

PART 1 - COMPLEX STRUCTURES

1.1 Paragraph 3.1.2 of Section 007200, General Conditions of the Contract, Montgomery County Complex Structures process does not apply to this project.

PART 2 - PROJECT PROCEDURES

2.1 The Contractor shall coordinate with the College regarding site access and utilities shut downs.

2.2 The Contractor and Subcontractors must adhere to all College Policies and Procedures. MC's Policies and Procedures may be found online at: https://www.montgomerycollege.edu/policies-and-procedures/index.html

2.3 The Contractor shall accommodate mid-terms and final exams in the schedule and refrain from any noisy or disruptive work during this time. The College shall determine time frame for mid-term and final examinations.

2.4 The Macklin Tower Roof Replacement and Limited HVAC Upgrades project will be executed concurrently with the Macklin Tower Library Renovation project. The contractor for the Roof Replacement project shall coordinate their work to align with the Library Renovation schedule.

2.5 The Macklin Tower Building will be partially occupied during the duration of the project. Contractor shall minimize disruption to operation in occupied areas. Coordinate utilities shut off in advance with the College.

2.6 The HVAC equipment for this project is connected to the shared hot water/chilled water (HW/CW) piping system serving both this and the Library Renovation project. The replacement of VAVs and exterior underground piping shall be coordinated with the HVAC work associated with the Macklin Tower Library Renovation. The Contractor shall closely coordinate with the Macklin Tower Library Renovation schedule.

2.7 The contractor for this project is responsible for testing and balancing the work that is part of this project. It is expected for the contractor of this project to closely coordinate TAB activities with the CMAR of the Macklin Tower Library Renovation project and to sequence TAB activities in a manner that makes sense for both projects.

2.8 The building contains asbestos and other hazardous materials. The contractor is responsible for abatement of asbestos and removal of hazardous materials to allow for construction of the Work. The contractor is responsible for providing proper and timely notification to the AHJs and governing bodies, and to comply with Maryland State regulations. The contractor will perform a pre-abatement meeting and/or site walk-through with the College.

2.9 Roof assemblies and manufacturers to be FM Global approved, with an associated RoofNav Assembly Number.

2.10 It is anticipated for the contractor of this project to have multiple mobilizations for the roof replacement portion of work. Temporary patching will be required after demolition of roof equipment and structure by the Macklin Tower Library Renovation project. Partial demolition of the roof to facilitate installation of roof curb, clerestory window, and other penetrations from the Macklin Tower Library Renovation project will also be required.

PART 3 - PREVAILING WAGE RATES

3.1 With regard to Paragraph 3.3.1.3 of Section 007200, Montgomery College General Conditions of the Contract, Contractor is advised that this project is **NOT** subject to the Maryland Prevailing Wage Law.

END OF SUPPLEMENTARY CONDITIONS

Montgomery College

MACKLIN TOWER ROOF REPLACEMENT

Rockville, MD

HCM Project No. 225012.000

PROJECT MANUAL

PERMIT AND BID SET

August 29, 2025

VOL 1 of 1, **Divisions 00 - 32**

hord | coplan | macht

700 E. Pratt Street, Suite 1200, Baltimore, MD 21202, (410) 837-7311

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PROJECT DIRECTORY

Owner:
Montgomery College
9221 Corporate Boulevard
Rockville, MD 20850

Architect:
Hord Coplan Macht, Inc.
700 East Pratt Street Ste. 1200
Baltimore, MD 21202
Phone: 410-837-7311

Landscape Architect:
Hord Coplan Macht, Inc.
400 East Pratt Street Ste. 1200
Baltimore, MD 21202
Phone: 410-837-7311

Structural Engineer:
A+F Engineers, Inc.
1112 16th St. NW Unit 920
Washington, DC 20036
Phone: 202-628-1600

Mechanical, Plumbing Engineer:
James Posey Associates, Inc.
11155 Red Run Blvd.
Owings Mills, MD 21117
Phone: 410-265-6100

Electrical Engineer:
James Posey Associates, Inc.
11155 Red Run Blvd.
Owings Mills, MD 21117
Phone: 410-265-6100

Roofing/Envelope Consultant:
Gale & Associates, Inc.
1122 Kenilworth Drive, Suite 206
Towson, MD 212042143
Phone: 443-249-4500

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PERMIT AND BID SET
AUGUST 29, 2025

COVER

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DOCUMENT 003126 - EXISTING HAZARDOUS MATERIAL INFORMATION

1.1 EXISTING HAZARDOUS MATERIAL INFORMATION

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.

B. An existing asbestos report for Project, prepared by Boggs Environmental Consultants, dated July 2, 2021, is available for viewing.

END OF DOCUMENT 003126

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SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work under Owner's separate contracts.
4. Owner-furnished/Contractor-installed (OFCI) products.
5. Contractor's use of site and premises.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and Drawing conventions.
9. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.3 PROJECT INFORMATION

A. Project Identification: Montgomery College, Macklin Tower Roof Replacement and Limited HVAC Upgrades.

1. Project Location: 51 Mannakee Street, Rockville, MD.
2. HCM Project Number: 225012.00.
3. MC Project # FP24-021.

B. Owner: Montgomery College, 9221 Corporate Boulevard, Rockville, MD 20850. .

C. Architect: Hord Coplan Macht Inc., 700 East Pratt Street, Ste. 1200, Baltimore, MD 21202, 410-837-7311, www.hcm2.com. Contact: Michael Ferraro, mferraro@hcm2.com.

D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:

1. Landscape Architect: Hord Coplan Macht Inc., 700 East Pratt Street, Ste. 1200, Baltimore, MD 21202, 410-837-7311.
2. Structural Engineer: A+F Engineers, Inc., 1112 16th St. NW Unit 920, Washington, DC 20036, 202-628-1600.
3. Mechanical, Plumbing Engineer: James Posey Associates, Inc., 11155 Red Run Blvd., Owings Mills, MD 21117, 410-265-6100.
4. Electrical Engineer: James Posey Associates, Inc., 11155 Red Run Blvd., Owings Mills, MD 21117, 410-265-6100.

E. Other Owner Consultants: Owner has retained the following design professionals who have prepared designated portions of the Contract Documents:

1. Roofing/Envelope Consultant: Gale & Associates, Inc., 1122 Kenilworth Drive, Suite 206, Towson, MD 21204-2143, 443-279-4500.

F. Web-Based Project Software: Project software will be used for purposes of managing communication and documents during the construction stage.

1. See Section 013100 "Project Management and Coordination." for requirements for using web-based Project software.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. Renovation of existing terrace into a vegetated roof, roof replacement, and improvements to the building mechanical system and other Work indicated in the Contract Documents.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 WORK UNDER OWNER'S SEPARATE CONTRACTS

A. Work with Separate Contractors: Cooperate fully with Owner's separate contractors, so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under Owner's separate contracts.

B. Preceding Work: Owner will award separate contract(s) for the following construction operations at Project site. Those operations are scheduled to be substantially complete before Work under this Contract begins.

1. Asbestos abatement.

1.6 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:

1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
2. Provide for delivery of Owner-furnished products to Project site.
3. Upon delivery, inspect, with Contractor present, delivered items.

    a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.

4. Obtain manufacturer's inspections, service, and warranties.
5. Inform Contractor of earliest available delivery date for Owner-furnished products.

B. Contractor's Responsibilities: The Work includes the following, as applicable:

1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
3. Receive, unload, handle, store, protect, and install Owner-furnished products.
4. Make building services connections for Owner-furnished products.
5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
6. Repair or replace Owner-furnished products damaged following receipt.

C. Owner-Furnished/Contractor-Installed (OFCI) Products:

1. Items as indicated on Drawings.

1.7 CONTRACTOR'S USE OF SITE AND PREMISES

A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.

    a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.8 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

1.9 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit work to normal business working hours of 6:00 a.m. to 3:00 p.m., unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.

1. Weekend Hours: As permitted by Owner.
2. Early Morning Hours: As permitted by Owner.
3. Hours for Utility Shutdowns: As permitted by Owner.
4. Hours for Loud/Noisy Activity: As permitted by Owner and authorities having jurisdiction.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions, or as otherwise permitted by Owner.
2. Obtain Owner's written permission before proceeding with utility interruptions.

D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations, or as otherwise permitted by Owner.
2. Obtain Owner's written permission before proceeding with disruptive operations.

E. Smoking and Controlled Substance Restrictions: Use of tobacco products , alcoholic beverages, and other controlled substances on campus is not permitted.

F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.11 MISCELLANEOUS PROVISIONS

A. Owner's Sustainability Statement as appended to this Document.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

Owner's Sustainability Statement

As good stewards, it is Montgomery College's goal to furnish and maintain sustainable facilities, which are safe, reliable, life cycle cost effective, environmentally friendly, resilient and conform to Owner's Project Requirements (OPR). These facilities exist to provide a quality-built environment which enhances the learning experience and contributes to student success. To achieve this goal Montgomery College embraces a total quality process which relies on the vision, talents, and collaboration of all individuals involved or affected by this project.

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SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances may include the following:

1. Lump-sum allowances.
2. Quantity allowances.

C. Related Requirements:

1. Section 012200 "Unit Prices" for procedures for using unit prices, including adjustment of quantity allowances when applicable.
2. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
3. Section 014000 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.5 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.9 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs due to a change in the scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 01: Include the sum of $60,000 to support work such as existing cabling, repair/replace existing conduit fittings, and support and close junction boxes found during demolition of existing ceiling in accordance with NEC requirements.

1. Coordinate quantity allowance adjustment with corresponding unit-price requirements in Section 012200 "Unit Prices."

END OF SECTION

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 012100 "Allowances" for procedures for using unit prices to adjust quantity allowances.
2. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
3. Section 014000 "Quality Requirements" for field testing by an independent testing agency.

1.3 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the Part 3 "Schedule of Unit Prices" Article contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Unit Price No. 01: Electrical Cabling Support and Raceway Repair.

1. Description: Support existing cabling, repair/replace existing conduit fittings, and support/close junction boxes found during demolition of existing ceiling in accordance with NEC requirements.

a. Unit of measurement: Each cable support (for MC-cable and low-voltage system cable), including connection to structure, support wire or threaded rod, and J-hook/cable fastener.
b. Unit of measurement: Each box cover for up to 4"x4" box.
c. Unit of measurement: Each box cover up to 4"x4" box and extension ring.
d. Unit of measurement: Each Box support including connection to structure, threaded rod, and connection to box.
e. Unit of measurement: MC cable to junction box fitting with insulated throat.
f. Unit of measurement: Threaded steel conduit coupling between conduits with insulated throat, up to 1 1/4" conduit.
g. Unit of measurement: Threaded steel conduit connector between conduit and junction box with insulated throat, up to 1 1/4" conduit.
h. Unit of measurement: Seal conduit / cable penetration with fire rated sealant, up to 1 1/2" penetration.

END OF SECTION

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other Work of the Contract.

C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Provide Alternates as indicated on Drawings.

END OF SECTION

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 012100 "Allowances" for products selected under an allowance.
2. Section 012300 "Alternates" for products selected under an alternate.
3. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use form CSI 13.1A or comparable form acceptable to Architect.

a. Substitutions will not be considered as submittals until approved by Owner. Substitutions provided as submittals will be rejected.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.
g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES and other applicable code organizations.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Requested substitution provides sustainable design characteristics that specified product provided for compliance with sustainable design requirements.
c. Substitution request is fully documented and properly submitted.
d. Requested substitution will not adversely affect Contractor's construction schedule.
e. Requested substitution has received necessary approvals of authorities having jurisdiction.
f. Requested substitution is compatible with other portions of the Work.
g. Requested substitution has been coordinated with other portions of the Work.
h. Requested substitution provides specified warranty.
i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions (ASIs) authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, using Architect's standard ASI form, AIA Document G710, or other comparable form.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Quotation Form: Use forms acceptable to Architect.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on Architect's form, an AIA form, or other form acceptable to the Architect.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on Architect's form, an AIA form, or other form acceptable to the Architect. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

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SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the schedule of values:

a. Project name and location.

b. Owner's name.
c. Owner's Project number.
d. Name of Architect.
e. Architect's Project number.
f. Contractor's name and address.
g. Date of submittal.

2. Arrange schedule of values consistent with format of AIA Document G703.
3. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:

    a. Related Specification Section or division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.

        1) Labor.
        2) Materials.
        3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site.

6. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
7. Purchase Contracts: Provide a separate line item in the schedule of values for each Purchase contract. Show line-item value of Purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
8. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
9. Overhead Costs, Separate Line Items: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
10. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
11. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.

12. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architectand paid for by Owner.

B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

1. Other Application for Payment forms proposed by the Contractor may be acceptable to Architect and Owner. Submit forms for approval with initial submittal of schedule of values.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action. Schedule update required with each Application for Payment.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.

E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:

a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.

c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Sustainable design action plans, including preliminary project materials cost data.
7. Schedule of unit prices.
8. Submittal schedule (preliminary if not final).
9. List of Contractor's staff assignments.
10. List of Contractor's principal consultants.
11. Copies of building permits.
12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
13. Initial progress report.
14. Report of preconstruction conference.
15. Certificates of insurance and insurance policies.
16. Performance and payment bonds.
17. Data needed to acquire Owner's insurance.

I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."

2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Certification of completion of final punch list items.
3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
4. Updated final statement, accounting for final changes to the Contract Sum.
5. AIA Document G706.
6. AIA Document G706A.
7. Evidence that claims have been settled.
8. Proof that taxes, fees, and similar obligations are paid.
9. Waivers and releases.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:

1. General coordination procedures.
2. RFIs.
3. Digital project management procedures.
4. Web-based Project management software package.
5. Project meetings.

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.

C. Related Requirements:

1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.
4. Section 019113 "General Commissioning Requirements" for coordinating the Work with Owner's Commissioning Authority.

1.3 DEFINITIONS

A. BIM: Building Information Modeling.

B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and in prominent location in each built facility. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.6 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Owner name.
3. Owner's Project number.
4. Name of Architect.
5. Architect's Project number.
6. Date.
7. Name of Contractor.
8. RFI number, numbered sequentially.
9. RFI subject.
10. Specification Section number and title and related paragraphs, as appropriate.
11. Drawing number and detail references, as appropriate.
12. Field dimensions and conditions, as appropriate.
13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
14. Contractor's signature.
15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.

    a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.

1. Attachments shall be electronic files in PDF format.

D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow five (5) working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.

c. Requests for approval of Contractor's means and methods.
d. Requests for coordination information already indicated in the Contract Documents.
e. Requests for adjustments in the Contract Time or the Contract Sum.
f. Requests for interpretation of Architect's actions on submittals.
g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."

a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 days of receipt of the RFI response.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log at regular intervals. Include the following, Use of the software log that is part of web-based Project management software is also accepted.

1. Project name.
2. Name and address of Contractor.
3. Name and address of Architect.
4. RFI number, including RFIs that were returned without action or withdrawn.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, or Proposal Request, as appropriate.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three days if Contractor disagrees with response.

1.7 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. Architect's Digital Data Files: Electronic digital data files of drawings can be provided by the Architect for the Contractor's use, upon request, and at the Architect's discretion.

1. Contractor and all Subcontractors proposing to use furnished digital data shall execute a data licensing agreement in the form of the "Digital Information Release Agreement" included in the Project Manual following this Section.
2. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
3. Digital Format: Digital data may be available in Revit (BIM), AutoCAD, or PDF, contingent upon the Project.
4. The following information types may be furnished:

a. Architectural floor plans.
b. Architectural reflected ceiling plans.
c. Other drawing types at the Architect's discretion.

B. Web-Based Project Management Software Package: Use Architect's NEWFORMA web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.

1. Web-based Project management software includes, at a minimum, the following features:

a. Compilation of Project data, including Contractor, subcontractors, Architect, Architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
b. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
c. Document management for Drawings, Specifications, and coordination drawings, including revision control.
d. Management of construction progress photographs.
e. Mobile device compatibility, including smartphones and tablets.

C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.8 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of seven days prior to meeting.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.

B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Responsibilities and personnel assignments.
    b. Tentative construction schedule.
    c. Phasing.
    d. Critical work sequencing and long lead items.
    e. Designation of key personnel and their duties.
    f. Lines of communications.
    g. Use of web-based Project software.
    h. Procedures for processing field decisions and Change Orders.
    i. Procedures for RFIs.
    j. Procedures for testing and inspecting.
    k. Procedures for processing Applications for Payment.
    l. Distribution of the Contract Documents.
    m. Submittal procedures.
    n. Sustainable design requirements.
    o. Sustainability best-practices.

        1) For Projects in-general, discuss sustainability best practices; endeavor to use recycled content, limit VOCs, and recycle construction waste.

    p. Preparation of Record Documents.
    q. Use of the premises and existing building.
    r. Work restrictions.
    s. Working hours.
    t. Owner's occupancy requirements.
    u. Responsibility for temporary facilities and controls.
    v. Procedures for moisture and mold control.
    w. Procedures for disruptions and shutdowns.
    x. Construction waste management and recycling.
    y. Parking availability.
    z. Office, work, and storage areas.
    aa. Equipment deliveries and priorities.
    bb. First aid.
    cc. Security.
    dd. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Commissioning Authority of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

    a. Contract Documents.
    b. Options.
    c. Related RFIs.
    d. Related Change Orders.
    e. Purchases.
    f. Deliveries.
    g. Submittals.
    h. Sustainable design requirements.
    i. Review of mockups.
    j. Possible conflicts.
    k. Compatibility requirements.
    l. Time schedules.
    m. Weather limitations.
    n. Manufacturer's written instructions.
    o. Warranty requirements.
    p. Compatibility of materials.
    q. Acceptability of substrates.
    r. Temporary facilities and controls.
    s. Space and access limitations.
    t. Regulations of authorities having jurisdiction.
    u. Testing and inspecting requirements.
    v. Installation procedures.
    w. Coordination with other work.
    x. Required performance results.
    y. Protection of adjacent work.
    z. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.

2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

    a. Preparation of Record Documents.
    b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    c. Procedures for completing and archiving web-based Project software site data files.
    d. Submittal of written warranties.
    e. Requirements for completing sustainable design documentation.
    f. Requirements for preparing operations and maintenance data.
    g. Requirements for delivery of material samples, attic stock, and spare parts.
    h. Requirements for demonstration and training.
    i. Preparation of Contractor's punch list.
    j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    k. Submittal procedures.
    l. Coordination of separate contracts.
    m. Owner's partial occupancy requirements.
    n. Installation of Owner's furniture, fixtures, and equipment.
    o. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at regular intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

    a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

        1) Review schedule for next period.

    b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Status of sustainable design documentation.
5) Deliveries.
6) Off-site fabrication.
7) Access.
8) Site use.
9) Temporary facilities and controls.
10) Progress cleaning.
11) Quality and work standards.
12) Status of correction of deficient items.
13) Field observations.
14) Status of RFIs.
15) Status of Proposal Requests.
16) Pending changes.
17) Status of Change Orders.
18) Pending claims and disputes.
19) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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DIGITAL INFORMATION RELEASE AGREEMENT

hord | coplan | macht

Date:	
Project:	
Project No:	

The undersigned has requested access to design materials and related information, including Revit models or other digital models (the "Materials") in electronic format which were prepared by, or in the process of being prepared by, Hord Coplan Macht, Inc. (HCM) concerning the above referenced Project(s). The undersigned seeks access to the Materials for pricing and constructability review, and other uses. HCM is willing to permit access and use of the Materials, which access is expressly conditioned upon the following conditions.

Accordingly, the undersigned understands, acknowledges, and agrees:

1. That the Materials are prepared and stored on a computer system that may be vulnerable to latent defects, deficiencies, computer "viruses" and hidden software that could cause damage to the undersigned's own computer systems and business information.

2. The Materials comprise digital information which may be changed after the undersigned's receipt of the Materials. Electronic data, such as the Materials, stored on electronic media can deteriorate undetected and may be modified or altered without the knowledge of the undersigned or HCM. Further, HCM is under no obligation to correct, modify or update the Materials or to notify the undersigned of any need to correct, modify, or update the Materials.

3. The Materials may not be verified as compliant with all authorities having jurisdiction over the Project, and may be incomplete, may contain errors, and otherwise may not represent an accurate set of Materials required for the Project. Accordingly, the use of the Materials is wholly at the risk of the undersigned. Further, the use of Materials shall not in any way obviate the undersigned's responsibility for the proper checking and coordination of built conditions, dimensions, details, materials, sizes and quantities as required to facilitate complete and accurate pricing, fabrication and erection.

4. The Materials were generated utilizing commercial software (e.g. AutoCad, Revit) under license to HCM, and HCM is under no obligation to provide any software or hardware required to read and manipulate said information. HCM is also under no obligation to provide supplemental files, and linked data (e.g. font files, line types, or external references). The digital files to be provided for this project will be in _____ format as requested and as prepared by HCM.

5. The undersigned acknowledges the Materials are the property of HCM and its consultants or may be governed by HCM's contract concerning the Project. Accordingly, HCM neither owns nor controls the release of our consultants' digital files (i.e. MEP, structural, civil, etc.). This agreement does not constitute a transfer of ownership or copyright in the Materials or transfer or relinquishment of any rights to the intellectual properties contained in the Materials.

6. It is the sole discretion of HCM to determine the scope of any Materials which it may release and any costs for the same. The undersigned may use the documents and design only for the projects where HCM is the Architect for the above referenced project and only with our express written permission.

7. The undersigned agrees to indemnify, defend, release, and hold HCM, their consultants, and the Owner harmless from any responsibility or obligation as to the accuracy or completeness of the Materials and further waives any claim it may have for expenses, including but not limited to attorney's fees, resulting from the undersigned relying upon or utilizing the Materials.

8. The Materials are provided for the exclusive use of the personnel of the undersigned ONLY. The information will not be transferred by the undersigned for use by others.

9. The undersigned confirms that it will use the Materials solely with respect to the Project and shall not use, copy, or distribute the Materials for any other project or purpose. The undersigned shall require each individual user of the Materials, to the extent of the work to be performed by such user, to be bound by the terms and conditions of this Agreement, and to assume toward the undersigned all the obligations and responsibilities that the undersigned, by this Agreement, assumes toward HCM.

10. The undersigned acknowledges and agrees that in the event of a breach or threatened breach of this Agreement by the undersigned or any of its employees or agents, HCM or its consultants may suffer irreparable harm and therefore HCM will be entitled to seek injunctive relief to enforce this Agreement, in addition to any other legal remedies available to them. The undersigned expressly agrees that HCM shall be entitled to collect from the undersigned any reasonable attorneys' fees or costs incurred by HCM to enforce this Agreement or any provision herein.

The above shall constitute the entire agreement between Hord Coplan Macht, Inc, and the undersigned for providing the undersigned permission to access and utilize the Materials for any and all purposes.

THIS AGREEMENT ACCEPTED BY:

Company: Hord Coplan Macht, Inc.	Company:
Name:	Name:
Title:	Title:
Signature:	Signature:

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's Construction Schedule.
2. Construction schedule updating reports.
3. Site condition reports.
4. Unusual event reports.

B. Related Requirements:

1. Section 014000 "Quality Requirements" for schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

1.4 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. PDF file.

B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Site Condition Reports: Submit at time of discovery of differing conditions.

E. Unusual Event Reports: Submit at time of unusual event.

1.5 QUALITY ASSURANCE

A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Review software limitations and content and format for reports.
2. Verify availability of qualified personnel needed to develop and update schedule.
3. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial Owner occupancy (if any).
4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.6 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Temporary Facilities: Indicate start and completion dates for the following as applicable:

    a. Securing of approvals and permits required for performance of the Work.
    b. Temporary facilities.
    c. Construction of mock-ups, prototypes and samples.
    d. Owner interfaces and furnishing of items.
    e. Interfaces with Separate Contracts.
    f. Regulatory agency approvals.
    g. Punch list.

3. Procurement Activities: Include procurement process activities for long lead-time items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery. .
4. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
6. Commissioning Time: Include no fewer than 15 days for commissioning.
7. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
8. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
6. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use-of-premises restrictions.

f. Provisions for future construction.
g. Seasonal variations.
h. Environmental control.

7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

a. Subcontract awards.
b. Submittals.
c. Purchases.
d. Mockups.
e. Fabrication.
f. Sample testing.
g. Deliveries.
h. Installation.
i. Tests and inspections.
j. Adjusting.
k. Curing.
l. Building flush-out.
m. Startup and placement into final use and operation.
n. Commissioning.

8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

a. Structural completion.
b. Temporary enclosure and space conditioning.
c. Permanent space enclosure.
d. Completion of mechanical installation.
e. Completion of electrical installation.
f. Substantial Completion.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion, and the following interim milestones:

1. Interior mock-ups review.
2. Electrical box-walks.
3. Commissioning reviews.
4. Important dates on Owner's schedule.

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

G. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Final Completion percentage for each activity.

H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

I. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.8 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for the Notice to Proceed.

1. Base schedule on the startup construction schedule and additional information received since the start of Project.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.9 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.

3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Construction Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

C. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
5. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
6. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
8. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.

    a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.

4. Format: Arrange the following information in a tabular format:

    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Architect.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
8. Category and type of submittal.
9. Submittal purpose and description.

10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

    a. the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 14 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 14 calendar days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 calendar days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 14 calendar days for review of each submittal. Submittal will be returned to before being returned to Contractor.

    a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. Submittals, General: For electronic submittals exceeding 24 pages, provide an index and electronic bookmarks to allow navigation through the submittal. Submittals without electronic bookmarks will be returned "not reviewed" at the architect's discretion.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.

d. Statement of compliance with specified referenced standards.
e. Testing by recognized testing agency.
f. Application of testing agency labels and seals.
g. Notation of coordination requirements.
h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

a. Wiring diagrams that show factory-installed wiring.
b. Printed performance curves.
c. Operational range diagrams.
d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

D. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.
d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.
3. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit two (2) sets of Samples. Architect will retain one (1) Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

F. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

G. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

H. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.

I. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.

b. Date of evaluation.
c. Time period when report is in effect.
d. Product and manufacturers' names.
e. Description of product.
f. Test procedures and results.
g. Limitations of use.

1.7 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit a digitally signed PDF file of the certificate, signed and sealed by the responsible design professional licensed in the State of the AHJ, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.
2. Submit delegated designs to the Authorities Having Jurisdiction (AHJ), in electronic format or paper copies, as required by the AHJ. Delegated designs that require submittal may include, but are not limited to the following:

a. Fire alarm systems.
b. Fire suppression systems.
c. Structural engineering that is not provided by the project engineer-of-record.
d. Some access control systems.

1.8 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 ARCHITECT'S REVIEW

A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.

1. Architect will indicate, via markup on each submittal, the appropriate action, as follows:

a. NO EXCEPTIONS TAKEN: Submittals which require no corrections.
b. EXCEPTIONS AS NOTED: Minor amount of corrections are noted on the submittal; necessary corrections will be assumed as understood by Contractor unless the Architect is notified within seven (7) calendar days.
c. EXCEPTIONS AS NOTED-PARTIAL RESUBMITTAL REQUIRED.
d. REVISE AND RESUBMIT.
e. INCOMPLETE-RESUBMIT. Submittals returned to the Contractor and not considered as submitted, such as:

1) Violation of submission procedures.
2) Inadequately reviewed by the Contractor.
3) Not containing the Contractor’s approval stamp.
4) Inaccurate and substantially in error.
5) Lacking completeness or clarity.

f. DISAPROVED-RESUBMIT: Submittals contrary to requirements of the Contract Documents including submission procedure. Necessary corrections are too extensive for consideration.
g. REJECTED.
h. PROVIDE RECORD RESUBMITTAL WIT HREQUESTED CORRECTIONS IDENTIFIED: Make corrections noted on the submittals and provide a file copy of the corrected submittal for Project documentation. Necessary corrections will be assumed as understood by Contractor unless the Architect is notified within seven (7) calendar days.
i. REVIEWED FOR INFORMATION ONLY.
j. FOR RECORD ONLY.
k. NOT SUBJECT TO REVIEW: Submittals outside of the scope of the Contract Documents and thus returned to the Contractor and not considered as submitted.

2. Architect's consultants will indicate, via markup on each submittal, the appropriate action. Submittals will be returned to the Contractor through the Architect.

B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Architect will return without review submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 013516 - ALTERATION PROJECT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes special procedures for alteration work.

1.2 DEFINITIONS

A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.

B. Consolidate: To strengthen loose or deteriorated materials in place.

C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.

D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

K. Retain: To keep an element or detail secure and intact.

L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.3 COORDINATION

A. Pedestrian and Vehicular Circulation: Coordinate alteration work with circulation patterns within Project building(s) and site. Some work is near circulation patterns . Circulation patterns cannot be closed off entirely and in places can be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

1.4 PROJECT MEETINGS FOR ALTERATION WORK

A. Preliminary Conference for Alteration Work: Before starting alteration work, conduct conference at Project site.

1. Attendees: In addition to representatives of Owner, Architect, and Contractor, testing service representative, specialists, and chemical-cleaner manufacturer(s) shall be represented at the meeting.
2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:

    a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
    b. Fire-prevention plan.
    c. Governing regulations.
    d. Areas where existing construction is to remain and the required protection.
    e. Hauling routes.
    f. Sequence of alteration work operations.
    g. Storage, protection, and accounting for salvaged and specially fabricated items.
    h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
    i. Qualifications of personnel assigned to alteration work and assigned duties.
    j. Requirements for extent and quality of work, tolerances, and required clearances.
    k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.

3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.

1.5 INFORMATIONAL SUBMITTALS

A. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.

1.6 QUALITY ASSURANCE

A. Title X Requirement: Each firm conducting activities that disturb painted surfaces shall be a "Lead-Safe Certified Firm" according to 40 CFR 745, Subpart E, and use only workers that are trained in lead-safe work practices.

B. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.

1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.

D. Safety and Health Standard: Comply with ANSI/ASSP A10.6.

1.7 STORAGE AND HANDLING OF SALVAGED MATERIALS

A. Salvaged Materials for Reinstallation:

1. Repair and clean items for reuse as indicated.
2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.

B. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.

C. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.

1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, or photographs by annotating the identifying marks.
2. Secure stored materials to protect from theft.
3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F or more above the dew point.

D. Storage Space:

1. Owner will arrange for limited on-site location(s) for free storage of salvaged material. This storage space does not include security for stored material.
2. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.

1.8 FIELD CONDITIONS

A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of preconstruction photographs .

B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.

C. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.

1. Use only proven protection methods, appropriate to each area and surface being protected.
2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
3. Erect temporary barriers to form and maintain fire-egress routes.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.

7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.

B. Temporary Protection of Materials to Remain:

1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.

C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.

D. Utility and Communications Services:

1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.

1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

F. Existing Roofing: Prior to the start of work in an area, install roofing protection as indicated on Drawings.

3.2 PROTECTION FROM FIRE

A. General: Follow fire-prevention plan and the following:

1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties titled "Owner's Responsibility for Fire Protection."
2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.

a. If combustible material cannot be removed, provide fire blankets to cover such materials.

B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:

1. Obtain Owner's approval for operations involving use of welding or other high-heat equipment. Use of open-flame equipment is not permitted. Notify Owner at least 72 hours before each occurrence, indicating location of such work.
2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:

    a. Train each fire watch in the proper operation of fire-control equipment and alarms.
    b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
    c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
    d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each areato detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
    e. Maintain fire-watch personnel at each area of Project site until two hours after conclusion of daily work.

C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.

D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.

1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.3 PROTECTION DURING APPLICATION OF CHEMICALS

A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.

B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.

C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.

D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.

E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.4 GENERAL ALTERATION WORK

A. Have specialty work performed only by qualified specialists.

B. Ensure that supervisory personnel are present when work begins and during its progress.

C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs.

D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.

E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.

1. Do not proceed with the work in question until directed by Architect.

END OF SECTION 013516

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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, Commissioning Authority**,** or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

D. Mockups: Physical assemblies of portions of the Work constructed to establish the standard by which the Work will be judged. Mockups are not Samples.

1. Mockups are used for one or more of the following:

    a. Verify selections made under Sample submittals.
    b. Demonstrate aesthetic effects.
    c. Demonstrate the qualities of products and workmanship.
    d. Demonstrate successful installation of interfaces between components and systems.
    e. Perform preconstruction testing to determine system performance.

2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" has the same meaning as the term "testing agency."

I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.4 DELEGATED DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated Design Services Statement: Submit a statement signed and sealed by the responsible design professional licensed in the State of the AHJ, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.6 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.

C. Reports: Prepare and submit certified written reports and documents as specified.

D. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.

B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.

1. Project quality-control manager may also serve as Project superintendent.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by Commissioning Authority.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.

11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement of whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement of whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.

1. Requirements of authorities having jurisdiction supersede requirements for specialists.

G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:

1. Provide test specimens representative of proposed products and construction.
2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
4. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.
5. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
6. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect and Commissioning Authority, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect.
3. Notify Architect not less than seven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.

    a. Allow seven days for initial review and each re-review of each mockup.

7. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
8. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
9. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
10. Demolish and remove mockups when directed unless otherwise indicated.

1.10 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Engage a qualified testing agency to perform quality-control services.

    a. Contractor will not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspection will be performed.
4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect, Commissioning Authority and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Commissioning Authority, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.

1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.
2. Distribution: Distribute schedule to Owner, Architect, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures, and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Architect, Commissioning Authority, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
5. Interpreting tests and inspections, and stating in each report whether tested and inspected Work complies with or deviates from the Contract Documents.
6. Retesting and reinspecting corrected Work.

B. Owner-Furnished Special Tests and Inspections: Special tests and inspections conducted by Owner's agent include, but are not limited to, the following:

1. Steel Construction.
2. Concrete Construction.
3. Fire-Resistant Penetrations and Joints.
4. General Commissioning (mechanical, plumbing, electrical).

C. Contractor-Furnished Special Tests and Inspections: Special tests and inspections conducted by the General Contractor's Agent include, but are not limited to, the following:

1. Joint Sealant Testing.
2. Concrete Slab Moisture Testing.
3. Fire Alarm.
4. Fire Sprinkler System.
5. Testing required for Warranty.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority's,and authorities' having jurisdiction reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 PRE-ROUGH-IN WALK-THROUGH

A. After framing installation and early during utility rough-in, schedule a walk-through of all spaces with Architect and Owner. Locations of all utilities and other requirements of the Contract Documents are to be reviewed and approved by the Owner at this walk-through.

3.3 PRE-CLOSE-IN WALK-THROUGH

A. Prior to wall close-in with application of wall finishes, schedule a walk-through with Architect and Owner in order to verify utility rough-in, blocking and/or backing, wall insulation, and other requirements of the Contract Documents. Coordinate walk-through attendance by subcontractors as necessary.

3.4 POST-CONSTRUCTION WALK-THROUGH

A. Approximately 9 months after Substantial Completion, schedule a walk-through with the Architect and Owner to review any items to be corrected prior to the end of the specified one-year correction period.

B. Just prior to one year after Substantial Completion of the Project, the General Contractor's Project Manager, Architect, and Owner shall inspect the Project in order to verify correction of warranty items addressed prior to the end of the specified one-year period of correction.

3.5 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

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SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Abbreviations and acronyms not included in this list shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; (See FGIA).
3. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
4. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
5. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
6. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
7. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
8. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
9. AIA - American Institute of Architects (The); www.aia.org.
10. AISC - American Institute of Steel Construction; www.aisc.org.
11. AISI - American Iron and Steel Institute; www.steel.org.
12. AITC - American Institute of Timber Construction; www.plib.org.
13. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
14. ANSI - American National Standards Institute; www.ansi.org.
15. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
16. APA - APA - The Engineered Wood Association; www.apawood.org.
17. APA - Architectural Precast Association; www.archprecast.org.
18. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
19. ASCE - American Society of Civil Engineers; www.asce.org.
20. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
21. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
22. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
23. ASTM - ASTM International; www.astm.org.
24. AWI - Architectural Woodwork Institute; www.awinet.org.
25. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
26. AWPA - American Wood Protection Association; www.awpa.com.
27. AWS - American Welding Society; www.aws.org.

28. AWWA - American Water Works Association; www.awwa.org.
29. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
30. BIA - Brick Industry Association (The); www.gobrick.com.
31. BICSI - BICSI, Inc.; www.bicsi.org.
32. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
33. CEA - Canadian Electricity Association; www.electricity.ca.
34. CGA - Compressed Gas Association; www.cganet.com.
35. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
36. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
37. CPA - Composite Panel Association; www.compositepanel.org.
38. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
39. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
40. CSA - CSA Group; www.csa-group.org.
41. CSI - Cast Stone Institute; www.caststone.org.
42. CSI - Construction Specifications Institute (The); www.csiresources.org.
43. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
44. DHA - Decorative Hardwoods Association; (Formerly: Hardwood Plywood & Veneer Association); www.decorativehardwoods.org.
45. DHI - Door and Hardware Institute; www.dhi.org.
46. ECA - Electronic Components Association; (See ECIA).
47. EIA - Electronic Industries Alliance; (See TIA).
48. EIMA - EIFS Industry Members Association; www.eima.com.
49. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
50. EOS/ESD Association; (Electrostatic Discharge Association); www.esda.org.
51. ESTA - Entertainment Services and Technology Association; (See PLASA).
52. FGI - Facilities Guidelines Institute; Developer of guidelines for planning, design, and construction of hospitals, outpatient facilities, and residential health, care, and support facilities; www.fgiguidelines.org.
53. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
54. FM Approvals - FM Approvals LLC; www.fmapprovals.com.
55. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
56. FSC - Forest Stewardship Council U.S.; www.fscus.org.
57. GA - Gypsum Association; www.gypsum.org.
58. GANA - Glass Association of North America; (See NGA).
59. GS - Green Seal; www.greenseal.org.
60. HI - Hydraulic Institute; www.pumps.org.
61. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
62. HPVA - Hardwood Plywood & Veneer Association; (See DHA).
63. ICBO - International Conference of Building Officials; (See ICC).
64. ICC - International Code Council; www.iccsafe.org.
65. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
66. ICPA - International Cast Polymer Association; www.theicpa.com.
67. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
68. IEC - International Electrotechnical Commission; www.iec.ch.
69. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
70. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
71. IESNA - Illuminating Engineering Society of North America; (See IES).
72. IGMA - Insulating Glass Manufacturers Alliance; (See FGIA).

73. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
74. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
75. ISO - International Organization for Standardization; www.iso.org.
76. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
77. MBMA - Metal Building Manufacturers Association; www.mbma.com.
78. MCA - Metal Construction Association; www.metalconstruction.org.
79. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
80. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
81. MPI - Master Painters Institute; www.paintinfo.com.
82. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
83. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
84. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
85. NADCA - National Air Duct Cleaners Association; www.nadca.com.
86. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
87. NEBB - National Environmental Balancing Bureau; www.nebb.org.
88. NECA - National Electrical Contractors Association; www.necanet.org.
89. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
90. NEMA - National Electrical Manufacturers Association; www.nema.org.
91. NETA - InterNational Electrical Testing Association; www.netaworld.org.
92. NFHS - National Federation of State High School Associations; www.nfhs.org.
93. NFPA - National Fire Protection Association; www.nfpa.org.
94. NFPA - NFPA International; (See NFPA).
95. NFRC - National Fenestration Rating Council; www.nfrc.org.
96. NGA - National Glass Association (The); (Formerly: Glass Association of North America); www.glass.org.
97. NHLA - National Hardwood Lumber Association; www.nhla.com.
98. NLGA - National Lumber Grades Authority; www.nlga.org.
99. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
100. NRCA - National Roofing Contractors Association; www.nrca.net.
101. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
102. NSF - NSF International; www.nsf.org.
103. NSI - National Stone Institute; (Formerly: Marble Institute of America); www.naturalstoneinstitute.org.
104. NSPE - National Society of Professional Engineers; www.nspe.org.
105. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
106. NWFA - National Wood Flooring Association; www.nwfa.org.
107. NWRA - National Waste & Recycling Association; www.wasterecycling.org
108. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
109. PDI - Plumbing & Drainage Institute; www.pdionline.org.
110. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
111. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
112. RFCI - Resilient Floor Covering Institute; www.rfci.com.
113. SAE - SAE International; www.sae.org.
114. SDI - Steel Deck Institute; www.sdi.org.
115. SDI - Steel Door Institute; www.steeldoor.org.
116. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.

117. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
118. SJI - Steel Joist Institute; www.steeljoist.org.
119. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
120. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
121. SPIB - Southern Pine Inspection Bureau; www.spib.org.
122. SPRI - Single Ply Roofing Industry; www.spri.org.
123. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
124. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
125. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
126. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
127. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
128. TMS - The Masonry Society; www.masonrysociety.org.
129. TPI - Truss Plate Institute; www.tpinst.org.
130. TPI - Turfgrass Producers International; www.turfgrasssod.org.
131. TRI - Tile Roofing Institute; www.tileroofing.org.
132. UL - Underwriters Laboratories Inc.; www.ul.com.
133. USGBC - U.S. Green Building Council; www.usgbc.org.
134. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
135. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
136. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
137. WDMA - Window & Door Manufacturers Association; www.wdma.com.
138. WI - Woodwork Institute; www.wicnet.org.
139. WWPA - Western Wood Products Association; www.wwpa.org.

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.

7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.govinfo.gov.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.
6. USAB - United States Access Board; www.access-board.gov.
7. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/Main-Page.aspx.
2. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Erosion and Sedimentation Control Plan: Show compliance with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10-mil minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.

C. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Field Offices: Owner will provide conditioned interior space for field offices for duration of Project.

C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures."

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities is not permitted.

D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.

    a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    b. Maintain negative air pressure within work area, using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.

F. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install cellular phone access equipment for each field office.

1. At common-use facilities, post a list of important telephone numbers.

a. Police and fire departments.
b. Ambulance service.
c. Contractor's home office.
d. Contractor's emergency after-hours telephone number.
e. Architect's office.
f. Engineers' offices.
g. Owner's office.
h. Principal subcontractors' field and home offices.

I. Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.

J. Project Computer: Provide a computer in the primary field office adequate to access Project electronic documents and maintain electronic communications.

3.4 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:

1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.
2. Utilize designated area within existing building for temporary field offices.
3. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

D. Storage and Staging: Use designated areas of Project site for storage and staging needs.

E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs, so they are legible at all times.

F. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

G. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

1. Do not load elevators beyond their rated weight capacity.
2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work, so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.

J. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.

1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas, so no evidence remains of correction work.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 011000 "Summary."

C. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

D. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals, so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

E. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

G. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.

H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

I. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

1. Construct dustproof partitions with gypsum wallboard, with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
2. Construct dustproof partitions with two layers of 6-mil polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.

    a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches between doors. Maintain water-dampened foot mats in vestibule.

3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
4. Insulate partitions to control noise transmission to occupied areas.
5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
6. Protect air-handling equipment.
7. Provide walk-off mats at each entrance through temporary partition.

J. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign, stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.

3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

    a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
    b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.7 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

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SECTION 015639 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary site fencing.

1.3 DEFINITIONS

A. Caliper (DBH): Diameter breast height; diameter of a trunk as measured by a diameter tape at a height 54 inches above the ground line for trees with caliper of 8 inches or greater as measured at a height of 12 inches above the ground.

B. Drip Line: The area on the ground beneath a tree or plant, covered by the spread of the branches.

C. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings .

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:

a. Tree-service firm's personnel, and equipment needed to make progress and avoid delays.
b. Arborist's responsibilities.

c. Quality-control program.
d. Coordination of Work and equipment movement with the locations of protection zones.
e. Trenching by hand or with air spade within protection zones.
f. Field quality control.
g. GC responsibility to protect trees within drip line (or better).
h. GC responsibility to water existing trees.

1.5 ACTION SUBMITTALS

A. Shop Drawings:

1. Include plans, elevations, sections, and locations of protection-zone fencing and signage, showing relation of equipment-movement routes and material storage locations with protection zones.
2. Detail fabrication and assembly of protection-zone fencing and signage.
3. Indicate extent of trenching by hand or with air spade within protection zones.

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

B. Quality-control program.

1.7 QUALITY ASSURANCE

A. Quality-Control Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work without damaging trees and plantings. Include dimensioned diagrams for placement of protection zone fencing and signage, the arborist's and tree-service firm's responsibilities, instructions given to workers on the use and care of protection zones, and enforcement of requirements for protection zones.

1.8 FIELD CONDITIONS

A. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Moving or parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.

5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

B. Do not direct vehicle or equipment exhaust toward protection zones.

C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements: Previously used materials may be used when approved by Architect.

1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch opening, 0.148-inch- diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch- OD line posts, and 2-7/8-inch- OD corner and pull posts; with 1-5/8-inch- OD top rails and 0.177-inch- diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.

    a. Height: 48 inches.

2. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi; secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 96 inches apart.

    a. Height: 48 inches.
    b. Color: High-visibility orange, nonfading.

B. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:

1. Size and Text: As shown on Drawings.
2. Lettering: 3-inch- high minimum, black characters on white background.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

B. Prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.

3.2 PREPARATION

A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Tie a 1-inch blue vinyl tape around each tree trunk at 54 inches above the ground.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated. Do not exceed indicated thickness of mulch.

1. Install temporary root protection matting over mulch to the extent indicated.

D. Trunk Protection: Protect the trunk of each tree to remain as follows:

1. Install 2-by-4-inch wood planks around trunk at maximum 3 inches apart. Minimum three planks per tree. Band together with no less than three steel bands stapled to the planks to hold them securely in place. Wrap orange plastic construction fencing to a minimum of three layers outside slats. Fasten wrap with wire.

a. Height: 48 inches.

3.3 PROTECTION ZONES

A. Trees: Prior to construction, install protection zone fencing around all trees to be saved, protecting the total area within the drip line (or greater). If there is limited space on a site and passage beside a tree is mandatory, construct a bridge over the root zone, with boards to protect the tree trunk. Do not park or store equipment or materials, including excavated soil, within the drip line.

B. Turf: Protect existing turf. Do not park or store equipment or materials on existing turf areas without prior approval from the Owner's representative. If parking occurs on landscape areas, the Contractor shall be responsible for repairing soil compaction, damaged irrigation systems, and replacement of sod and other damaged materials.

C. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected areas except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

1. Chain-Link Fencing: Install to comply with ASTM F567 and with manufacturer's written instructions.
2. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.
3. Access Gates: Install where indicated; adjust to operate smoothly, easily, and quietly; free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

D. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 50 feet on protection-zone fencing, but no fewer than four signs with each facing a different direction.

E. Maintain protection zones free of weeds and trash.

F. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

1. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
2. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

3.4 WATERING

A. Maintain existing irrigation system to extents possible for regular watering of existing trees.

B. For existing trees that cannot be maintained by an existing irrigation system, provide regular watering. Consult arborist for recommended method and duration.

3.5 EXCAVATION

A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section 312000 "Earth Moving" unless otherwise indicated.

B. Trenching within Protection Zones: Where utility trenches are required within protection zones, excavate under or around tree roots by hand or with air spade, or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots.

C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction and as required for root pruning.

D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

3.6 ROOT PRUNING

A. No pruning shall be performed except by an approved arborist.

B. Prune tree roots that are affected by temporary and permanent construction. Prune roots as shown on Drawings

1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
2. Cut Ends: Do not paint cut root ends.
3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
4. Cover exposed roots with burlap and water regularly.
5. Backfill as soon as possible according to requirements in Section 312000 "Earth Moving."

C. Root Pruning at Edge of Protection Zone: Prune tree roots 12 inches outside of the protection zone by cleanly cutting all roots to the depth of the required excavation.

D. Root Pruning within Protection Zone: Clear and excavate by hand or with air spade to the depth of the required excavation to minimize damage to tree root systems. If excavating by hand, use narrow-tine spading forks to comb soil to expose roots. Cleanly cut roots as close to excavation as possible.

3.7 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches as shown on Drawings, under direction of arborist.

1. Prune to remove only injured, broken, dying, or dead branches unless otherwise indicated. Do not prune for shape unless otherwise indicated.
2. Do not remove or reduce living branches to compensate for root loss caused by damaging or cutting root system.
3. Pruning Standards: Prune trees according to ANSI A300 (Part 1) and as indicated on Drawings.

    a. Type of Pruning: Cleaning where indicated.

B. Unless otherwise directed by arborist and acceptable to Architect, do not cut tree leaders.

C. Cut branches with sharp pruning instruments; do not break or chop.

D. Do not paint or apply sealants to wounds.

E. Provide subsequent maintenance pruning during Contract period as recommended by arborist.

F. Chip removed branches and dispose of off-site.

3.8 REGRADING

A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.

1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.

C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

D. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with backfill soil. Place backfill soil in a single uncompacted layer and hand grade to required finish elevations.

3.9 REPAIR AND REPLACEMENT

A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or to be relocated that are damaged by construction operations, in a manner approved by Architect.

1. Submit details of proposed pruning and repairs.
2. Perform repairs of damaged trunks, branches, and roots within 24 hours according to arborist's written instructions.
3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.

B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.

1. Small Trees: Provide new trees of same size and species as those being replaced for each tree that measures 6 inches or smaller in caliper size.
2. Large Trees: Provide one new tree(s) of 6-inch caliper size for each tree being replaced that measures more than 6 inches in caliper size.

    a. Species: As selected by Architect.

3. Plant and maintain new trees as specified in Section 329300 "Plants."

C. Excess Mulch: Rake mulched area within protection zones, being careful not to injure roots. Rake to loosen and remove mulch that exceeds a 2-inch uniform thickness to remain.

D. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch-diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash, and debris and legally dispose of them off Owner's property.

END OF SECTION 015639

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 012100 "Allowances" for products selected under an allowance.
2. Section 012300 "Alternates" for products selected under an alternate.
3. Section 012500 "Substitution Procedures" for requests for substitutions.
4. Section 014200 "References" for applicable industry standards for products specified.

1.3 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.4 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

    a. Form of Approval: As specified in Section 013300 "Submittal Procedures."
    b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 013300 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.

2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
6. Or Approved Substitution: For products specified by name and accompanied by the term "or approved substitution," comply with requirements in "Comparable Products" article to obtain approval for use of an unnamed product.
7. Or Equal: For products specified by name and accompanied by the term "or equal," or "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:
   a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
   b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

   a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
   b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Installation of the Work.
3. Cutting and patching.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 013300 "Submittal Procedures" for submitting surveys.
3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
4. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.
5. Section 078413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

    a. Primary operational systems and equipment.
    b. Fire separation assemblies.
    c. Air or smoke barriers.
    d. Fire-suppression systems.
    e. Mechanical systems piping and ducts.
    f. Control systems.
    g. Communication systems.
    h. Fire-detection and -alarm systems.
    i. Conveying systems.
    j. Electrical wiring systems.
    k. Operating systems of special construction.

3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Architect and Construction Manager promptly.

B. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

D. Use of Indelible Paints and Ink

1. Use of indelible paint and ink for layout indicators on exposed concrete surfaces is prohibited. Use only removable marking products, if any, on exposed concrete surfaces.

3.4 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.

F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.5 CUTTING AND PATCHING

A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

    a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 017419 "Construction Waste Management and Disposal."

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.7 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements".

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

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SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.

B. Related Requirements:

1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
4. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 DEFINITIONS

A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.5 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

1.7 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 14 calendar days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner. Label with manufacturer's name and model number.

    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.

5. Submit testing, adjusting, and balancing records.
6. Submit sustainable design submittals not previously submitted.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 14 calendar days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 14 calendar days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.8 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:

1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.
5. Submit Final Completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.9 LIST OF INCOMPLETE ITEMS

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, listed by room or space number.
2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.

4. Submit list of incomplete items in the following format:

    a. Web-Based Project Software Upload: Utilize software feature for creating and updating list of incomplete items (punch list).

1.10 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 calendar days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit on digital media acceptable to Architect.

E. Warranties in Paper Form:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

F. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
d. Remove tools, construction equipment, machinery, and surplus material from Project site.
e. Remove snow and ice to provide safe access to building.
f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
h. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
i. Vacuum and mop concrete.
j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
l. Remove labels that are not permanent.
m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
p. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
r. Clean strainers.
s. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste-disposal requirements in Section 0174190.01 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Systems and equipment operation manuals.
2. Systems and equipment maintenance manuals.
3. Product maintenance manuals.

B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Section 019113 "General Commissioning Requirements" for verification and compilation of data into operation and maintenance manuals.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect and Commissioning Authority will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit electronic PDFs uploaded to web based project software site.
2. Provide as follows:

    a. Enable reviewer comments on draft submittals.
    b. Enable documents so that text is searchable.
    c. Provide Bookmarks to improve navigation.

C. Initial Manual Submittal: Submit at minimum, a Cover and Table-of-Contents for each manual at least 30 calendar days before commencing demonstration and training. Architect and Commissioning Authority will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 calendar days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.

1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's and Commissioning Authority's comments and prior to commencing demonstration and training.

E. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.

2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.

8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.8 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 017700 "Closeout Procedures" for general closeout procedures.
2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of record Drawings as follows:

a. Initial Submittal:

1) Submit one (1) of the following for review:

a) One (1) paper-copy set of marked-up record prints.
b) PDF electronic file of scanned record prints.
c) PDF electronic file of marked-up record file.

2) Architect will indicate whether general scope of changes, additional information recorded, and quality of documentation are acceptable.

b. Final Submittal:

1) Submit one of the following:

a) PDF electronic file of scanned record prints.

b) PDF electronic file of marked-up record file.

2) Submit one (1) set set(s) of hardcopy prints from the electronic file.
3) Print each drawing, whether or not changes and additional information were recorded.

B. Record Specifications: Submit annotated PDF electronic files and one (1) paper copy of Project's Specifications, including addenda and Contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories and one (1) paper copy of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report weekly indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.
c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.

i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record PDF Electronic File of Marked-up Record File: An electronic version of the Record Prints described above and with similar preparation and content may be provided as a Record Drawing instead of a marked-up paper copy.

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect.
e. Name of Contractor.

1.5 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.

4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders and Record Drawings where applicable.

B. Format: Submit record specifications as annotated PDF electronic file .

1.6 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

C. Format: Submit Record Product Data as annotated PDF electronic file .

1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file .

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

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SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.3 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit one copy within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

a. Name of Project.
b. Name and address of videographer.
c. Name of Architect.
d. Name of Construction Manager.
e. Name of Contractor.
f. Date of video recording.

2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.

3. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

B. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

1. Equipment.
2. Fire-protection systems.
3. Conveying systems, including elevators.
4. Heat generation ,including boilers, pumps and water distribution piping.
5. Refrigeration systems, including chillers, cooling towers, condensers, pumps, and distribution piping.
6. HVAC systems.
7. HVAC instrumentation and controls.
8. Electrical service and distribution.

9. Packaged engineer generators, including transfer switches.
10. Lighting equipment and controls.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.

k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.
b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Owner will furnish Contractor with names and positions of participants.

B. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner with at least seven days' advance notice.

C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD modewith vibration reduction technology.

1. Submit video recordings on CD-ROM or thumb drive or by uploading to web-based Project software site.
2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

    a. Name of Contractor/Installer.
    b. Business address.
    c. Business phone number.
    d. Point of contact.
    e. Email address.

B. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.

    a. Produce segments to present a single significant piece of equipment per segment.
    b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

C. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.

1. Furnish additional portable lighting as required.

D. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.

E. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

SECTION 024119 - ROOF DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Remove existing roofing and related materials.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, and locations of temporary set up areas.

B. Predemolition Photographs or Videotapes: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Submit before Work begins.

C. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

D. Proposed locations of chutes, dumpsters, cranes, hoists, and other temporary equipment or facilities required for demolition work.

E. Proposed methods for interior and exterior protection and clean-up during removal and re-roofing operations.

F. Provide schedule, updated weekly, indicating areas of roof where demolition will occur. Notify Owner of schedule changes.

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241; OSHA, 29 CFR 1926.1101; EPA, NESHAP 40 CFR, Part 60.

D. Comply with Federal, State and Local requirements.

1.5 PROJECT CONDITIONS

A. The facility may be partially occupied during construction. Notify owner of intended work area in advance. Provide barricades to segregate area and provide interior protection to protect contents as indicated elsewhere in the contract documents. In no case shall demolition be completed over occupied space.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

1.7 DEMOLITION AND TRANSPORT

A. Conveyances: Buggies or wheelbarrows used on roofs to transport removed debris to chutes or crane apparatus location shall be of size and design to prevent damage to deck and structure.

B. Chutes: Provide enclosed chutes for debris transfer from roof areas at height of 10-feet or more. Do not allow debris to spill from bottom of chute directly onto ground. Direct chutes into approved construction debris container (dumpster). Control and contain dust and noise from falling debris by use of breaks in vertical alignment of chute or tarps covering dumpster. Provide hose with nozzle near chute outlet to wet debris, as necessary, for dust control.

C. Hoists/Cranes: Provide hoists or cranes to remove debris and transport materials to and from roof. Secure materials to prevent loss during lifting. Place debris transported from roof directly in approved construction debris containers. Provide proper protection of wall areas for entire height directly adjacent to or under area of hoisting.

D. Use of "bobcat" type removal equipment on roof is prohibited.

E. Mechanical cutting equipment: Roof cutting equipment shall be equipped with operable blade depth setting mechanisms to control cutting depth of blade and prevent damage to structural deck during cutting operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

B. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

3.2 GENERAL

A. During removal of existing roofing and related materials, report to Owner areas of damaged, deteriorated, or otherwise unsuitable structural deck or framing materials exposed during work. Do not cover or remove unacceptable deck or framing areas until

reviewed by Owner. Provide temporary protection to areas in question. Use care in removal of membrane flashings and decking to prevent damage to substrates.

B. Do not remove more material than can be replaced in one day with the new specified roof system.

C. Take precautions to prevent water on or within existing roof system from migrating into building or new roof system.

D. Review available prints and/or inspect interior of structure to ascertain if electrical or other service has been placed above roof deck or in contact with underside of deck.

E. Set cutting blades of mechanical cutting equipment to proper depth to prevent scoring or damage to structural deck. Use care in removal of membrane flashing to prevent damage to substrates.

F. Control visible emissions during roof removal and at dumpster level.

G. Remove roof materials down to structural deck. Sweep, clean, and vacuum debris from deck surfaces.

3.3 SELECTIVE DEMOLITION

A. Demolish and remove existing materials as expressly indicated or implied on the drawings. Demolition shall include but may not be limited to the following:

1. Remove existing roofing system(s) and associated components, including overburden on the terraces, in preparation for new systems.
2. Remove brick masonry units at rising walls in preparation for new throughwall flashings, where indicated.
3. Remove abandoned rooftop observation platform and structures, tie-off anchors, curbs, penetrations, and associated materials. Prepare opening to receive new decking or enclosure as specified.
4. Remove existing sheet metal caps, fascias, edge metal, counterflashings, penetration flashings, and related sheet metal items unless indicated on Drawings to remain.
5. Remove existing perimeter and other wood blocking where indicated in preparation for new wood blocking on stud walls.
6. Remove existing roof drains and enclosed openings. Remove concrete deck in preparation for new drain bowl assemblies and leader pipe connections.
7. Remove existing tie-off anchors.
8. Remove existing satellite dishes and antenna, where indicated.
9. Remove three (3) access doors on Terrace 3 and infill with fixed glazing and spandrel panels to match existing.
10. Remove existing duct wrap in preparation for new.
11. Remove existing roof access doors and frames in preparation for new.

12. Remove stairs from elevated platform in preparation for new.
13. Remove louver vent in preparation for new framing, roof deck, and roof system.

B. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.5 CLEANING

A. Clean demolition materials and debris from roof daily.

B. Clean debris that has fallen into building, including material on top surface of ceiling. If deemed necessary by the Owner the Contractor shall remove and reinstall ceiling tiles suspected of harboring construction debris and clean the affected areas.

C. Repair damage to building by replacing damaged material or component in-kind.

D. Clean site daily to satisfaction of Owner.

E. Dispose of debris and demolition materials at landfill in accordance with applicable regulations.

F. Remove construction related debris that accumulates on top of ceiling tiles.

END OF SECTION 024119

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 013513 "Alteration Project Procedures" for special procedures for alteration work.
3. Section 015639 "Temporary Tree and Plant Protection" for temporary protection of existing trees and plants that are affected by selective demolition.
4. Section 017300 "Execution" for cutting and patching procedures.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
5. Review areas where existing construction is to remain and requires protection.

B. Post-Demolition Field-Walk: Schedule and conduct a post-demolition field-walk of existing conditions.

1. After demolition of ceilings and walls, conduct a field-walk to identify and address any latent defects or unforseen conditions, including but not limited to the following:

a. Existing fire-ratings voided by previous work.
b. Existing overhead plumbing/mechanical that may be in conflict with proposed new ceiling heights.
c. Other existing conditions.

2. Attendees: Contractor, Owner, Architect, and Consultants as needed.
3. Schedule: Conduct field-walk as soon as possible, but not less than two-weeks prior to the start date for new work within the existing area(s).

1.6 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property , for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.

5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

C. Predemolition Photographs or Video: Submit before Work begins.

D. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.7 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.
2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
2. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.

    a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
    c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly. Comply with requirements in Section 017419 "Construction Waste Management and Disposal."

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

E. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section 075423 "TPO Roofing" for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

F. Luminaires:

1. Disconnect, remove, and store, at the job site, in an indoor dry location, luminaires scheduled for reuse by Owner, that have been previously determined to not contain PCB fluorescent ballasts, until such time as they are ready to be installed.

    a. Existing lamps shall not be reused regardless of whether or not the existing luminaire is scheduled for reuse. Existing lamps shall be legally disposed of, and reused luminaires shall be re-lamped with new lamps.

2. Move luminaires that have been previously determined to not contain PCB Fluorescent ballasts, and that are scheduled for disconnection and removal, and are not scheduled for reuse or reinstallation, to an on-site location, as directed by the Owner. Moved luminaires shall remain the property of the Owner.

a. Remove lamps from luminaires, and store separately at an on-site location, as directed by the owner.

3. Remove from the site, and legally dispose of disconnected and removed luminaires, that have been previously determined to not contain PCB fluorescent ballasts, and that the Owner does not wish to retain.

a. Remove lamps from luminaires and disposed of separately.

4. Do not use existing luminaires that have been determined to contain integral or remote mounted PCB fluorescent ballasts, either known, or determined by field survey and investigation.

a. Disconnect and remove the PCB containing fluorescent ballast(s), if the ballast(s) is not leaking, per the ballast disposal requirements written herein, and replace with a new non-PCB replacement ballast.
b. Notify the project owner if the PCB-containing ballast is leaking, and proceed no further. The luminaire is considered contaminated and hazardous. Removal of the luminaire shall be the responsibility of the Owner.

5. Do not remove or re-use existing luminaires installed in project spaces being abated for asbestos. Luminaires installed in project spaces being abated for asbestos shall be considered hazardous material and as such shall be removed as part of any abatement process.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
4. Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

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SECTION 040120 - MAINTENANCE OF UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Remove and reinstall and/or replace existing brick masonry veneer to facilitate throughwall flashing installation above roof and at shelf angles on exterior elevations.
2. Remove and replace areas of damaged / deteriorated masonry veneer.
3. Repoint brick masonry veneer.
4. Saw cut new vertical control joints.
5. Clean masonry, where indicated.

1.2 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

B. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Work Plan: Indicating sequence of work, temporary scaffolding and staging locations, proposed method for temporary wall shoring.

C. Letter Certifying that tradesmen have five or more years of experience.

D. Samples: For each exposed product and for each color and texture specified.

1.4 QUALITY ASSURANCE

A. Mason Qualifications: Provide experienced personnel with a minimum of 5 years of experience to perform the specified work.

1.5 PROJECT CONDITIONS

A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

D. Prepare, install, and cure all materials in accordance with these Specifications, Brick Institute of America (B.I.A.) Technical Notes, and Manufacturer's Printed Instructions.

E. Provide brick or concrete masonry units as required to replace units damaged during removal and replacement.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Face Brick: Provide face brick, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work.

1. Provide units with physical properties, colors, color variation within units, surface texture, size, and shape to match existing brickwork meeting ASTM C 216, Grade SW, Type FBS.

a. For existing brickwork that exhibits a range of colors or color variation within units, provide brick that proportionally matches that range and variation rather than brick that matches an individual color within that range.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, white or gray or both where required for color matching of exposed mortar.

1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Sand: ASTM C 144 unless otherwise indicated.

1. Color: Provide natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
2. For pointing mortar, provide sand with rounded edges.
3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.

D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.

E. Water: Potable.

2.3 ACCESSORIES

A. Throughwall Flashing: Refer to Division 07 Section “Flashing and Sheet Metal.”

B. Self-Adhering Membrane: Refer to Division 07 Section “Flashing and Sheet Metal.”

C. Weep Vents: Polypropylene honeycomb type venting weep hole material, clear or grey to match mortar, standard size for head joint. Quadro Vent by Hohmann and Barnard or approved substitute.

D. Sealant and Backer Rod: Refer to Division 07 Section “Joint Sealants.”

2.4 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Heavy duty cleaner: MASONRE-G, by Catherdral Stone Products, Inc.

2.5 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

B. Do not use admixtures in mortar unless otherwise indicated.

C. Mortar Type: Provide mortar materials in the following proportions or as indicated below:

1. Pointing and Rebuilding Mortar: Comply with ASTM C 270, Proportion Specification, Type N.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.

3.2 BRICK INSTALLATION AND REPLACEMENT

A. Where brick removal is required or indicated, such as locations where brick is spalled, cracked or otherwise damaged, or where brick is scheduled to be removed for throughwall flashing replacement, carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

B. Remove in an undamaged condition as many whole bricks as possible to allow new masonry to be “toothed” in.

1. Remove mortar and loose particles from brick by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.

C. Remove sealants by cutting close to brick with utility knife and cleaning with solvents.

D. Support masonry, specifically at location of new throughwall flashing installation, in accordance with approved drawings but in no case more than 4-feet on center. Protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

E. Notify Owner of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

F. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

G. Provide through wall flashings if required as stated in the section.

H. Replace removed damaged brick with other removed brick in good quality, where possible, or with new brick matching existing brick in color, shape and size. Do not use broken units unless they can be cut to usable size.

I. Install replacement brick into bonding and coursing pattern of existing masonry. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.

1. Maintain joint width for replacement units to match existing joints.
2. Use setting buttons or shims to set units accurately spaced with uniform joints.

J. Lay replacement brick with completely filled bed and head joints. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30

sq. in. per min. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.

K. Anchor masonry to the backup wall with wall ties in accordance with the manufacturers written instructions but in no case greater than 16-inches on center vertically and 32-inches on center horizontally. At locations of throughwall flashing installation, provide 1 row of wall ties immediately above the newly installed flashing. Recess leading edge of wall ties at least 5/8-inch from outer face of veneer.

L. Provide open head joints, spaced at 24-inches on center in brick masonry courses located directly above any throughwall flashings. Provide polypropylene full height venting matrix within open head joint.

M. Clean masonry veneer with water and a stiff bristle brush.

3.3 VERTICAL MASONRY RELIEF JOINTS

A. Where indicated or required, provide new vertical relief joints in the existing veneer. Provide new joints at building outside corners approximately 2-feet from the corner. If providing relief joints on both sides of the building corner, provide one column of helical retro fit wall ties between the new joint and the building corner, both sides. Space ties at 24-inches on center vertically.

B. Sawcut existing veneer to provide 1/2-inch minimum wide joint. Where relief joints are being provided at locations of existing vertical cracks, strike vertical lines and cut existing veneer to provide a relief joint that is as close to plumb as possible. Provide a maximum joint width of 2-inches.

3.4 FLASHING INSTALLATION

A. General: Provide continuous sheet metal throughwall flashings at scheduled locations. Refer to this section and Division 07 Section “Flashing and Sheet Metal” for materials and additional information on installation.

B. Install flashing as follows unless otherwise indicated:

1. Prepare surfaces so they are smooth and free from projections that could puncture flashing.
2. At ends of runs, turn ends up not less than 2-inches to form watertight end dams.
3. Secure flashing to back-up wall and cover with self-adhering membrane. Terminate top of self-adhering membrane with metal termination bar.

3.5 CLEANING MASONRY, GENERAL

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

B. Use only those cleaning methods indicated for each masonry material and location.

1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
3. Equip units with pressure gages.
4. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.
5. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
6. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg Fat flow rates indicated.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

D. Water-Spray Application Method: Unless otherwise indicated, hold spray nozzle at least 6-inches from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

E. Chemical-Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush or spray application. Do not spray apply at pressures exceeding 50 psi. Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

F. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.

1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

3.6 CLEANING MASONRY

A. Detergent Cleaning:

1. Wet masonry with cold water applied by low-pressure spray.
2. Scrub masonry with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that masonry surface remains wet.
3. Rinse with cold water applied by low to medium-pressure spray to remove detergent solution and soil.
4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

3.7 REPOINTING MASONRY

A. Rake out and repoint joints to the following extent:

1. All joints in areas indicated and as necessary for throughwall flashing replacement/installation.
2. Joints where mortar is missing or where they contain holes.
3. Cracked joints where cracks can be penetrated at least 1/4-inch by a knife blade 0.027-inch thick.
4. Cracked joints where cracks are 1/8-inch or more in width and of any depth.
5. Joints where they sound hollow when tapped by metal object.
6. Joints where they are worn back 1/4-inch or more from surface.
7. Joints where they are deteriorated to point that mortar can be easily removed by hand, without tools.
8. Joints where they have been filled with substances other than mortar.
9. Joints indicated as sealant-filled joints.

B. Do not rake out and repoint joints where not required. Report quantity of area daily to Owner.

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Remove mortar from joints to depth of 2 times joint width, but not less than 1/2-inch or not less than that required to expose sound, unweathered mortar.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.

    a. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades. Remove remaining mortar by hand with chisel and resilient mallet.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

E. Pointing with Mortar:

1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8-inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8-inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.

    a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.

6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.

F. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.8 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

END OF SECTION 040120

SECTION 051213 – ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes architecturally exposed structural-steel (AESS) for rooftop pergolas.

B. Related Requirements:

1. Section 099600 "High-Performance Coatings" for surface preparation, priming and finish requirements. All AESS to receive High Performance Coating.

1.3 DEFINITIONS

A. AESS: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication of AESS components. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.

B. Samples: Submit Samples of AESS to set quality standards for exposed welds.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, fabricator, and coating applicator.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant.

1. Use of a non-Certified Fabricator is permissible, provided that qualification data acceptable to the Owner, Architect, and SER is submitted consisting of no less than 15 years documented experience and 25 projects of similar or greater complexity. At least 15 of these projects must incorporate AESS.

B. Installer Qualifications: Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector.

1. Use of a non-Certified Erector is permissible, provided that qualification data acceptable to the Owner, Architect, and SER is submitted consisting of no less than 15 years documented experience and 25 projects of similar or greater complexity.

C. High Performance Coating Applicator: A qualified applicator who participates in the AISC Quality Certification Program and possesses a Complex Coatings Endorsement appropriate to the environment in which the coating will be applied.

1. Use of a non-Certified Applicator is permissible, provided that qualification data acceptable to the Owner, Architect, and SER is submitted consisting of no less than 25 years documented experience and 40 projects of similar or greater complexity.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.9 FIELD CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. Recycled Content: Provide steel shapes per documents with minimum 90 percent total recycled content including at least 60 percent post-consumer recycled content.

B. Regional Materials: Provide steel products manufactured and of primary raw materials extracted or recovered within 500 mile radius of Project Site.

C. Plates, and Bars: ASTM A572/A 572M, Grade 50 (345).

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade C, structural tubing.

E. Welding Electrodes: Comply with AWS requirements.

2.2 FILLER

A. Filler: Waterproof polyester filler with fiber reinforcing intended for use in repairing dents in automobile bodies. Basis of design is Bondo Fiberglass Resin.

2.3 PRIMER

A. Primer: Comply with Section 099600 "High-Performance Coatings."

2.4 FABRICATION

A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.

B. In addition to special care used to handle and fabricate AESS, comply with the following:

1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.

2. Grind sheared, punched, and flame-cut edges of AESS to remove burrs and provide smooth surfaces and edges.

3. Fabricate AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.

4. Fabricate AESS with exposed surfaces free of seams to maximum extent possible.

5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.

6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.

7. Fabricate AESS to the tolerances specified in AISC 303 for steel that is designated AESS.

C. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch with a tolerance of 1/32 inch for AESS.

D. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.

2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

3. Repair coatings at any holes cut after coatings have been applied.

2.5 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.

2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.

3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather.

4. Provide continuous welds of uniform size and profile where AESS is welded.

5. Make butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus zero inch for AESS. Do not grind unless required for clearances or for fitting other components, or unless directed to correct unacceptable work.

6. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for AESS.

7. At locations where welding on the far side of an exposed connection of AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.

B. Make fillet welds for AESS of uniform size and profile with exposed face smooth and slightly concave. Do not grind unless directed to correct unacceptable work.

2.6 SHOP QUALITY CONTROL

1. All shop connections must be inspected in accordance with Special Inspections Schedule on drawings and provisions of AISC 360 chapter N.

2. AISC Certified Fabricator: Inspections may be performed by the Contractor.

3. Non-AISC Certified Fabricator: Inspections must be performed by the Special Inspector. Inspection and testing after delivery to field is acceptable when direct observation of welding is not required.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedment's for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedment's showing dimensions, locations, angles, and elevations.

B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.

2. Repair any shop-applied coatings when tabs are removed.

3.3 ERECTION

A. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

1. Erect AESS to the tolerances specified in AISC 303 for steel that is designated AESS.

B. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.

3.4 FIELD CONNECTIONS

A. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.

1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth.

2. Remove erection bolts, fill holes, and grind smooth.

3. Fill weld access holes and grind smooth.

3.5 FIELD QUALITY CONTROL

A. Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

B. See Special Inspections Schedule on drawings for required inspections.

3.6 REPAIRS AND PROTECTION

A. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.

B. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

END OF SECTION 051213

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Provide new steel deck on Area H following removal of louver vent.

1.2 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings: Show layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

C. Product certificates.

D. Welding certificates.

1.3 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."

B. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 ROOF DECK

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 30, and with the following:

1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 G60 zinc coating.
2. Deck Profile: Type B.
3. Profile Depth: 1-1/2-inches.
4. Design Uncoated-Steel Thickness: 20-gauge.

2.2 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Fasteners for securing replacement roof deck panels to overlapped deck: #10-16 x 1-inch, self-drilling, self-tapping screws, hex-head, either stainless steel or factory-treated, fluorocarbon-coated steel (in accordance with FM 4470 requirements) in order to prevent rusting. Fasteners shall be designed to penetrate structural steel over 1/4-inch thick.

C. Fasteners for securing steel deck to structural framing: #14-14 self-drilling, self-tapping screws, 1-inch long, hex-head, fluorocarbon-coated steel (in accordance with FM 4470 requirements).

D. Primer for steel framing: Rust-inhibitive industrial enamel primer by Sherwin Williams or accepted substitute. Primer shall be lead and chromate-free.

PART 3 - EXECUTION

3.1 GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 30, manufacturer's written instructions, requirements in this Section, and as indicate

3.2 INSTALLATION

A. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.

B. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

C. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

D. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners along centerline of framing members. Attach deck according to deck manufacturer's written instructions. In no case shall fasteners be spaced more than 6-inches on center.

E. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches.

F. Laps: side laps shall be 3-inches, minimum. End laps shall be 6-inches minimum. Secure panel laps at 16-inches on center.

END OF SECTION 053100

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies requirements for the following Scope of Work:

1. Provide steel access stair for existing elevated platform on Roof Area B.
2. Provide steel studs and tracks on Area H.
3. Provide aluminum railing on Terrace 3.

1.2 SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, and details of metal fabrications and their connections.

1. Include signature of Contractor and fabricator.
2. Provide stamped and sealed fabrication drawings where indicated.

B. Templates: For anchors and bolts.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.

B. Ferrous Metals:

1. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
2. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

2.2 PAINT

A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664 and compatible with finish paint systems indicated.

B. Galvanizing Repair Paint: SSPC-Paint 20, high-zinc-dust-content paint for regalvanizing welds in steel.

2.3 FASTENERS

A. General: Provide type 304 or 316 stainless-steel fasteners unless otherwise indicated.

B. Steel to steel connections: Bolts; ASTM A 325, endorsed by AISC; 1/2-inch.

2.4 STEEL FRAMING (AREA H)

A. Steel Studs and Track: 16-gauge, mill certified galvanized steel, 6-inches.

2.5 PREFABRICATED STAIR

A. Basis of Design: Steep Incline Structural Steel Stairway OSHA Stair by FS Industries or approved equal.

1. Finish: Galvanized and powder coated.
2. Treads: Bar Grating.
3. Width: As required to utilize existing attachment angles, +/- 30-inches.

2.6 ALUMINUM RAILING

A. Extrusions: ASTM B 221, alloy 6061 or 6063-T6, powder coated.

1. Top and Bottom Rails and Posts: 2-inch tube.

a. Post Spacing: 8-feet on center maximum and as needed when railing direction changes.

2. Pickets (Infills): 1-inch tube, spaced 4-inches on center.

B. Structural Performance Requirements:

1. Top and Bottom Rails and Posts:

a. Uniform load of 50 lb/ft applied in any direction.
b. Concentrated load of 200 lb applied in any direction.

2. Pickets (Infills)

a. Concentrated Load of 50 lb/ft applied horizontally on an area of one (1) square foot.

2.7 FINISHES

A. Ferrous Metals: Finish metal fabrications after assembly. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Shop prime ferrous-metal items not indicated to be galvanized.

1. Hot-dip galvanize items indicated to be galvanized to comply with ASTM A 123 or ASTM A 153/A 153M as applicable.
2. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
3. Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Provide anchorage devices and fasteners for securing metal fabrications to in-place construction. Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true.

1. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
2. Fit exposed connections accurately together. Weld connections, unless otherwise indicated. Do not weld, cut, or abrade galvanized surfaces.

3.2 STAIR INSTALLATION

A. Fabricate stairs to a width and height required for the existing platform configuration.

B. Attach stairs to platform using the specified bolts, 2 per angle.

3.3 FRAMING INSTALLATION (AREA H)

A. Provide continuous members in the configuration shown on the Drawings.

B. Fasten framing to the existing masonry and to each other using fasteners listed in the Drawings.

3.4 ALUMINUM RAILING

A. Fabricate railing to follow profile of parapet wall. Attach through plates to concrete deck, using minimum four (4) fasteners per plate.

3.5 SURFACE CORRECTION – FERROUS METALS

A. Touch up surfaces and finishes after erection.

1. Shop painted Surfaces: Clean field welds, bolted connections, and abraded areas and touch up paint with same material as used for surrounding surfaces.

2. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

SECTION 061000 – ROOF-RELATED CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies requirements for the following Scope of Work:

1. Provide wood blocking, stud walls, supports, shims, and other miscellaneous assemblies as indicated.

1.2 SUBMITTALS

A. Product Data: For each item specified in Part 2 of this Section.

1.3 PROJECT CONDITIONS

A. Wood blocking shown on Drawings may be greater or less than quantities required to match insulation thickness. Include required quantities in Base Bid.

B. Maintain constant perimeter heights to provide equal edge metal and fascia reveals.

C. Store wood to prevent distortion and to protect from atmospheric moisture.

D. Dimensional lumber and plywood shall be kiln dried unless otherwise indicated. If pressure treated lumber is required by the roof membrane manufacturer, additional compensation will not be considered. Additionally, if pressure treated wood is used, wood shall be separated from all metal components to avoid galvanic corrosion.

E. Wood blocking shown on the drawings shall be continuous unless specifically indicated otherwise.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by ALSC.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Maximum moisture content at time of dressing: 19 percent, maximum, for 2-inch nominal thickness or less.

B. Wood blocking and framing construction shall be No. 2 grade and any of following species:

1. Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; NLGA, WCLIB, or WWPA.
2. Hem-fir or Hem-fir (north); NLGA, WCLIB, or WWPA.
3. Southern pine; SPIB.
4. Spruce-pine-fir (south) or Spruce-pine-fir; NELMA, NLGA, WCLIB, or WWPA.

2.2 DECKING AND SHEATHING

A. Plywood Sheathing: APA PS 1 Exposure 1 sheathing, 3/4-inch thick.

2.3 FASTENERS

A. Fasteners, washers, and accessories: Stainless steel or galvanized steel.

1. Galvanized: ASTM A 153, hot-dip method. Electrogalvanized items unacceptable.

B. Wood-to-wood connections: Galvanized, annular-threaded or ring-shanked common nails, 3-inches long.

C. Termination bar to wood: Number 12, self-drilling, self-tapping screws of sufficient length to penetrate substrate 1-1/2-inches minimum.

D. Wood blocking to steel framing: Number 14, self-drilling, self-tapping screws, factory treated with fluorocarbon coating or stainless steel, of sufficient length to penetrate upper flutes of steel deck or steel framing 1-inch minimum and 1-1/4-inches maximum.

E. Plywood to brick masonry or concrete walls: 1/4-inch diameter, 2-inch long drive pin anchors, with zinc sheath and stainless steel pin.

F. Dimension lumber to masonry or concrete: Masonry screws with high-low threads for tapping concrete and corrosion resistant coating; 1/4-inch diameter; Tapcon, by ITW Buildex, or approved equal.

2.4 ACCESSORIES

A. Fiberglass Batt insulation: See Division 07 Section “Roof and Deck Insulation.”

B. Self-Adhering Membrane: See Division 07 Section “Flashing and Sheet Metal.”

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Selection of lumber pieces:

1. Select members so that knots and obvious defects will not interfere with proper fastening and will allow making of proper connections. Cut out and discard defects that render piece unable to serve intended function.
2. Lumber may be rejected for excessive warp, twist, bow, crook, mildew, fungus, mold, or moisture content, as well as for improper cutting and fitting.

B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Comply with Factory Mutual (FM) Data Sheet 1-49 for anchoring perimeter blocking. Reduce fastener spacing by half within 8-feet of exterior corners.

D. Cut butt joints in woodwork to provide smooth, uniform line without irregularities. Stagger butt joints at multiple layers of blocking, layer to layer. Gap joints 1/8-inch. Minimum length of any individual piece of woodwork at perimeter edge shall be 3-feet, with minimum of 2 fasteners per piece.

E. Overlap wood blocking joints at corners from layer to layer.

F. Protect installed wood from moisture and weather. Wood degraded by exposure shall be rejected.

3.2 FASTENING OF WOODWORK

A. General:

1. Countersink fasteners below top plane of nailers.
2. Achieve 1-1/4-inch minimum penetration into substrate when fastening 2x lumber to brick, structural concrete, or 2x lumber. Provide 1-inch minimum and 1-1/2-inches maximum penetration of metal decks.
3. Provide 2 rows of fasteners at the specified frequency for wood blocking 2-inches by 8-inches nominal and wider.
4. When attaching wood to concrete or masonry, through-drill wood 1/16-inch larger than fastener shank.
5. Re-secure existing wood blocking scheduled for reuse with appropriate fasteners spaced at 48-inches on center, staggered off centerline.

B. Wood blocking:

1. To wood blocking: With annular-threaded, ring-shank nails, 12-inches on center, maximum, and staggered slightly off centerline of member being installed.
2. To concrete/masonry substrates: With screws spaced 16-inches on center maximum and staggered slightly off centerline of member being secured.
3. To steel framing: With self-drilling, self-tapping screws spaced at 16-inches on center maximum in staggered pattern.
4. For nailer to nailer connections, penetrate member being fastened to 3/4 thickness of member. Fasten 16-inches on center, staggered.

C. Plywood:

1. To concrete/masonry walls: Provide fasteners at 16-inches on center along the long dimension in rows 8-inches on center. Provide fasteners in each corner, 4-inches from each edge. Stagger fasteners along the long dimension from row to row providing a minimum of 20 fasteners per 4x8 ft board. Predrill pilot holes in accordance with fastener manufacturer's printed instructions.
2. To wood blocking: With nails spaced at 8-inches on center along each framing member.

    a. Countersink fasteners below top plane of plywood.
    b. Provide 1/8-inch gap between successive sections of plywood. Align finished surfaces to vary not more than 1/16-inch from plane of surfaces of adjacent units.
    c. Place panels with long dimension perpendicular to support.
    d. Install roof deck panels in staggered array, with panel ends in successive rows being offset. Minimum panel placement size shall be 48-inches by 48-inches. Each panel shall span minimum of 3 supports.
    e. Center joints accurately over support.

3.3 STUD WALLS

A. Fabricate stud walls with continuous top and bottom plates and studs spaced at 16-inches on center, maximum. Secure studs to top and bottom plates with 2 fasteners at top and bottom connections. Provide stud walls with extra wide bottom plate where indicated.

B. Where stud walls are to be installed over existing wood, resecure existing wood at 48-inches on center maximum. Secure bottom plate of stud wall to existing substrate with 2 rows of fasteners spaced at 16-inches on center. Provide stud walls in maximum 8-foot lengths. Secure mating studs of adjacent wall sections with 2 rows of fasteners spaced 8-inches on center.

C. Position plywood so that ends align with studs and extend onto adjacent section of stud walls 32-inches minimum. Overlap plywood onto existing wall and or framing where indicated. Secure plywood to exterior and interior of wall along top and bottom plates with fasteners spaced at 16-inches on center. Secure plywood to studs with 2 fasteners per stud. Provide batt insulation between studs unless otherwise indicated.

D. Shim and adjust perimeter parapet walls as required to provide a plumb and true wall. Provide a longitudinal wall deviation of 1/2-inch maximum in 50 feet.

END OF SECTION 061000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood blocking and nailers.
2. Plywood backing panels.
3. Plywood blocking and nailers.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal or greater size but less than 5 inches nominal size in least dimension.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Sustainable Design Submittals:

1. Product Certificates: For materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
2. Product Data: For installation adhesives, indicating VOC content.
3. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.
2. Fire-retardant-treated wood.
3. Power-driven fasteners.
4. Post-installed anchors.
5. Metal framing anchors.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Regional Materials: Dimension lumber, except treated materials, shall be manufactured within 100 miles (160 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site.

B. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review (NGLA, WWPA,NeLMA, SPIB, etc.) to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Dress lumber, S4S, unless otherwise indicated.

C. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal thickness or less; no limit for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following except as otherwise noted:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat items indicated on Drawings, and the following:

1. Framing for raised platforms.
2. Plywood backing panels.
3. Plywood, blocking, and nailers within exterior walls and exterior openings.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking and nailers.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:.

1. Hem-fir.
2. Douglas-fir.

C. Concealed Boards: 19 percent maximum moisture content of any of the following species and grades:

1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
2. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods, No. 2 Common grade; NELMA.
5. Northern species, No. 2 Common grade; NLGA.
6. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.6 PLYWOOD BLOCKING AND NAILERS

A. Plywood Blocking and Nailers: Plywood, DOC PS 1, Exterior, A-C, fire-retardant treated, in thickness indicated or, if not indicated, not less than thickness as indicated on Drawings nominal thickness.

2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Screws for Fastening to Metal Framing: ASTM C 1002 and ASTM C 954, length as recommended by screw manufacturer for material being fastened.

D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

E. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 , ICC-ES AC58 , ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.

2.8 METAL FRAMING ANCHORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cleveland Steel Specialty Co.
2. KC Metals Products, Inc.

3. Phoenix Metal Products, Inc.
4. Simpson Strong-Tie Co., Inc.
5. USP Structural Connectors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B; G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

D. Stainless-Steel Sheet: ASTM A 666, Type 304.

1. Use for exterior locations and where indicated.

2.9 MISCELLANEOUS MATERIALS

A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet o.c.

H. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

J. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

K. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

L. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD BLOCKING AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 064116 - PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plastic-laminate-faced architectural cabinets.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing cabinets and concealed within other construction before cabinet installation.
2. Section 092216 "Non-Structural Metal Framing" for metal backing required for installing cabinets and concealed within other construction before cabinet installation.
3. Division 12 Sections for manufactured casework requirements.
4. Section 123623.13 "Plastic-Laminate-Clad Countertops."
5. Section 123661.16 "Solid Surfacing Countertops."

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product, including high-pressure decorative laminate adhesive for bonding plastic laminate and cabinet hardware and accessories.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".
2. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content, in accordance with 018113 "Sustainable Design Requirements".

3. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".
4. Sourcing of Raw Materials - Recycled Content:

    a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
    b. Include information on Building Product Disclosure and Optimization Calculator.

5. Low Emitting Materials - Adhesives and Sealants:

    a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
    b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

6. Low Emitting Materials : Composite Wood:

    a. Submit product data or other published information verifying the composite wood has low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
2. Show locations and sizes of cutouts and holes for electrical switches and outlets and other items installed in architectural plastic-laminate cabinets.

D. Samples for Verification:

1. Plastic laminates, 8 by 10 inches, for each color, pattern, and surface finish.

2. Exposed cabinet hardware and accessories, one unit for each type and finish.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance..

B. Installer Qualifications: Fabricator of products.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

B. Grade: Custom.

C. Type of Construction: Face frame.

D. Cabinet, Door, and Drawer Front Interface Style: Flush overlay .

E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.

1. Basis-of-Design: Subject to compliance with requirements provide products indicated on Drawings or approved substitution from the following:

a. Formica Corporation.
b. Lamin-Art, Inc.
c. Panolam Industries International, Inc (Nevamar, Pionite).
d. Wilsonart International; Div. of Premark International, Inc.

F. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGS.
2. Postformed Surfaces: Grade HGP.
3. Vertical Surfaces: Grade VGS.
4. Edges: Grade HGS .

G. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS Thermoset decorative panels.

a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch thick, matching laminate in color, pattern, and finish.
b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
c. Balanced Construction: For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.

2. Drawer Sides and Backs: Thermoset decorative panels with PVC or polyester edge banding.
3. Drawer Bottoms: Thermoset decorative panels.

H. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

I. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

J. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As indicated on Drawings.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

B. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

C. Low-Emitting Composite Wood: Provide materials/products that have low formaldehyde emissions that meet the California Air Resources Board (CARB) ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

D. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard: ANSI A208.2, Grade 130.
2. Particleboard: ANSI A208.1, Grade M-2.
3. Particleboard: Straw-based particleboard complying with requirements in ANSI A208.1, Grade M-2, except for density.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Environ Biocomposites Manufacturing LLC; Biofiber Wheat.
2) Sorm Incorporated; Primeboard Premium Wheat.

4. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
5. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 120 degrees of opening.

C. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.

D. Catches: Magnetic catches, BHMA A156.9, B03141.

E. Shelf Rests: BHMA A156.9, B04013; plastic, two-pin type with shelf hold-down clip.

F. Drawer Slides: BHMA A156.9.

1. Grade 1 and Grade 2: Side mounted and extending under bottom edge of drawer; full-extension type; zinc-plated steel with polymer rollers.
2. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
3. For drawers not more than 3 inches high and not more than 24 inches wide, provide Grade 2.
4. For drawers more than 3 inches high but not more than 6 inches high and not more than 24 inches wide, provide Grade 1.
5. For drawers more than 6 inches high or more than 24 incheswide, provide Grade 1HD-100.
6. For computer keyboard shelves, provide Grade 1.
7. For trash bins not more than 20 inches high and 16 incheswide, provide Grade 1HD-100.

G. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.

H. Door and Drawer Locks: Manufacturer’s standard ANSI/BHMA Grade 1 five (5) pin-tumbler deadbolt type lock.

1. Small pin-tumbler or interchangeable core deadbolt style with heavy duty deadbolt.

    a. Disc-tumbler type locks will not be accepted.
    b. Cam locks will not be accepted.

2. Door locks: ANSI number E07121.

    a. Basis-of-Design: Subject to compliance with requirements, provide Olympus 100DR, 700S/700LCA, 721DR, or 777, or approved substitution.

3. Drawer locks: ANSI number E07041.

    a. Basis-of-Design: Subject to compliance with requirements, provide Olympus 200DW, 800S/800LCA, 721DW, or 888, or approved substitution.

4. Finish: Satin chrome (626/US26D).
5. Keying: Coordinate all keying with Owner.

    a. Key locks within each room alike.
    b. Key rooms differently from one another.
    c. Master key all locks, furnish six (6) master keys to Owner.
    d. Provide a system that allows a minimum of 2,000 key changes.

6. Provide locks on all doors and drawers.

I. Door and Drawer Silencers: BHMA A156.16, L03011.

J. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3, with exposed edges seamed before tempering, 6 mm thick unless otherwise indicated.

K. Tempered Float Glass for Cabinet Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear), Quality-Q3; with exposed edges seamed before tempering, 6 mm thick.

L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

1. Satin Stainless Steel: BHMA 630.

M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

A. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

B. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

C. Adhesives: Do not use adhesives that contain urea formaldehyde.

D. Adhesive for Bonding Plastic Laminate: Contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

A. Fabricate cabinets to dimensions, profiles, and details indicated.

B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.

2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

D. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.

C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.

1. Use filler matching finish of items being installed.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips,or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION

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SECTION 066400 - PLASTIC PANELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Plastic sheet paneling (FRP).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".
2. Environmental Product Declaration (EPD) :

    a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
    b. Include information on Building Product Disclosure and Optimization Calculator.

3. Low Emitting Materials - Adhesives and Sealants:

    a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
    b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

4. Low Emitting Materials : Composite Wood:

a. Submit product data or other published information verifying the composite wood has low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

5. Low Emitting Materials - Wall Materials:

a. Submit product data or other published information verifying compliance with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

C. Samples: For plastic paneling and trim accessories, in manufacturer's standard sizes.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.

B. Low-Emitting Wall Materials: Provide materials/products, installed within the weatherproofing system, that comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

C. Low-Emitting Composite Wood: Provide materials/products that have low formaldehyde emissions that meet the California Air Resources Board (CARB) ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

D. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

2.2 MANUFACTURERS

A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

2.3 PLASTIC SHEET PANELING

A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319. Panels shall be USDA accepted for incidental food contact.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or comparable product by one of the following:

a. Crane Composites, Inc.
b. Glasteel.
c. InPro Corporation.
d. Marlite.
e. Newcourt, Inc.
f. Nudo Products, Inc.
g. Parkland Plastics, Inc.

2. Nominal Thickness: Not less than 0.09 inch.
3. Surface Finish: As indicated on Drawings.
4. Color: As indicated on Drawings.

2.4 ACCESSORIES

A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

1. Color: Match panels.

B. Adhesives shall have a VOC content of 50 g/L or less.

C. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

D. Adhesive: Provide product recommended by plastic paneling manufacturer that meets low-emitting requirements.

E. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.

B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.

1. Mark plumb lines on substrate at panel joint locations for accurate installation.
2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

3.3 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions.

B. Install panels in a full spread of adhesive.

C. Install trim accessories with adhesive. Do not fasten through panels.

D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.

E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.

F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION

SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies requirements for the following Scope of Work:

1. Modified bituminous sheet waterproofing.

1.2 SUBMITTALS

A. Qualification Data: For Installer.

B. Field quality-control reports.

C. Sample Warranties: For special warranties.

D. Product Data: For each type of product.

1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.

1. Warranty Period: Ten 10-years from date of Substantial Completion.

B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of five years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Waterproofing System: Obtain waterproofing materials and drainage board from single source from single manufacturer.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet: Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.

1. Manufacturers

a. Bituthene 3000 as manufactured by GCPAT.
b. CCW MiraDri 860/861 as manufactured by Carlisle Coatings and Waterproofing.
c. Blueskin WP200 as manufactured by Henry.

2. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid waterborne or solvent-borne primer recommended for substrate by sheet-waterproofing material manufacturer.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet-waterproofing material manufacturer.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch, predrilled at 9-inch centers.

G. Mastic: Manufacturer's recommended mastic material.

2.4 DRAINAGE BOARD

A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel with Polymeric Film: Composite subsurface drainage panel acceptable to waterproofing manufacturer and consisting of a studded, nonbiodegradable, molded-plastic-sheet drainage core; with a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 sieve laminated to one side of the core and a polymeric film bonded to the other side; and with a vertical flow rate through the core of 9 to 21 gpm per ft..

1. Manufacturer's recommended drainage panel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.

1. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
2. Verify that compacted subgrade is dry, smooth, sound, and ready to receive waterproofing sheet.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.

F. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.

1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:

a. At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.

G. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 MODIFIED BITUMINOUS SHEET-WATERPROOFING APPLICATION

A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions and per recommendations in ASTM D 6135.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.

1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.

D. Horizontal Application: Apply sheets from low to high points to ensure that laps shed water.

E. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

F. Seal edges of sheet-waterproofing terminations with mastic.

G. Install sheet-waterproofing and auxiliary materials to tie into adjacent waterproofing.

H. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

I. Immediately install protection course with butted joints over waterproofing membrane.

1. Drainage board may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer and installed immediately.

3.4 DRAINAGE BOARD INSTALLATION

A. Place and secure molded-sheet drainage panels, with geotextile facing away from wall or deck substrate, according to manufacturer's written instructions. Use adhesive or another method that

does not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.

3.5 PROTECTION, REPAIR, AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Protect installed insulation drainage panels from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

D. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

E. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 071326

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Polyisocyanurate foam-plastic board.
2. Mineral-wool blanket.
3. Minimally expanding spray polyurethane insulation for miscellaneous voids.

B. Related Requirements:

1. Section 092900 "Gypsum Board" for sound attenuation blanket used as acoustic insulation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Preinstallation Conference for NFPA 285: Prior to installation of exterior wall assemblies required to be NFPA 285 compliant, review and document the methods and procedures related to installation. Require representatives of each entity direcly concerned with assembly components to attend, including the following:

a. Contractor's Superintendent.
b. Sheathing installer.
c. Weather barrier/air barrier installer.
d. Thermal insulation installer.
e. Exterior cladding installer.

2. Review the following:

a. NFPA 285 documentation showing all components in the wall assembly are in compliance as a complete, tested assembly.
b. Manufacturer's installation guidelines.
c. Drawing details.
d. Wall framing, including potential interference and conflicts,
e. Wall assembly requirements in addition to NFPA 285 compliance, such as fire-rated assembly requirements, if any.
f. Weather barrier/air barrier assembly requirements.

g. Cladding fasteners, airspace clearances, and other requirements.
h. Field quality control procedures.
i. Repair of defects and defective work, if any.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD) :

a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
b. Include information on Building Product Disclosure and Optimization Calculator.

2. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

3. Low Emitting Materials - Adhesives and Sealants:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer¢¢s claims of compliance must also state the range of total VOC content after 14 days.

4. Low Emitting Materials - Thermal Insulation:

a. Submit product data or other published information verifying compliance with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer¢¢s claims of compliance must also state the range of total VOC content after 14 days.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1. NFPA 285 Compliance: Where thermal insulation is part of an exterior wall assembly required to be in compliance with NFPA 285, submit documentation showing all components in the wall assembly are in compliance as a complete, tested assembly.

a. Components of the exterior wall assembly include, but are not limited to; wall framing, sheathing, weather barrier/air barrier, continuous insulation, and exterior cladding.

B. Evaluation Reports: For foam-plastic insulation, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Installers of insulation that is part of an exterior wall assembly that is required to be in compliance with NFPA 285 shall be certified by the insulation manufacturer and trained in proper installation of insulation and seam treatment.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

B. Protect foam-plastic board insulation as follows:

1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 POLYISOCYANURATE FOAM-PLASTIC BOARD

A. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.

B. Polyisocyanurate Board, Foil Faced : ASTM C 1289, foil faced, Type I, Class 1 or 2.

a. Atlas Roofing Corporation.
b. Carlisle Coatings & Waterproofing
c. DuPont de Nemours, Inc.
d. Hunter Panels.
e. Ox Engineered Products.
f. Rmax, Inc.

2. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
3. Locations:

a. Continuous exterior insulation, where indicated on Drawings.

2.2 MINERAL-WOOL BLANKETS

A. Performance Requirements:

1. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.
2. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.
3. Low-Emitting Thermal Insulation: Provide materials/products, installed within the weatherproofing system, that comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

B. Mineral-Wool Blanket, Unfaced : ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Industrial Insulation Group, LLC.
b. Rockwool.
c. Thermafiber Inc.; an Owens Corning company.

2. Location(s): Fire-rated assemblies, fireblocking, draftstopping, and where indicated on Drawings.

2.3 INSULATION FASTENERS

A. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

B. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AGM Industries, Inc.
b. Gemco.

2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:

a. Crawl spaces.

b. Ceiling plenums.
c. Attic spaces.

C. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates without damaging insulation, fasteners, or substrates.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AGM Industries, Inc.
b. Gemco.

2.4 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Spray Polyurethane Foam Insulation: minimally expanding, low pressure-build, flexible foam, with compressive strength less than 10 psi per ASTM D 1621, designed to insulate and seal window and door framing. Provide maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.

a. Basis-of-Design Product: Subject to compliance with requirements, provide DOW Great Stuff Pro or comparable product.

2. Low-Emitting Thermal Insulation: Provide materials/products, installed within the weatherproofing system, that comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

1. Adhesives shall have a VOC content of 70 g/L or less.

2. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.3 INSTALLATION OF CONTINUOUS EXTERIOR BOARD INSULATION

A. Rigid Foam Board Insulation:

1. Installation, General:

   a. Comply with manufacturer's instructions for installation of rigid foam board insulation.
   b. Do not install rigid foam board insulation that has become soiled, wet, or has not been properly protected from sunlight.
   c. Dry fit rigid foam board insulation prior to final installation. Neatly trim board around conduits, pipes, and other items that will penetrate board insulation.
   d. Butt edges tightly in both directions.
   e. Seal any gaps greater than 1/4 inch with spray polyurethane insulation for miscellaneous voids, or compatible sealant according to manufacturer's recommendations.

2. Installation over Gypsum Sheathing:

   a. Dry fit rigid foam board insulation prior to final installation. Neatly trim board around conduits, pipes, and other items that will penetrate board insulation.
   b. Install manufacturer's recommended mechanical fasteners with washers, approximately 16 inches x 24 inches o.c. into stud framing, or spacing as otherwise recommended by manufacturer.

3. Installation over Unit Masonry and Concrete:

   a. Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer. Fit courses of insulation between wall ties and other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.
   b. Supplement adhesive attachment of insulation by securing boards with manufacturer's recommended fasteners for use behind cladding indicated.

3.4 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Where indicated, install in cavities formed by framing members according to the following requirements:

1. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
2. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

3. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

    a. Exterior Walls: Set units with facing placed toward as indicated on Drawings.
    b. Interior Walls: Set units with facing placed as indicated on Drawings.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.5 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

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SECTION 072200 - ROOF AND DECK INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies requirements for the following Scope of Work:

1. Provide tapered and flat thermal insulation and cover board.
2. Provide insulation crickets, fillers, and cants.

1.2 SYSTEM DESCRIPTION

A. Tapered Insulation System:

1. Provide minimum insulation thickness as specified.
2. The maximum thickness for any given insulation board or layer shall be 3-inches.
3. Provide minimum aged R-Value of 30 throughout roof areas.
4. Maintain constant perimeter height at edges of each roof section.
5. Utilize existing and augmenting drain locations as indicated on Drawings.
6. Provide crickets and saddles between interior drainage points. Cricket width shall be as required to provide positive slope to drain but in no case less than 8-foot wide unless specifically indicated otherwise.
7. Provide 8-foot by 8-foot sumps at each drain location.

1.3 SUBMITTALS

A. Product Data: For each product indicated in Part 2 of this Section.

B. Manufacturer’s full size tapered insulation/cricket drawing with the following:

1. Outline of roof area with drain and major penetration locations.
2. Profile of tapered sections to include crickets.
3. Average R-value of system.

C. Certifications: Provide documentation for requirements described in Paragraph 1.4, Quality Assurance.

D. FM Approval/RoofNav Number: Provide the FM roof assembly number that includes all submitted products/components in an approved assembly.

E. Insulation attachment pattern: Provide a drawing showing typical fastener pattern and frequency at field, corners, and edges.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide insulation and related materials with fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

B. Securement: Fasten or secure components of system to meet or exceed requirements of FMG Data Sheets 1-28 and 1-29. Comply with requirements to achieve wind uplift rating of 1-90.

C. Insulation products incorporated into roof system shall be included in roof membrane manufacturer's system warranty. Provide documentation from membrane manufacturer that proposed insulation will be included in required warranty.

D. Tapered insulation plan in Drawings is a conceptual configuration showing basic design intent. Do not interpret Drawings as approved tapered insulation layout plan.

PART 2 - PRODUCTS

2.1 INSULATION

A. General: All roof insulation and associated materials shall be manufactured by or acceptable to the roof membrane manufacturer for inclusion in full system warranty to be issued by the manufacturer.

B. Extruded-Polystyrene Board Insulation: ASTM C 578, Type VI, 1.80 lb/cu. ft., with maximum flame-spread and smoke-developed indices of 75 and 450, respectively; with shiplap edges and drainage channels on one side of board.

C. Polyisocyanurate: ASTM C 1289, Type II; Class I, Grade 2.

1. Flat Board Stock: Minimum thickness 2.6-inches (2 layers).
2. Tapered System: 1/4-inch per foot slope, to provide consistent slope; minimum thickness of tapered isocyanurate shall be 1/2-inch.
3. Crickets: 1/2-inch per foot, minimum slope.
4. Board size, maximum:
    a. For Adhered Installation: 4-feet by 4-feet.
    b. For Mechanically Attached Insulation: 4-feet by 8-feet.

D. Wood Fiberboard: ASTM C 208.

1. Cants: 4-inch face; 1-1/2-inch thickness.
2. Drain Sumps: 1/2-inch per foot, minimum, slope.

E. Cover Board: Fiberglass faced, gypsum board with moisture resistant core; ASTM C 1177.

1. Thickness: 1/2-inch.
2. DensDeck Prime by Georgia Pacific, or approved substitute.

2.2 MECHANICAL INSULATION

A. Insulation for drain bowls and leader piping: fibrous glass batt type with premolded polyvinyl chloride jackets. Seaming tape for jacket seams shall be as supplied by insulation jacket manufacturer. Minimum thickness 1-inch.

B. Fiberglass batt insulation for use at locations other than hot pipes: Conforming to ASTM C 665, Type II, Class C and E84, I, 3-inches thick.

2.3 ACCESSORIES

A. Adhesive: One- or two-part; spray applied polyurethane foam approved by membrane manufacturer.

B. Fasteners

1. Insulation Fasteners: Number 12, self-drilling, self-tapping screws; sufficient length to penetrate top flange of steel decking by 1-inch minimum and 1-1/4-inches maximum; with fluorocarbon coating complying with FMG 4470.
2. Stress Plates: Nominal 3-inch diameter, 26 gauge galvalume coated steel.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure that surfaces to receive insulation are clean and dry. If necessary, provide equipment to dry surface prior to application. Do not dry with open flames.

B. Remove dirt, debris, and dust from substrates by brooming or vacuuming. Clean dirt and debris from between steel deck ribs.

C. Provide roof insulation boards free of defects, including, but not limited to, broken corners, improperly adhered skins, excessive moisture content (if insulation surface “foams” when hot bitumen is applied, excessive moisture is present), dimensional irregularities, or other defects that may adversely affect replacement roof system. Mark defective insulation boards permanently and remove from site.

3.2 TERRACE INSULATION INSTALLATION

A. Loosely lay board insulation units over roofing membrane, with long joints of insulation in continuous straight lines and with end joints staggered between rows. Abut edges and ends between units.

B. Install one or more layers of insulation to achieve required thickness over roofing membrane. Cut and fit to within 3/4-inch of projections and penetrations.

1. Where overall insulation thickness is 2-inches or more, install required thickness in two or more layers with joints of each succeeding layer staggered over joints of previous layer a minimum of 6-inches in each direction.

C. Install geotextile fabric over insulation, overlapping edges and ends at least 12-inches. Do not lap ends of fabric sheets within 72-inches of roof perimeter. Extend fabric 2 to 3-inches above ballast at perimeter and penetrations. Apply additional layer of fabric around penetrations to prevent aggregate from getting between penetration and insulation. Do not cover drains or restrict water flow to drains.

3.3 ROOF INSULATION INSTALLATION

A. Mechanical Attachment:

1. Secure base layer of insulation to steel roof decks using specified fasteners. Stagger end joints to middle of long dimension of insulation boards. Install fasteners at a rate of 1 fastener per 2 square feet (16 fasteners per 4-feet by 8-feet board) in the field of the roof. Increase fasteners to 24 fasteners per 4-feet by 8-feet board 8 feet minimum from the building perimeter. Further increase fastener frequency to 32 fasteners per 4-feet by 8-feet board for minimum of 8-feet in each direction from building corners where parapets do not exceed 3-feet in height. Drive fasteners straight, perpendicular to insulation. Install fasteners in accordance with the pattern established by the FMG Approval Guide. Adhere subsequent layers of insulation in adhesive.
2. Install insulation boards with minimum surface area of 16 square feet within 8-feet of building perimeters. Minimum dimension on cut insulation boards in field of roof shall be 12-inches, with minimum surface area of 2 square feet.

B. Adhesive Attachment:

1. Secure insulation layers and cover board using urethane adhesive. Adhere each insulation layer, including the cover board, over acceptable substrate using coverage method in accordance with manufacturer’s requirements and recommendations but in no case shall adhesive ribbons be spaced more than 12-inches in the field or 6-inches at the building perimeter.
2. Set boards in adhesive, butting edges tightly. Stagger joints of insulation and coverboard within each layer. Offset joints between layers 12-inches minimum. Fill gaps greater than 1/4-inch.
3. Walk in boards to ensure adhesion and provide smooth top plane of insulation.

C. Utilize tapered edge strips and filler boards at drain sump locations. Place taper from surrounding insulation system down to drain bowl locations, providing 8-foot by 8-foot minimum drain sumps.

3.4 PIPE INSULATION INSTALLATION

A. Install insulation and jackets at drain bowls as indicated on Drawings, in accordance with manufacturer's printed instructions. Refer to Division 22, "Roof Drains" for additional information

B. Install batt insulation at hot pipe locations as indicated on Drawings. Place foil facing toward pipe penetration.

END OF SECTION 072200

SECTION 072713 - MODIFIED BITUMINOUS SHEET AIR BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes self-adhering, vapor-retarding, modified bituminous sheet air barriers.

B. Related Requirements:

1. Section 061600 "Sheathing" for wall sheathings and wall sheathing joint-and-penetration treatments.

1.3 DEFINITIONS

A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.

B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.

C. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; and tested physical and performance properties of products.

B. Sustainable Design Submittals:

1. Product Data: For coatings, indicating VOC content.
2. Laboratory Test Reports: For coatings, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For air-barrier assemblies.

1. Show locations and extent of air barrier materials, accessories, and assemblies specific to Project conditions.
2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
3. Include details of interfaces with other materials that form part of air barrier.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with air barrier.

C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

D. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Remove and replace liquid materials that cannot be applied within their stated shelf life.

B. Protect stored materials from direct sunlight.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.

1. Protect substrates from environmental conditions that affect air-barrier performance.
2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction shall be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Air-Barrier Assembly Air Leakage: Maximum 0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft., when tested according to ASTM E 2357.

2.3 SELF-ADHERING SHEET AIR BARRIER

A. Modified Bituminous Sheet: 40-mil- thick, self-adhering sheet consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick, cross-laminated polyethylene film with release liner on adhesive side and formulated for application with primer that complies with VOC limits.

1. Basis-of-Design Product: Subject to compliance with Requirements, provide Henry Blueskin Roof High Temp Roof Underlayment PE 200 HT or comparable product another manufacturer.

2. Physical and Performance Properties:

a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft. pressure difference; ASTM E 2178.
b. Tensile Strength: Minimum 600 psi; ASTM D 412, Die C.
c. Ultimate Elongation: Minimum 250 percent; ASTM D 412, Die C.
d. Puncture Resistance: Minimum 40 lbf; ASTM E 154/E 154M.
e. Water Absorption: Maximum 0.15 percent weight gain after 48-hour immersion at 70 deg F; ASTM D 570.
f. Vapor Permeance: Maximum 0.05 perms; ASTM E 96/E 96M, Desiccant Method.
g. Adhesion to Substrate: Minimum 16 lbf/sq. in. when tested according to ASTM D 4541 as modified by ABAA.
h. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

i. UV Resistance: Can be exposed to sunlight for 60 days according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
3. Verify that substrates are visibly dry and free of moisture
4. Verify that masonry joints are flush and completely filled with mortar.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, fill, and seal substrate and joints and cracks in substrate according to manufacturer's written instructions and details. Provide clean, dust-free, and dry substrate for air-barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

H. Bridge isolation joints expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement according to manufacturer's written instructions and details.

3.3 INSTALLATION

A. Install materials according to air-barrier manufacturer's written instructions and details and according to recommendations in ASTM D 6135 to form a seal with adjacent construction and ensure continuity of air and water barrier.

1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous air-barrier sheet produced for low-temperature application. Do not install low-temperature sheet if ambient or substrate temperature is higher than 60 deg F.
2. Unless manufacturer recommends in writing against priming, apply primer to substrates at required rate and allow it to dry.

B. Prepare, treat, and seal inside and outside corners and vertical and horizontal surfaces at terminations and penetrations with termination mastic and according to ASTM D 6135.

C. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.

D. Apply and firmly adhere air-barrier sheets over area to receive air barrier. Accurately align sheets and maintain uniform 2-1/2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.

1. Apply sheets in a shingled manner to shed water.
2. Roll sheets firmly to enhance adhesion to substrate.

E. Apply continuous air-barrier sheets over accessory strips bridging substrate cracks, construction, and contraction joints.

F. CMU: Install air-barrier sheet horizontally against the CMU beginning at base of wall. Align top edge of air-barrier sheet immediately below protruding masonry ties or joint reinforcement or ties, and firmly adhere in place.

1. Overlap horizontally adjacent sheets a minimum of 2 inches and roll seams.
2. Apply overlapping sheets with bottom edge slit to fit around masonry reinforcing or ties. Roll firmly into place.
3. Seal around masonry reinforcing or ties and penetrations with termination mastic.
4. Continue the sheet into all openings in the wall, such as doors and windows, and terminate at points to maintain an airtight barrier that is not visible from interior.

G. Seal top of through-wall flashings to air-barrier sheet with an additional 6-inch- wide, transition strip.

H. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

I. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.

1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.

J. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.

K. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.

L. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

M. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.

1. Transition Strip: Roll firmly to enhance adhesion.

N. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air-barrier material with foam sealant.

O. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.

P. Do not cover air barrier until it has been tested and inspected by testing agency.

Q. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner may Engage a qualified testing agency to perform tests and inspections.

B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Continuous structural support of air-barrier system has been provided.
3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.

4. Site conditions for application temperature and dryness of substrates have been maintained.
5. Maximum exposure time of materials to UV deterioration has not been exceeded.
6. Surfaces have been primed.
7. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
8. Termination mastic has been applied on cut edges.
9. Air barrier has been firmly adhered to substrate.
10. Compatible materials have been used.
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (air barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
13. All penetrations have been sealed.

C. Air barriers will be considered defective if they do not pass tests and inspections.

1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
2. Remove and replace deficient air-barrier components for retesting as specified above.

D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

E. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials according to air-barrier manufacturer's written instructions.
2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 072713

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SECTION 073363 – VEGETATED ROOF ASSEMBLIES MODULAR TRAY ASSEMBLY – EXTENSIVE PLANTINGS

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies requirements for the following Scope of Work.
   1. Modular vegetated green roof system and accessories.

1.2 SUBMITTALS

A. Product Data: For each product listed in Part 2 of this section.

B. Shop Drawings: Include details of construction and installation including but not limited to roof plans, slopes, and locations of drains, roof penetrations, and mechanicals; and drawing details of vegetated green roof assembly, walkway pavers, and other accessories.

C. Warranty: Sample of available or applicable warranties.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Installer must be pre-approved by the manufacturer to install materials of this section.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards. Store materials within absolute limits for temperature and humidity recommended by the manufacturer. Protect from damage.

B. Vegetated green roof modules are to be delivered in good condition, free from shipping damage.

C. Modules and plant materials in plastic shipping wrap should be stored away from sun and extreme heat exposure and above grade until ready to install.

D. Fully vegetated green roof modules should be installed and/or un-stacked from delivery pallet within 4 hours of delivery.

E. Use only standard methods for hoisting palletized materials to the roof deck. Stabilize equipment to account for decreasing load limits as cranes and forklifts are extended.

F. Prior to hoisting materials to the roof deck, clear the roof deck of any left over materials from other trades by hand. These materials can include screws, nails, metal shavings, scrap wood, tools, etc. Sweep the roof deck free on any grit, soil, and/or other debris.

G. Protect exposed roofing system with plywood panels, protective sheeting or rubber tires while landing pallets on the roof deck.

H. Never exceed the load capacity of the roof deck when placing vegetated green roof modules on the roof.

I. During installation, NEVER scrape or puncture the slip-sheet or membranes. Keep surfaces clear of grit, soil, and/or other debris at all times with a broom or blower. Never set pallets or modules on areas with grit, soil, and/or other debris.

J. Provide readily available water source for irrigation and maintenance of plants in accordance with manufacturers guidelines.

K. Maintain health of plants during and after delivery, storage, and installation of the vegetated green roof modules as recommended by manufacturers guidelines.

1.5 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.6 WARRANTY

A. Standard Tray Warranty: Manufacturer's 25-year standard warranty.

1. Warranty Period: 25 years from date of installation
2. Installer shall complete and submit necessary documentation to manufacturer as required to complete warranty registration.

B. Standard Plant Warranty: 30-day plant warranty

1. Warranty Period: 30 days from date of installation
2. Plants must be sourced through manufacturer and adhere to manufacturer’s recommended plant list for the regional location.
3. Installer shall complete and submit necessary documentation to manufacturer as required to complete warranty registration.

PART 2 - PRODUCTS

2.1 SYSTEM

A. Modular Green Roof Tray System: Pre-vegetated modular green roof trays for installation over waterproof roofing system with accessories including walkway pavers.

2.2 MANUFACTURERS

A. Basis of Design: Green Roof Outfitters.

2.3 PERFORMANCE

A. Fire Rating: ASTM E108, Class A fire resistance. Lab tested and verified.

2.4 MODULAR VEGETATED GREEN ROOF TRAY SYSTEM

A. Protection Course: Refer to Division 07 Section “Fluid-Applied Protected Membrane Roofing”.

B. Green Roof Module Trays: Basis of Design: GROWVista-2 Green Roof Module Tray as manufactured by Green Roof Outfitters, Inc.

1. Material: recycled materials
2. Tray Dimensions: 24in. x 12in. (609.6mm x 304.8mm)
3. Tray Depth: 4 inches (106mm) (nominal)
4. Integrated irrigation channels: 1.8in. x 1.78in. (45.72mm x 45.212mm)
5. Optional Connection holes: 25in. dia. (6.35mm)
6. Optional Tray Fasteners: connect trays together using connection holes on tray

a. Product: Push Pin - Nylon 66 w/ UV Additive
b. Product: Heavy duty UV resistant nylon cable ties

C. Growing Media: light weight engineered growing media designed for use in green roof applications, consisting of organic and inorganic components

1. Must be a mix approved by manufacturer or must be verified to follow green roof soil guidelines by an independent laboratory experienced with testing vegetated green roof growing media.

D. Planting Methods: Includes mixtures of drought tolerant plants appropriately suited for climate and site specific conditions, and recommended or approved by the manufacturer.

1. Pre-grown: vegetated green roof trays are pre-planted in a nursery setting and grown out to desired plant coverage.

a. Standard plant mix: manufacturer’s standard regional mix selections of plants.

2.5 ACCESSORIES

A. Concrete Pavers

1. Refer to Division 07 Section “Fluid-Applied Protection Membrane Roofing.”

PART 3 - EXECUTION

3.1 DELIVERY & HANDLING

A. Upon delivery of green roof modules they are to be kept out of the sun if plastic wrapped to prevent overheating.

B. Installation shall be dependent upon weather and/or plant availability. Proceed with installation only when existing and forecasted weather conditions permit installation when optimum results may be obtained.

C. It is recommended not to install on saturated roof surfaces or under inclement weather conditions, unless with the express written permission of module supplier.

D. Handle empty or vegetated modules with care (i.e.: do not drop, stack or kick modules during handling or installation) to prevent damage to modules and all roofing components. Contractor/Installer shall be responsible for protection of waterproofing/roofing membrane/roof surface.

E. Distribute modules temporarily stored on the roof deck for installation to stay within load limits of the roof construction.

3.2 PREPARATION

A. Perform module installation only after appropriate waterproofing system inspection. If additional waterproofing layers/slip sheets are required before installation, these shall be installed by professionals and inspected before placement of modules. It is strongly recommended that the waterproofing system be leak tested prior to module installation to confirm water tightness.

B. Restrict traffic from work areas until modules are installed and thereafter to restrict damage to the vegetation and modules.

C. Thoroughly remove all debris, foreign materials and etc. from the waterproofing surface, before, during, and after installation.

3.3 INSTALLATION

A. Remove all debris from the roof surface or slip sheet surface that might interfere with installation of the modules or compromise the integrity of the waterproofing surface with a broom and/or blower. Execute work in accordance with the specification, drawings, and details.

1. Install edging along perimeter border between vegetation-free zones and vegetated areas.
2. Ensure modules fit tightly within edging perimeter so that modules fit over flange feet.

B. Place modules on the roof surface or slip-sheet, according to the landscape design, and following the approved recommendations of the roofers/engineers/architects consulted for

this project.

C. Carefully place modules tight against each other in straight rows, so that designed holes are aligned for optimal module attachment. Attempt to place modules in intended locations and give care to minimize the amount of sliding required for accurate positioning.

D. Module Interconnection: Connect modules together with approved self-locking fasteners in any occurrence where more than one module is adjacent to another.

E. Once installed, the modules shall be uniformly watered to sufficiently saturate the vegetation and soil media from top to bottom. Water shall be free of substances harmful to plant growth. The contractor shall furnish hoses or other methods of temporary irrigation.

F. When temperatures exceed 80 degrees thoroughly saturate growing media prior to placing sedum tiles or sedum mats on filled modules. If temperatures are below 80 degrees no preliminary growing media saturation is required.

1. Install sedum tiles or sedum mats conforming to landscape design and other specified requirements.
2. Uniformly water to fully saturate modules once sedum tiles or mats are in place.

3.4 PAVER INSTALLATION

A. Refer to Division 07, Section “Fluid-Applied Protected Membrane Roofing.”

3.5 FIELD QUALITY CONTROL

A. Engage membrane roofing/waterproofing manufacturer’s authorized service representatives to provide inspection of module installation and prepare final inspection reports.

B. Correct deficiencies in work that do not comply with requirements.

3.6 30 DAY MAINTENANCE PERIOD

A. Installation contractor shall maintain the vegetated modules for a period of at least 30 days after completion prior to acceptance from building owner.

B. 30 day maintenance shall include:

1. If vegetation was planted in the modules within the last 45 days, then water the vegetated modules once every 7 days (weather dependent) to assist in vegetation stability. Water more frequently during extended hot weather and drought conditions, especially when plants are showing signs of distress. If vegetation has already been established for at least 45 days before the installation, then water once every 10 days (weather dependent).
2. Perform debris removal and spot weeding as needed. Weeding should occur a minimum of once every two weeks. This process should be continued at least once quarterly for the life of the green roof to prevent weeds from flowering and laying seeds.

3. Replace dead plants with new plants and repair/replant areas that have been damaged, washed out, or inundated with weeds.
4. Limit foot traffic on vegetated areas. When safe paver or non-vegetation zones are not available for access of vegetated area, give care to vary foot placement on vegetation to prevent distress to plant life and prevent localized compaction of growing media.

C. Upon completion of the 30-day maintenance period, the green roof installation company shall submit a written maintenance plan for the vegetated modules to the building owner.

3.7 ACCEPTANCE

A. Upon completion of the 30-day maintenance period, or Substantial Completion for New Construction Projects, contractor shall request owner's acceptance of vegetated modules. Contractor shall provide owner no less than 7 working days to complete owner's initial inspection.

B. Vegetated modules shall be considered acceptable, provided that all requirements, including compliance with the terms of the 30-day maintenance period, and the vegetation is in a healthy state.

C. Upon acceptance, the owner shall assume vegetation and module maintenance unless a maintenance contract is in place.

3.8 CLEANING AND PROTECTION

A. Perform cleaning during installation and upon completion of the work by removal of all excess materials, debris, and equipment resulting from work of this section.

B. Protect modules from damage due to operations of other contractors and trades.

END OF SECTION 073363

SECTION 074213.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Concealed-fastener, lap-seam metal wall panels.

B. Related Sections:

1. Section 054000 "Cold-formed Metal Framing" for furring behind formed metal wall panels.
2. Section 072100 "Thermal Insulation" for continuous insulation installed behind metal wall panels.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal panel assembly during and after installation.
8. Review of procedures for repair of metal panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Sustainable Design Submittals:

1. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

C. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches.

D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.

1. Include Samples of trim and accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical metal panel assembly as shown on Drawings, including supports, attachments, and accessories.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Tapered-Rib Profile, Concealed-Fastener Metal Wall Panels: Multi-purpose wall panel, may be used horizontally and vertically.

1. Basis-of-Design Product: Subject to compliance with requirements, provide CENTRIA Architectural Series Concept Series CS-260 or approved equal by one of the following:

a. Alcoa Inc.
b. Architectural Building Components.

c. Architectural Metal Systems; a Nucor company.
d. ATAS International, Inc.
e. Berridge Manufacturing Company.
f. CENTRIA Architectural Systems.
g. Firestone Metal Products, LLC.
h. MBCI; a division of NCI Building Systems, L.P.
i. Metal-Fab Manufacturing, LLC
j. Morin; a Kingspan Group company.
k. Pac-Clad, a Carlisle Company.
l. Petersen Aluminum Corporation.

2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

   a. Nominal Thickness: 0.032 inch.
   b. Exterior Finish: Two-coat fluoropolymer.
   c. Color: As selected by Architect from manufacturer's full range.

3. Panel Coverage: 12 inches.
4. Panel Height: 7/8 inch .

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

2.4 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

    a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
2. Examine continuous insulation and sheathing to verify that joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

    a. Verify that air/water barrier has been installed, to prevent air infiltration and water penetration.
    b. Verify that air/water barrier is sealed around components and equipment penetrating the air/water barrier.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.

    a. Field-pre-notch holes as recommended by the manufacturer to further reduce binding and risk of oil-canning.

4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

C. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
5. Flash and seal panels with weather closures at perimeter of all openings.

D. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

E. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.

B. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 074243 - COMPOSITE WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies requirements for the following Scope of Work:

1. Provide composite wall with prefabricated extruded aluminum connections.

1.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal-faced composite wall panel assemblies capable of withstanding the effects of the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 330:

1. Wind Loads: Determine loads based on the following minimum design wind pressures:

a. Uniform pressure of 20 lbf/sq. ft., acting inward or outward.

2. Deflection Limits: Metal-faced composite wall panel assemblies shall withstand wind loads with horizontal deflections no greater than 1/175 of the span at the perimeter and 1/60 of the span anywhere in the panel of the span.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation layouts of metal-faced composite wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish among factory, shop, and field-assembled work.

C. Samples: For each type of exposed finish required.

D. Product test reports.

E. Maintenance data.

F. Samples of special warranties.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal-faced composite wall panel assemblies that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal-faced composite wall panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: 20 years from date of Substantial Completion.

1.5 MANUFACTURER INSPECTIONS

A. Inspections: Provide an initial project start-up visitation by the manufacturer. The visit shall be from a qualified representative of the panel manufacturer who will provide a 1 day minimum installation seminar for the proposed products.

PART 2 - PRODUCTS

2.1 TRIM MATERIALS

A. Aluminum Sheet: ASTM B 209, Material shall be provided by the composite panel manufacturer.

1. Surface: Flat finish.
2. Exposed Coil-Coated Finishes:

a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.

3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
4. Color: Color shall match the composite wall panels.

B. Panel Sealants: ASTM C 920.

C. Extruded connections and terminations: extruded aluminum meeting ASTM B 221, as provided by the manufacturer. Color shall match the composite panels.

D. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Where necessary, provide exposed fasteners with heads matching color of metal-faced composite wall panels by means of plastic caps or factory-applied coating. Provide EPDM or neoprene sealing washers where required.

2.2 METAL-FACED COMPOSITE WALL PANELS

A. General: Provide factory-formed and assembled, metal-faced composite wall panels fabricated from two metal facings bonded, using no glues or adhesives, to solid, extruded thermoplastic core; formed into profile for installation method indicated. Include attachment system components and accessories required for weathertight system.

1. Fire-Retardant Core: Noncombustible, with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 450 or less.

2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Laminators, Inc.
b. Alcan Composites

B. Aluminum-Faced Composite Wall Panels:

1. Panel Facing: .032-inch aluminum, embossed.
2. Panel Backing: .01-inch aluminum, flat.
3. Core: Solid or corrugated thermoplastic material.
4. Exterior Finish: 2-coat fluoropolymer.

a. Color: As selected by Owner from manufacturer's full range.

5. Panel Size: 4ft x 8ft

2.3 ACCESSORIES

A. Wall Panel Accessories: Provide components required for a complete metal-faced composite wall panel assembly including trim, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal-faced composite wall panels unless otherwise indicated.

B. Flashing and Trim: As provided by the manufacturer and as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fascia, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal-faced composite wall panels.

C. Attachment Subplates: Continuous 4-inch wide, 26 gauge, galvanized steel or as required by panel manufacturer.

D. Panel Adhesive: Adhesive shall be VOC compliant, silicone glazing sealant such as 896 by Pecora or accepted substitute.

E. Foam tape: 3/8-inch thick adhesive foam tape as provided by the panel manufacturer.

2.4 FABRICATION

A. General: Fabricate and finish metal-faced composite wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Metal-Faced Composite Wall Panels: Factory form panels in a batch process by laminating each sheet using glues or adhesives between dissimilar materials. Trim and square edges of sheets with no displacement of face sheets or protrusion of core material.

1. Form panel lines, breaks, and angles to be sharp and true, with surfaces free from warp and buckle.
2. Fabricate panels with sharply cut edges, with no displacement of face sheets or protrusion of core material.
3. Fabricate panels with panel stiffeners, as required to comply with deflection limits, attached to back of panels with structural silicone sealant or bond tape.
4. Dimensional Tolerances:

    a. Panel Bow: 0.8 percent maximum of panel length or width.
    b. Squareness: 0.25-inch maximum.

C. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Miscellaneous Framing: Verify substrate is properly secured and meets the tolerances required. Ensure subplates, hat channels, base angles and other miscellaneous are properly installed in accordance with the specifications and the manufacturer’s requirements.

3.2 METAL-FACED COMPOSITE WALL PANEL INSTALLATION

A. Layout and General Installation. Layout wall panels to provide for butt joints spaced at not less than 8 ft on center. Layout panels to align symmetrically with building reveals and architectural features to the greatest extent possible. Layout panels to provide panels with a minimum length and width of 2-feet at end of vertical and horizontal runs.

B. Subplates: Unless substrate is specifically approved for direct adhesion, provide continuous sheet metal subplates along the long dimension of the panels. Provide rows at top, bottom and center of the panels. Secure subplates with 2 rows of fasteners spaced at 16-inches on center in a staggered pattern. Fasteners shall be as specified or recommended and provided by the panel manufacturer. Provide prefabricated closures and clips. Secure closures and clips at 8-inches on center. with manufacturer's standard fasteners.

C. Panel Installation: Install extruded “J” channel and inside and outside corners as shown in the detail drawings and as required. Provide continuous, vertically oriented foam tape at 16-24-inches on center. Provide 3-inch diameter adhesive spots, on previously installed subplates where applicable, along the previously installed foam tape or at 16 - 24-inches on center. Provide extruded “H” channel clips at horizontal and vertical panel section joints. Provide full bed of butyl sealant within all extruded sections prior to installing composite panels.

3.3 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal-faced composite wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal-faced composite wall panel units within installed tolerance of 1/4-inch in 20-feet, nonaccumulative, on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.5 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal-faced composite wall panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal-faced composite wall panel installation, clean finished surfaces as recommended by panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074243

SECTION 075216 - MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Provide new 3-ply SBS modified bitumen roof membrane, 2-ply SBS modified flashing system, and associated roof system components.

1.2 SUBMITTALS

A. Certificates of Compliance: Roof membrane manufacturer's certification that materials are chemically and physically compatible with each other and suitable for inclusion in roof system and are acceptable for warranty specified. Do not submit materials without obtaining membrane manufacturer's written certification. Explicitly identify in writing, difference between manufacturer's written requirements and these specifications, and membrane manufacturer’s approval of proposed asphalt source.

B. Product data: For each product specified in Part 2.

C. FM Approval/RoofNav Number: Provide the FM roof assembly number that includes all submitted products/components in an approved assembly.

D. Sample: Roof membrane manufacturer’s warranty.

E. Contractor’s letter certifying a minimum of 5-years commercial built-up roofing experience with list of project references, including names and phone numbers.

1.3 QUALITY ASSURANCE

A. Manufacturer Approval:

1. Installer Qualifications: Approved by manufacturer to install manufacturer’s products.
2. Source Limitations: To greatest extent possible, obtain auxiliary materials for roofing system from roofing membrane manufacturer. Provide letter of acceptance from manufacturer for auxiliary materials from other sources.
3. System Approval: Provide statement from manufacturer that specified roof system meets requirements for requested warranty.
4. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

5. Comply with manufacturer's written instruction and these Specifications for roofing and associated work. Provide skilled tradesmen experienced in installation of 2-ply SBS modified bitumen roofing systems. Foreman shall have a minimum of 5 years of previous SBS membrane installation experience.
6. Identify in writing specific contract requirements that are not approved or warrantable by manufacturer.

B. Minimum quality standards: Comply with NRCA/ARMA publications “Quality Control Guidelines for the Application of Built-up Roofing” and “Quality Control Guidelines for Polymer Modified Bitumen Roofing”. Standards within these specifications that exceed NRCA/ARMA shall prevail.

C. Project construction will be monitored and evaluated by the Owner or Owner’s Representative for compliance with the Contract Documents.

1.4 GUARANTEES AND WARRANTIES

A. Provide complete roof system, including temporary roof membrane and insulation, to be covered by roof membrane manufacturer’s system warranty. Provide materials not included in Specifications where required by manufacturer to obtain requested warranty, without additional charge to Owner.

B. Roof membrane manufacturer’s system warranty meeting following minimum criteria:

1. Coverage to repair damage to system components resulting from leaks due to failure of materials or workmanship.
2. Non-prorated, non-penal sum (no dollar limit), 20-year warranty period.
3. Coverage of cost of removal and replacement of wet or damaged insulation due to failure of materials or workmanship.
4. No exclusion from coverage for damage to roof system from wind gusts less than 55 miles per hour.

C. Submit a full Contractor's Guarantee of the Work to be free from defect in materials and workmanship upon Substantial Completion, and prior to final payment. This Guarantee shall be for a period of two (2) years from the date of Substantial Completion and shall be signed by a Principal of the Contractor’s firm and sealed if a corporation. If the project is a phased project, the guarantee shall begin at the completion of the final phase.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of following:
1. Cold-Applied 3-Ply Modified Bitumen Roofing:
a. Soprema, Inc.

b. Siplast
c. Johns Manville
d. Accepted Substitute

2.2 PRODUCT PERFORMANCE

A. Provide products fully compatible with substrates and other assembly components. Materials shall be approved for UL Class A fire rating service and meet FM 1-90 (minimum) wind uplift requirements.

B. Modified bitumen products and systems shall comply with test methods designated in ASTM D 5147-91.

2.3 MODIFIED BITUMEN SHEETS

A. Roofing Membrane Base Plies: ASTM D 6164, Grade S, Type I or II, polyester-reinforced, SBS-modified asphalt sheet; sanded surfaced; suitable for application with cold-applied adhesive.

B. Roofing Membrane Cap Sheet: ASTM D 6164, Grade G, Type I or II, polyester-reinforced, SBS-modified asphalt sheet; granular surfaced; fire rated; suitable for application with cold-applied adhesive; white granules.

C. Reinforcing Sheet: As specified in Paragraph 2.2A of this Section.

D. Flashing (Top) Ply: As specified in Paragraph 2.2B of this Section.

E. Liquid-Applied Flashing: Fully reinforced PMMA, provided by same manufacturer as roof membrane, white.

2.4 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.

B. Asphalt Primer: ASTM D 41.

C. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied SBS modified bitumen adhesive specially formulated for compatibility and use with roofing membrane and base flashings.

D. Sealant: One-part polyurethane, gunnable grade, high performance elastomeric sealant: ASTM C 920, Type S, Grade NS, Class 25, use NT.

E. Self-adhering Membrane: See Division 07 Section “Flashing and Sheet Metal.”

F. Lap Bleed Finish Granules: Ceramic granules sized and colored to match flashing sheet surfacing as supplied by membrane manufacturer.

G. Temporary Foam Night Seal: Two-part polyurethane foam pack: Roofpak by Dow Chemical Company or accepted substitute.

H. Lead Sheet: See Division 07 Section "Flashing and Sheet Metal."

I. Walkways

1. Cap Sheet Walkways: SBS-modified asphalt sheet; granular surfaced as specified in this Section.

2.5 FASTENERS

A. Base flashings to wood substrates: Hot-dipped galvanized, annular-threaded roofing nails with 1-inch wide cap-type head and of sufficient length to penetrate wood a minimum of 5/8-inch.

B. Base flashings to masonry substrates: 1/4-inch by 2-inch long drive pin anchors with lead sheath and stainless steel pin and 1-inch diameter flat galvanized steel washer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify insulation boards are installed smoothly and evenly, and are not broken, cracked, or curled. Insulation shall be roofed over on same day as it is installed.

B. Verify all roof penetrating elements and other items necessary to begin installation of membrane are installed.

C. Do not cut or modify bituminous products with solvent or dilutant.

D. Prime masonry, concrete, and sheet metal surfaces in contact with bituminous materials, including sheet metal flanges (both sides) and lead sheet at drain sumps (both sides) with asphaltic primer prior to roofing or flashing installation. Allow primer to dry thoroughly prior to installing bituminous flashings.

E. Do not deliver to site or install a material or system that has not been approved. Remove materials installed without prior approval upon Owner's request.

F. Surfaces to receive new membrane and flashings shall be clean and thoroughly dry. Should surface moisture such as dew exist, provide necessary equipment to dry surface prior to application. Do not dry with open flames.

G. Ensure that SBS modified bitumen products are sufficiently warmed prior to use when ambient overnight temperatures are below 40 degrees F.

H. All reinforcing plies, self-adhering membrane envelopes, and base flashings must be installed concurrently with roof membrane installation work, and must be complete and up to date by end of each work week (i.e. Friday or next working day).

3.2 BASE PLY AND INTERMEDIATE PLY SHEET INSTALLATION

A. Sheets shall be laid parallel to longest dimension of tapered area to be roofed and/or perpendicular to slope of area. Application shall start at low point of area working to high point. Laps shall be parallel to slope of short dimension of tapered area and in no case shall laps buck flow of water.

B. Unroll dry membrane on substrate and align with adjacent sheet, providing 3-inch side laps and 6-inch end laps. Stagger end laps of adjacent sheets by 12-inches minimum. Reroll approximately one-half of dry membrane sheet while maintaining alignment.

C. Apply even pressure with stiff bristle broom directly behind roll to ensure full adhesion. Repeat procedure for other half of roll.

D. Membrane sheets shall be applied free of wrinkles, creases, fishmouths, or voids. Maintain alignment of sheets utilizing marked lap lines. Should lap lines become misaligned while unrolling, cut sheet and establish a new end lap. Do not attempt to realign a partially adhered membrane roll.

E. Inspect ply sheet application for defects. Cut wrinkles, creases, and fishmouths to relax membrane. Apply a full width strip of base ply membrane over defect lapped a minimum of 3-inches beyond cut. Unbonded lap seams of more than 1/2-inch wide shall be embedded in cold adhesive troweled under unbonded membrane or heat welded.

F. Following inspection and repair of base ply, repeat installation steps for intermediate ply.

3.3 REINFORCING PLY INSTALLATION

A. Verify that repairs have been made to field membrane in area adjacent to flashing area.

B. Metal flanges shall be treated with a brush coat of asphaltic primer (both sides) and set in full bed of adhesive prior to reinforcing ply installation.

C. Set reinforcing plies at base flashings, metal flanges, and other detailed areas in full, uniform bed of SBS-modified bitumen adhesive applied by trowel at minimum rate of coverage, as recommended by membrane manufacturer.

D. Cut reinforcing plies for horizontal metal flange applications wide enough to provide full coverage of flange and 6-inches onto built-up membrane. Embed end of strip in wet adhesive by applying pressure with dry trowel, working toward metal flange and opposite end of strip. Ensure that membrane is solidly set in adhesive with no voids. Provide 3-inch laps at end of strips.

E. Cut reinforcing plies across width of roll for base flashings at walls, curbs, and other vertical applications to lengths sufficient to provide full coverage to top of vertical element, across cant,

and 6-inches onto horizontal surface of built-up membrane. Embed sheet in adhesive by applying pressure with dry trowel at top of cant and working toward top of wall or curb.

F. Starting again at top of cant, apply pressure with trowel, working across face of cant and toward horizontal surface of base ply and embed lower portion of sheet. Ensure that membrane is solidly set in adhesive with no voids or bridging at cant.

G. Provide 3-inch laps and stagger laps. Provide additional reinforcing strip at vertical corners lapped 3-inches onto each vertical side and 3-inches onto horizontal built-up membrane.

3.4 MODIFIED CAP SHEET INSTALLATION

A. Verify that all repairs have been made to the field membrane and reinforcing plies have been properly installed. Surfaces should be free of sawdust, dirt, insulation debris, and other contaminants prior to starting installation.

B. Cap sheets shall be laid perpendicular to the flow of water starting at the low point of the area and working to the high point. Unroll dry membrane and allow it to relax. Provide 3-inch side laps and 6-inch end laps, and stagger end laps of adjacent cap sheets by 24-inches. Align the granulated side of the sheet over the selvage side of the adjacent sheet. While maintaining alignment, reroll approximately one-half of the dry membrane sheet.

C. Apply adhesive at the rate recommended by the manufacturer. Apply even pressure with stiff bristle broom directly behind roll to ensure full adhesion. Avoid excessive bleed out of more than 1-inch. Distribute loose granules into adhesive bleed out directly behind membrane applicable to ensure complete color uniformity of cap sheet surface. Repeat procedure for the other half of the roll.

D. Membrane cap sheets shall be applied free of wrinkles, creases, fishmouths, or voids. Maintain alignment of sheets utilizing marked lap lines. Should the lap lines become misaligned while unrolling, cut the sheet and establish a new end lap. Do not attempt to realign a partially adhered membrane roll.

E. Inspect cap sheet application for defects. Cut wrinkles, creases, and fishmouths to relax the membrane. Apply a full width strip of cap sheet membrane over the defect in a full bed of cold adhesive and lapped a minimum of 6-inches beyond the cut. Unbonded lap seams of more than 1/2-inch wide shall be embedded in cold adhesive troweled under the unbonded membrane. Reapply granules to repairs as needed.

3.5 SELF-ADHERING MEMBRANE INSTALLATION

A. Condition surfaces with primer at walls and perimeter elements to receive membrane as recommended by membrane manufacturer. Do not prime more than can be covered by sheet installation in one day.

B. Install self-adhering modified bitumen membrane as detailed.

C. Cut modified bitumen into lengths not to exceed 8-feet.

D. Remove release paper backing, set membrane into place, provide minimum 3-inch head laps, and roll down smooth with metal roller.

E. Lap membrane over vertical base flashings and substrate surfaces 3-inches minimum or as indicated in Drawings.

3.6 FLASHING AND STRIPPING SHEET INSTALLATION

A. Verify that repairs have been made to field membrane in area adjacent to cant to receive flashing sheet. Snap chalk line distance of 4-inches minimum from edge of reinforcing ply and on field side of roof.

B. Set flashing sheet at walls, curbs, and other vertical elements in full, uniform bed of adhesive applied at minimum rate of 75 square feet per gallon.

C. Cut flashing sheet across width of roll to provide full coverage to top of vertical element and minimum of 4-inches beyond edge of reinforcing ply on horizontal membrane surface. Embed flashing sheet into wet adhesive by applying pressure starting at top of cant and working toward top of wall or curb. Apply sufficient pressure to ensure full and continuous adhesion of membrane with no air pockets, voids, wrinkles, fishmouths, or bridging. Apply pressure from top of cant working down across face of cant and toward field of roof in similar manner until entire flashing sheet is solidly adhered.

D. Allow 3-inch laps onto adjacent sheets and nail top edge of flashing sheets at 6-inches on center with specified fastener.

E. Inspect other laps of completed flashing sheet installation and repair defects with adhesive.

3.7 DRAIN FLASHING

A. Apply base ply over drain bowl flange (beneath clamping ring) as detailed. Trim flush with inside diameter of drain bowl as detailed.

B. Install lead flashing sheet at drains in full bed of adhesive as detailed. Cut single piece of reinforcing ply membrane 39-inches by 39-inches and chalk diagonal lines to establish center of sheet. Cut hole at center of this target sheet to provide minimum of 1-inch of membrane inside clamping ring.

C. Install target sheet centered over drain bowl in a full bed of modified bitumen adhesive at specified rate and directly to primed lead sheet and 4-inches minimum onto field membrane.

D. Offset cap sheet from edge of drain approximately 6-inches so that no seams are installed under clamping ring.

3.8 WALKWAYS

A. Provide walkway pads at roof access points and top and bottom of each roof access ladders.

B. Provide capsheet walkway pads at locations indicated by the owner and as shown on the drawings. Provide walkways using full width of roll cut in maximum 5-foot lengths. Provide 6-inch gaps between adjacent pieces.

C. Embed pads in full applications of adhesive. “Step in” and broom each piece to ensure total adhesion.

3.9 TEMPORARY PROTECTION

A. Unfinished perimeter and penetration components: Provide temporary waterstops adequate to prevent moisture intrusion into newly installed work around exposed edges and incomplete flashing locations. Remove temporary materials completely prior to continuing with subsequent work.

B. Tie-ins: Provide temporary waterstops at deck and tie-ins between newly installed and existing membrane as detailed. Inspect tie-ins thoroughly and repair as needed to provide watertight assembly prior to leaving site.

3.10 FIELD QUALITY CONTROL

A. Inspect and repair each completed section of roofing plies prior to application of membrane surfacing. Mark deficiencies such as fishmouths, dry laps, voids, and excessive asphalt with keel or paint for repairs.

B. Ensure by inspection that visible bleed-through of adhesive is present over entire surface of each ply, and that there is visible but not excessive bleedout at edge of each ply. Bare spots, dry laps, voids shall be repaired prior to proceeding with additional plies.

C. Prior to application of capsheet, notify Owner or Owner’s Representative in writing that the base ply installation, quality control inspection, and repair work are complete. Provide manufacturer’s technical inspection and report the results in writing to Owner or Owner’s Representative.

END OF SECTION 075216

SECTION 075556 - FLUID-APPLIED PROTECTED MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Provide reinforced hot fluid-applied roofing membrane.
2. Provide drainage board, insulation, and pavers.

1.2 SUBMITTALS

A. Product Data: For each type of product specified in Part 2.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations, extent, and details of roof pavers.

C. Sample roof membrane manufacturer’s system warranty.

D. Contractor’s letter certifying a minimum of 5-years commercial roofing experience to include 3 projects of similar size and scope to this project completed in the last 5 years. Provide a list of project references, including names and phone numbers.

1.3 QUALITY ASSURANCE

A. Manufacturer approval:

1. Installer Qualifications: Approved by manufacturer to install manufacturer’s products.
2. Source Limitations: To greatest extent possible, obtain components for roofing system from roofing system manufacturer. Provide letter of acceptance from manufacturer for components, including insulation products and asphalt, from other sources.
3. System approval: Provide statement from manufacturer that specified roof system meets requirements for requested warranty.
4. Identify in writing specific contract requirements that are not approved or warrantable by manufacturer.

B. Do not deliver to site or install material or system that has not been approved. Remove materials installed without prior approval upon Owner’s request.

C. Restrict traffic on completed roof areas. Coordinate work to prevent trafficking by working toward roof edges and access ways. Should access to completed roof areas be necessary, provide protection for trafficked areas in accordance with Division 01 Section “Temporary Facilities and Controls”.

D. Minimum quality standards: Comply with NRCA/ARMA publications “Quality Control Guidelines for the Application of Built-up Roofing” and “Quality Control Guidelines for Polymer Modified Bitumen Roofing.” Standards within these specifications that exceed NRCA/ARMA shall prevail.

E. Project construction will be monitored and evaluated by the Owner or Owner’s Representative for compliance with the Contract Documents.

1.4 GUARANTEES AND WARRANTIES

A. Provide complete roof system, including temporary roof membrane and insulation, to be covered by roof membrane manufacturer’s system warranty. Provide materials not included in Specifications where required by manufacturer to obtain requested warranty, without additional charge to Owner.

B. Roof membrane manufacturer’s system warranty meeting following minimum criteria:

1. Coverage to repair damage to system components resulting from leaks due to failure of materials or workmanship.
2. Non-prorated, non-penal sum (no dollar limit), 20-year warranty period.
3. Coverage of cost of removal and replacement of wet or damaged insulation due to failure of materials or workmanship.
4. No exclusion from coverage for damage to roof system from wind gusts less than 55 miles per hour.

C. Submit a full Contractor's Guarantee of the Work to be free from defect in materials and workmanship upon Substantial Completion, and prior to final payment. This Guarantee shall be for a period of two (2) years from the date of Substantial Completion and shall be signed by a Principal of the Contractor’s firm and sealed if a corporation. If the project is a phased project, the guarantee shall begin at the completion of the final phase.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Roofing materials to include sheet flashings, protection course, insulation and pavers shall be obtained from a single source or approved for use by the membrane manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D4272.

B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a roofing system, and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

1. Fire/Windstorm Classification: Class 1A-90.
2. Hail Resistance Rating: MH.

D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

E. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.3 ROOFING MEMBRANE

A. Hot Fluid-Applied, Rubberized-Asphalt Roofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. American Hydrotech, Inc; MM 6125.
b. Carlisle Coatings & Waterproofing Inc; CCW-500R.
c. Henry Company; 790-11.
d. Accepted substitute.

2.4 BASE FLASHING SHEET MATERIALS

A. Liquid-Applied Flashing: Fully reinforced, cold-fluid-applied PUMA flashings as approved by roof membrane manufacturer.

2.5 AUXILIARY ROOFING MEMBRANE MATERIALS

A. General: Auxiliary materials recommended by roofing manufacturer for intended use and compatible with roofing membrane.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content:
3. Plastic Foam Adhesives: 50 g/L.
    a. Multipurpose Construction Adhesives: 70 g/L.
    b. Fiberglass Adhesives: 80 g/L.
    c. Contact Adhesives: 80 g/L.
    d. Nonmembrane Roof Sealants: 00 g/L.
    e. Sealant Primers for Nonporous Substrates: 250 g/L.
    f. Sealant Primers for Porous Substrates: 775 g/L.
    g. Other Adhesives and Sealants: 250 g/L.

B. Asphalt Primer: ASTM D 41/D 41M.

C. Metal Termination Bars: Manufacturer's standard, predrilled, stainless-steel or aluminum termination bars, approximately 1 by 1/8-inch thick; with stainless-steel anchors.

D. Reinforcing Fabric: Manufacturer's recommended, spun-bonded polyester fabric.

E. Protection Course: Manufacturer's standard, 80-to-90-mil- thick, fiberglass-reinforced rubberized-asphalt or modified bituminous sheet.

F. Filter Fabric: Non-woven geotextile fabric to be installed over the insulation boards.

2.6 ROOF INSULATION

A. Refer to Division 07 Section “Roof and Deck Insulation.”

2.7 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.

2.8 PAVERS

A. Roof Pavers: Heavyweight, hydraulically pressed, concrete units, square edged, factory cast for use as roof pavers; absorption not greater than 5 percent, ASTM C 140; no breakage and maximum 1 percent mass loss when tested for freeze-thaw resistance, ASTM C 67; and as follows:

1. Products: Subject to compliance with requirements, provide or comparable product by one of the following:
    a. Hanover Architectural Products, Inc.
    b. Roofblok Limited.
    c. Wausau Tile Inc.
    d. Accepted substitute.
2. Size: 24 by 24-inches. Manufacture pavers to dimensional tolerances of plus or minus 1/16-inch in length, height, and thickness.
3. Thickness: 2-inches.
4. Weight: +/- 25 lbs/sf.
5. Compressive Strength: 8500 psi, minimum; ASTM C 140.
6. Colors and Textures: As selected by Owner/Architect from manufacturer's full range.
7. Paver Supports: Integral corner pedestals.
8. Paver Supports: Paver manufacturer's standard SBR rubber, high-density polyethylene, or polyurethane paver support assembly, including fixed-height pedestals, shims, and spacer tabs for joint spacing of 1/8 to 3/16-inch.

B. Drainage board: A composite drainage system consisting of a three-dimensional, crush-proof, drainage polymeric dimpled core and a non-woven filter fabric bonded to the core dimples, and a polymeric protective film adhered to the back of the dimpled core such as "Miradrain 6200" by Mirafi Moisture Protection Products, "J-Drain 420" by JDR Enterprises, or "Drainage Mat 420" by Sika.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof drain bodies are securely clamped in place.
2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations.
3. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
4. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
5. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions.

B. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

C. Mask off adjoining surfaces not receiving roofing to prevent spillage from affecting other construction.

D. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 JOINTS, CRACKS, AND TERMINATIONS

A. Prepare and treat substrates to receive roofing, including joints and cracks, roof drains, and penetrations, according roofing system manufacturer's written instructions.

1. Rout and fill joints and cracks in substrate. Before filling, remove dust and dirt according to ASTM D 4258.
2. Adhere strip of elastomeric sheet to substrate in a layer of hot fluid-applied, rubberized asphalt. Extend elastomeric sheet a minimum of 6-inches on each side of moving joints and cracks or joints and cracks exceeding 1/8-inch thick, and beyond roof drains and penetrations. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.
3. Embed strip of reinforcing fabric into a layer of hot fluid-applied, rubberized asphalt. Extend reinforcing fabric a minimum of 6-inches on each side of nonmoving joints and cracks not exceeding 1/8-inch thick, and beyond roof drains and penetrations.

    a. Apply second layer of hot fluid-applied, rubberized asphalt over reinforcing fabric.

B. At expansion joints and discontinuous deck-to-wall or deck-to-deck joints, bridge joints with elastomeric sheet extended a minimum of 6-inches on each side of joints, and adhere to substrates in a layer of hot fluid-applied, rubberized asphalt. Apply second layer of hot fluid-applied, rubberized asphalt over elastomeric sheet.

3.4 FLUID-APPLIED BASE FLASHING INSTALLATION

A. Apply base coat of flashing onto the properly prepared substrate.

B. Immediately embed reinforcing fabric in flashing and apply topcoat of flashing.

C. Continue flashing minimum 6-inches onto horizontal surface.

3.5 ROOFING MEMBRANE APPLICATION

A. Apply primer, at manufacturer's recommended rate, over prepared substrate and allow to dry.

B. Heat and apply rubberized asphalt according to manufacturer's written instructions.

1. Heat rubberized asphalt in an oil- or air-jacketed melter with mechanical agitator specifically designed for heating rubberized asphalt.

C. Start application with manufacturer's authorized representative present.

D. Reinforced Membrane: Apply hot fluid-applied, rubberized asphalt to area to receive roofing. Spread a 90-mil- thick layer of hot fluid-applied, rubberized asphalt; embed reinforcing fabric, overlapping sheets 2-inches; spread another 125-mil- thick layer of hot fluid-applied, rubberized asphalt to form a uniform, reinforced, seamless membrane, 215-mils thick.

E. Apply hot fluid-applied, rubberized asphalt over prepared joints and up wall terminations and vertical surfaces to heights indicated or required by manufacturer.

F. Cover membrane with protection course with overlapped joints before membrane is subject to construction traffic.

3.6 ROOF-PAVER INSTALLATION

A. Install roof pavers over roofed area according to insulation manufacturer's written instructions.

B. Install roof pavers on shims/pedestals set according to pedestal manufacturer's written instructions and as required to provide a level walking surface.

3.7 FIELD QUALITY CONTROL

A. The Owner will have a representative on-site to inspect substrate conditions; surface preparation; and application of membrane, base flashings, protection, insulation, and ballast.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

C. Testing: Prior to installation of overburden, contractor shall engage a third party firm to perform electronic leak detection (ELD) of all field membrane and flashing. Immediately following the test, contractor shall repair all deficiencies identified.

3.8 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075556

SECTION 076000 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Provide perimeter and penetration sheet metal flashings and components at locations indicated on the drawings and as required to properly terminate the roof system.

1.2 SUBMITTALS

A. Product Data:

1. For each item specified in Part 2 of this Section.
2. Color charts for coated metals.

B. Shop Drawings: Show layouts, profiles, shapes, seams, dimensions, and details for fastening, joining, supporting, and anchoring sheet metal flashing and trim.

C. Certifications: Perimeter sheet metal assembly must be in compliance with IBC requirements, specifically ANSI/SPRI ES-1 protocol.

1.3 QUALITY ASSURANCE

A. Installation procedures shall be in accordance with the industry standards and codes indicated in Division 01 Section “Summary of Work” and those indicated in this Section.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

C. Sheet Metal Standard: Comply with NRCA “Roofing and Waterproofing Manual, Fifth Edition.” Conform to dimensions and profiles shown unless more stringent requirements are indicated.

D. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for fabrication and installation. Include seams, attachments, underlayment, and accessories.

1. Parapet Cap
2. Roof edge
3. Gutter
4. Area Divider

1.4 WARRANTY

A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. Stainless-Steel Sheet: ASTM A 240, Type 304, No. 2D finish.

B. Perforated Stainless Steel Sheet: Type 304, 3/8-inch round holes, with 51% - 59% open area.

C. Galvanized (Zinc-Coated) Steel Sheet: ASTM A 653, G90 coating designation; structural quality, mill phosphatized for field painting.

D. Prepainted, Metallic-Coated Steel Sheet: Galvanized sheet steel (G90); prepainted by coil-coating process, ASTM A 755; provide with manufacturer’s strippable plastic film. Exposed finishes:

1. High-Performance Organic Finish: Two-coat thermocured system containing not less than 70 percent polyvinylidene fluoride (Kynar/Hylar) resin by weight; complying with AAMA 2604. Color as selected by Owner from standard colors.

E. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.

2.2 ACCESSORIES

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

B. Self-Adhering Membrane: High temperature self-adhering, SBS modified bitumen membrane with poly-surface and release-paper backing, minimum 40-mil thickness, designed for a minimum melting temperature of 220 deg F such as Ice & Water Shield HT by W.R. Grace, Lastobond Shield HT by Soprema, Metshield by MetFab, or accepted substitute.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

D. Exposed elastomeric Sealant: Refer to Division 07 Section “Joint Sealants.”

E. Concealed sealant for metal-to-metal connections: Refer to Division 07 Section “Joint Sealants.”

F. Pourable Sealer Pocket Filler

1. Two-part polyurethane pourable sealer for sealing roof penetrations: manufactured or approved by roof system manufacturer.
2. Gypsum concrete: Mill-mixed; ASTM C 317, Class A, with minimum compressive strength of 500 psi; Pyrofil, as manufactured by U.S. Gypsum/Poteet Industries, or accepted substitute.

G. Band Clamps: Stainless steel, including screw-adjustable clamps; 1/2-inch wide.

H. Flux: muriatic acid based with zinc.

I. Solder: ASTM B 32, 50% block tin and 50% pig lead; manufactured for use with stainless steel or copper.

J. Splash Block: Precast concrete formed to divert water in one direction. Splash block shall be in smooth forms with bottom edges rounded or chamfered to prevent abrasion.

K. Cold Applied Adhesive: See Division 07 Section “Modified Bituminous Membrane Roofing.”

2.3 FASTENERS

A. Sheet metal to wood blocking connections (concealed securement): No. 12 annular threaded Series 300 stainless steel nails minimum 1-1/2-inches long.

B. Sheet metal to wood blocking connections and mechanical unit securement (exposed securement): Self-drilling, self-tapping, Number 10, stainless steel hex-washer-head screws, 1-1/2-inch long, with metal-capped EPDM washers.

C. Sheet metal to masonry wall connections: 1/4-inch diameter, concrete/masonry screws of sufficient length to penetrate substrate 1-1/2-inch minimum. Provide metal capped EPDM washers at exposed locations.

D. Sheet metal fascia to wood connections: 1-inch long, #10, Series 300 stainless steel pan head screws.

E. Fasteners for downspout to downspout outlet connections: #10 Series 300 stainless steel screws, 1/2-inch long or stainless steel pop rivets.

F. Nuts and bolts for gutter assembly: Series 300 stainless steel, #12-24, 1-inch to 1-1/2-inch long.

G. Gutter Spacers: 3-inches long, #12, Type 304, Series 300 stainless steel screws or #14 fluorocarbon coated screws.

2.4 FABRICATION – GENERAL

A. General: Fabricate sheet metal flashing and trim to comply with IBC and recommendations in SMACNA and NRCA that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

B. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

D. Expansion Provisions: Where lapped expansion provisions in Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with butyl sealant concealed within joints.

E. Provide concealed fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

F. Provide cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal, and in thickness not less than that of metal being secured.

2.5 FABRICATION SCHEDULE

A. PVDF Coated Galvanized Steel (24 gauge)

1. Edge Metal/Cover Plates
2. Parapet Caps
3. Closures
4. Fascia Metal
5. Gutter/Downspout
6. Downspout Outlet
7. Securement Clips
8. Conductor Head/Downspout
9. Scupper Face Plate
10. Covers

B. Galvanized Steel (22 gauge)

1. Cleats
2. Stiffener

C. Stainless Steel (26 gauge)

1. Throughwall Counterflashing / Receiver
2. Skirt Flashing/Clips
3. Vent Pipe Sleeves and Caps

4. Pourable Sealer Boxes
5. Storm Hoods and Sleeves
6. Door Threshold Cover
7. Reglet Counterflashing
8. Expansion Joint Cover
9. Counterflashing Cleat
10. Curb Covers
11. Transition Closures (at stairs and ramps)
12. Pipe Enclosures

D. Stainless Steel (1-inch by 1/8-inch bar)

1. Gutter Spacer
2. Gutter Reinforcing Bar

E. Perforated Stainless Steel (26 gauge minimum)

1. Gutter Guard

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify that substrate and anchorage materials to receive sheet metal flashings are properly secured and aligned, without gaps, lumps, or offsets that may distort metal.

B. Install underlayment at roof edges, parapets, curbs, and similar transitions, and as shown on Drawings.

3.2 INSTALLATION, GENERAL

A. Comply with these specifications and applicable industry standards to include the IBC, NRCA, and SMACNA, whichever is more stringent.

B. General: Anchor sheet metal flashing and trim and other components of Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Torch cutting of sheet metal flashing and trim is not permitted.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

D. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

E. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and butyl sealant.

F. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

G. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10-feet, with no joints allowed within 18-inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with butyl sealant concealed within joints.

H. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4-inches for nails and not less than 3/4-inch for wood screws.

I. Non-moving seams and joints on non-solderable metal shall be interlocked, filled with sealant, and riveted, unless otherwise indicated.

J. Seal joints as required for watertight construction. Use elastomeric sealant for exposed conditions. Use butyl sealant for hidden conditions.

K. Provide sheet metal closure components at transitions to rising walls and similar changes in plane for edge metal, parapet caps, expansion joint covers, and other termination flashings. Fully crimp and seal closures to continuous blind nailed cleats.

L. Soldered Joints: Comply with SMACNA and CDA requirements. Use conduction soldering methods.

1. Clean surfaces to be soldered, removing oils and foreign matter. Smooth irregularities and round edges. Pretin edges of sheets to be soldered to width of 1-1/2-inches except where pretinned surface would show in finished Work.
2. Apply flux to surfaces to receive solder. Remove oxides and other impurities from joint.
3. Position and immobilize parts to be soldered. Heat parts above fluid temperature of solder. Draw solder into joint, creating 1-inch wide lap. Allow to cool before moving parts.
4. Remove flux and acid by cleaning with neutralizing agent.

M. Fabricate sheet metal components to the dimensions and shapes shown on the Drawings.

3.3 METAL COMPONENT INSTALLATION

A. Securement Clips

1. Securement clips shall be 6-inches long and 2-inches wide.
2. Secure clips to substrate with specified fasteners. Space clips 12-inches on center.

3. Bend clips minimum of 1-inch over bottom drip edge of counterflashing and crimp loosely.

B. Deck Flanges

1. Fabricate deck flanges 4-inches wide with hemmed edges unless otherwise indicated.
2. Prime deck flanges and set in bed of adhesive.
3. Secure deck flanges at 3-inches on center in staggered pattern. Hold fasteners back 2-inches minimum from edge metal dam.
4. Flash flanges in accordance with membrane requirements and Drawings.

C. Cleats

1. Form cleats with 3/4-inch kicks, bent out at maximum angle of 45 degrees to the vertical surface. Height of cleat shall be 3-3/4-inches unless otherwise indicated on Drawings.
2. Secure continuous cleats to wood blocking with fasteners spaced at 6-inches on center.
3. Provide 1/4-inch gap between cleat sections. Offset from joints in cover metal being secured.

D. Cover Plates

1. Fabricate cover plates 6-inches wide, with 4-inch wide deck flanges unless otherwise indicated on Drawings. Hem edges of cover plates to fit snugly against edge metal and fascia sections.
2. Install continuous beads of sealant on each side of edge metal joint.
3. Install cover plates centered over edge metal joint.
4. Secure edge metal cover plates with 2 fasteners driven through center and crimped to edge metal drip.
5. Hook fascia cover plates to drip edge and secure to wood blocking with 2 fasteners at areas that will be concealed by edge metal.

E. Sheet Metal Transition Closures

1. Extend sheet metal 4-inches minimum vertically up wall at sheet metal-to-wall transitions.
2. Set sheet metal in full bed of butyl mastic and secure using appropriate screws with EPDM washers spaced at 4-inches along centerline of vertical portions.
3. Fold vertical portion down over fasteners. Provide bead of sealant along sheet metal at wall.

F. Parapet Caps

1. Provide self-adhering membrane over parapet.
2. Fabricate parapet cap to dimensions and shapes shown on Drawings and to fit snugly over parapet and membrane flashings.
3. Secure continuous cleat at interior and exterior face.

4. Provide 1-1/4-inch high standing seams. Hook cap on cleats and crimp. Provide butyl mastic in each standing seam. Fold seams over to form standing seam and fold corners. Provide shop fabricated end and corner sections minimum 18-inches long.

G. Fascia

1. Secure fascia cleat. Hook fascia onto cleat and provide 3-inch lap joints filled with sealant.
2. Secure fascia along top edge at +/- 16-inches on center through slotted holes.
3. Do not secure upper edge metal cleat through fascia.

H. Edge Metal

1. Secure continuous cleats as specified. Where fascia metal is provided, secure cleats above the top edge of the fascia. Do not fasten cleat through fascia.
2. Apply asphalt primer to both top and bottom sides of edge metal flanges and top of cover plates.
3. Provide offset metal section joints from fascia section joints
4. Stagger butt joints between cleat and edge metal sections minimum 24-inches.
5. Crimp edge metal onto cleat and set deck flange in bed of adhesive. Secure deck flange at 6-inches on center.
6. Provide cover plates as previously specified.
7. Flash flanges in accordance with membrane requirements and Drawings.

I. Counterflashing

1. Provide counterflashing with 3-inch minimum sealant-filled section laps. Insert counterflashing into receiver.
2. Secure counterflashings into receivers with stainless steel screws spaced 12-inches on center, minimum 3 screws per length of counterflashing.
3. Secure counterflashings with clips.

J. Throughwall Counterflashing

1. Form throughwall flashing with integral counterflashing receiver to extend through brick veneer and up back-up wall 3-inches minimum.
2. Set vertical leg of counterflashing in full bed of butyl sealant and secure to substrate with fasteners at 24-inches on center. Provide 4-inch minimum butyl sealant filled section laps.
3. Prime masonry back-up wall and flashing.
4. Cover flashing with self-adhering membrane. Extend membrane up wall 6-inches minimum. Secure top of self-adhering membrane with termination bar secured at 12-inches on center. Stop self-adhering membrane 1/2-inch from outside face of wall
5. Insert counterflashing into receiver and secure with sheet metal clips and screws as specified.

K. Pipe Sleeves, Caps, and Hoods

1. Form pipe sleeves with integral flanges with locked and soldered seams. Provide hemmed edges of deck flanges as indicated on Drawings.
2. Prior to installing sheet metal sleeves on vent pipes, verify that vent pipes have been extended to 12-inches minimum above finished roof surfaces.
3. Prime flanges and set in bed of adhesive.
4. Secure deck flanges to substrate as specified.
5. Flash flanges in accordance with membrane requirements and Drawings.
6. Install vent caps in full beds of sealant to fit snugly over existing vent pipes and new vent pipe sleeves as indicated on Drawings.
7. Fabricate and install sheet metal hoods on conduit and pipe penetrations to cover sleeve flashings. Clamp tops of sleeves prior to installing hoods. Set hoods in bed of sealant and clamp to penetration.

L. Skirt Flashing

1. Insert skirt flashing beneath existing and new equipment covers. Lap skirt flashing sections 3-inches minimum.
2. Secure skirt flashing with sheet metal clips spaced 12-inches on center and minimum of 2 per side of curb.

M. Conductor Head/Downspout

1. Secure conductor head to wood blocking with specified fasteners spaced at 3-inches on center.
2. Secure downspout to wall with straps spaced at 4-feet on center, maximum.
3. Provide 45 degree downspout elbow at bottom outlet and splash block at roof surface. Set elbow 2 to 4-inches above receiving surface.

N. Gutter, Downspout, and Outlets

1. Extend self-adhering modified bitumen down behind gutter.
2. Provide sheet metal fascia where shown and secure to wood blocking.
3. Provide gutter with positive slope to drain. Provide sealant-filled 3-inch-wide section laps. Provide 2 rows of pop rivets spaced 4-inches on center along gutter section laps and at downspouts. Provide 6-inch wide, fully adhered, EPDM membrane over section joints. Provide expansion joints at high points of gutter.
4. Secure continuous stiffening bar and gutter spacers to outer edge of gutter box with bolt and nut connections. Space spacers at 16-inches on center. Secure spacers into wood blocking with fasteners, 1 screw per spacer.
5. Space downspouts where indicated on the drawings but in no case greater than 40-feet on center. Extend horizontal flange of downspout outlet 1-inch onto floor of gutter box. Set outlet in sealant and pop rivet, 4 per outlet. Extend outlet down vertically 4-inches, for

downspout securement. Secure downspout to outlet with stainless steel sheet metal screws, 4 per downspout.

6. Secure downspout to masonry wall with downspout straps, spaced at 4-feet on center maximum. Secure with appropriate stainless steel fasteners, 4 per strap.
7. Provide splash blocks below each downspout.
8. Install gutter guard over gutter as shown on drawings. Cut gutter guard at spacers and insert between stiffening bar and gutter box. Provide a compression fit to allow gutter guard to inserted behind drip edge to and allow removal if needed.

O. Pourable Sealer Pockets

1. Provide pourable sealer pockets only where field fabricated pipe flashings cannot be installed.
2. Fabricate pourable sealer boxes 6-inches high, with minimum 2-inch wide clear space on each side around each penetration.
3. Prime flanges and set in bed of adhesive.
4. Secure deck flanges to substrate as specified.
5. Pour premixed gypsum concrete into box to depth 2-inches from top and allow to set.
6. Fill remaining 2-inches with pourable sealer to top of box and allow to set. Tool pourable sealer to shed water.
7. Provide sheet metal storm hood set in sealant and secured with band clamp as indicated on Drawings.
8. Flash flanges in accordance with membrane requirements and Drawings.

P. Threshold Cover

1. Extend threshold beneath existing door jambs 1-inch minimum.
2. Remove, trim, cut, or otherwise modify existing door and frame as required to provide specified flashing height and install threshold cover.
3. Install self-adhering modified bitumen underlayment and provide full bed of butyl mastic at corners.
4. Set threshold in place and secure to masonry with screws spaced 12-inches on center.

3.4 CLEANING

A. Remove scrap metal, burrs, fasteners, and related debris from roof daily. Take precautions to prevent damage to roof membrane and flashings.

END OF SECTION 076000

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Formed roof-drainage sheet metal fabrications.
2. Formed wall sheet metal fabrications.
3. Formed equipment support flashing.
4. Formed overhead-piping safety pans.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood nailers and blocking.

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".
2. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content, in accordance with 018113 "Sustainable Design Requirements".
3. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".
4. Sourcing of Raw Materials - Recycled Content:

    a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
    b. Include information on Building Product Disclosure and Optimization Calculator.

C. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches .

D. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

1.6 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of coping and roof edge flashing that is SPRI ES-1 tested.

B. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are SPRI ES-1 tested, shop shall be listed as able to fabricate required details as tested and approved.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.10 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 ; prepainted by coil-coating process to comply with ASTM A 755/A 755M.

1. Surface: Smooth, flat.
2. Exposed Coil-Coated Finish:

    a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

3. Color: As selected by Architect from manufacturer's full range of standard colors.
4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil .

2.3 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. Carlisle Coatings & Waterproofing Inc; CCW WIP 300HT.
    b. Carlisle Residential; a division of Carlisle Construction Materials; WIP 300HT.
    c. Grace Construction Products; W.R. Grace & Co. -- Conn.; Grace Ice and Water Shield HT.
    d. Henry Company; Blueskin PE200 HT.
    e. Kirsch Building Products, LLC; Sharkskin Ultra SA.
    f. Metal-Fab Manufacturing, LLC; MetShield.
    g. Owens Corning; WeatherLock Metal High Temperature Underlayment.
    h. Polyguard Products, Inc.; Deck Guard HT.
    i. Protecto Wrap Company; Protecto Jiffy Seal Ice & Water Guard HT.
    j. SDP Advanced Polymer Products Inc; Palisade SA-HT.

2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.

B. Membrane Roofing as Underlayment: Where indicated on Drawings, roofing membrane may serve as underlayment, provided warranties of all adjacent systems are maintained.

C. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft.minimum.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

    a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.

b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.

2. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.

D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

E. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

G. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

H. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

I. Do not use graphite pencils to mark metal surfaces.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch- long sections. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.

1. Gutter Profile: As indicated on Drawings , and according to cited sheet metal standard.
2. Expansion Joints: Butt type with cover plate.

3. Gutters with Girth up to 20 Inches : Fabricate from the following materials:

    a. Galvanized Steel: 0.028 inch thick.

B. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.

1. Fabricated Hanger Style: Fig 1-35B according to SMACNA's "Architectural Sheet Metal Manual."
2. Fabricate from the following materials:

    a. Galvanized Steel: 0.028 inch thick.

2.7 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Galvanized Steel: 0.028 inch thick.

B. Overhead-Piping Safety Pans: Fabricate from the following materials:

1. Galvanized Steel: 0.040 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches . Roll laps and edges with roller. Cover underlayment within 14 days.

B. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.4 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Hanging Gutters: Join sections with joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchor them in position. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Fasten gutter spacers to front and back of gutter.
2. Anchor and loosely lock back edge of gutter to continuous cleat.
3. Anchor gutter with straps spaced not more than 36 inches apart to roof deck, unless otherwise indicated, and loosely lock to front gutter bead.

4. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c.
2. Provide elbows at base of downspout to direct water away from building.
3. Connect downspouts to underground drainage system.

3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

3.6 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 042000 "Unit Masonry".

3.7 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

3.8 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.9 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Provide roof accessory components as indicated on the Drawings.

1.2 SUBMITTALS

A. Product Data: For each type of roof accessory indicated.

B. Shop Drawings: Show fabrication and installation details for roof accessories.

C. Manufacturer Installation Instructions: For each product in Part 2.

1.3 QUALITY ASSURANCE

A. Comply with manufacturer’s recommendations and requirements.

B. Verify locations, dimensions, and substrate conditions before installation.

PART 2 - PRODUCTS

2.1 ROOF CURBS

A. Fan and Vent Curbs: Prefabricated with welded seams and corner joints and integral mounting flange at perimeter bottom. Coordinate dimensions with roof openings.

1. Material: Galvanized steel sheet, 18 ga min.
2. Factory installed wood nailers at tops of curbs.
3. Factory insulation with 1-1/2-inch thick, glass-fiber board insulation.
4. Curb height: 24-inches minimum, unless otherwise indicated.

2.2 PREFABRICATED SAFETY RAIL

A. Provide freestanding, non-penetrating, safety rail to include pipe railings, uprights, bars, counterweights, and fittings.

1. Freestanding counterweighted guardrail system with 42-inch minimum height to provide a pedestrian egress barrier on the roof to withstand a minimum load of 200 pounds in any direction to the top rail per OSHA Regulation 29 CFR 1910.23.
2. Pipe: Steel, 1-1/2-inches schedule 40, galvanized.
3. Tube: Galvanized tube, 12 gauge, 1-1/2-inches, 1.90-inches OD.
4. Rails and Posts: Galvanized Tube, 12 gauge, 1-1/2-inches, 1.90-inches diameter.
5. Counterweighted Levers: Galvanized Tube, 12 gauge, 1-1/4-inches 1.660-inches diameter.
6. Mounting Bases: Steel bases are galvanized and are supplied with a rubber pad on the underside of the component.
7. Counterweights: Molded recycled PVC with one fixing collar per counterbalance.
8. Fasteners: Stainless steel or galvanized.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General

1. Coordinate installation of roof accessories with installation of roof deck, roof insulation, flashing, roofing membranes, penetrations, equipment, and other construction to ensure that combined elements are weatherproof and watertight.
2. Install roof accessory items according to construction details in NRCA's "Roofing and Waterproofing Manual," unless otherwise indicated,
3. Separation: Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.

B. Fan and Vent Curb Installation

1. Set curb flange on wood blocking or deck and secure with specified fasteners, minimum 2 per side and maximum 24-inches on center.
2. Where new fan and vent curbs are specified for reuse, shim curb level with continuous wood blocking attached to the substrate as previously specified.

C. Safety Rail Installation

1. Install in accordance with manufacturer’s instructions.
2. Perform cutting and fitting required for installation of handrails. Set handrails accurately in location, alignment, and elevation, measured from established lines

3.2 REINSTALLATION

A. Reinstall equipment disturbed or disconnected by work of this section. Extend and reconnect electrical and mechanical connections. Restore normal operation of equipment.

3.3 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions. Touch up damaged metal coatings.

END OF SECTION 077200

SECTION 079200 – JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Provide sealant and backer materials at exterior vertical joints as indicated on the Drawings.

1.2 SUBMITTALS

A. Product Data: All items specified in Part 2 of this Section.

1.3 QUALITY ASSURANCE

A. Utilize skilled and experienced specialty workers to install work. Experienced trade workers shall be utilized for each aspect of work.

B. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to Project joint substrates according to the method in ASTM C 1193 that is appropriate for the types of Project joints.

1.4 WARRANTY

A. Refer to specific Sections of this specification for systems and product warranty requirements. Verify with Manufacturer of proposed systems and products that specified warranty requirements are acceptable, without exception, prior to selecting materials for use on this project.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

C. Warranty Period: Refer to specific Sections of this specification for systems and product warranty requirements. Verify with Manufacturer of proposed systems and products that specified warranty requirements are acceptable, without exception, prior to selecting materials for use on this project.

1. Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SEALANTS

A. Color(s) shall be selected by Owner from approved manufacturer's color chart. Colors shall be manufacturers available premium colors such as "Fast Pak" by Tremco or approved equal. Owner may require a minimum of two (2) sealant colors to be installed at each new sealant joint type. Contractor will include multiple colors in his/her Bid.

B. Sealant for exposed masonry joints: single component urethane such as Dymonic by Tremco, Dynatrol I by Pecora, or NP-1 by Sonneborne conforming to ASTM C 920, Type S, Grade NS, Class 25, Use M and A.

C. Sealant for concealed joints: one-part butyl sealant, conforming to ASTM C 1311.

D. Sealant for hot pipe one-part silicone, non-corrosive, with service temperature from -60° F to +400° F, minimum, such as “Dow Corning 999-A” or equal.

2.2 ACCESSORIES

A. Primer shall be non-staining type as manufactured or recommended by sealant manufacturer for each substrate.

B. Joint cleaner shall be non-corrosive and non-staining as recommended by sealant manufacturer. Cleaner shall be totally compatible with sealant for each substrate.

C. Bond breaker tape shall be pressure-sensitive tape as recommended by sealant manufacturer.

D. Backer rod shall be continuous length, closed-cell polyethylene foam, as recommended by sealant manufacturer. Backer rod shall be compressible, resilient, non-waxing, non-extruding, and non-staining. Backer rod shall be of sufficient size to be compressed 30% of maximum joint width and shall be totally compatible with sealant, primer, and substrates. Backers shall conform to requirements of ASTM C 1330, ASTM D 1622, ASTM D 1623, and ASTM D 5249.

E. Masking material shall be commercially available masking tape of appropriate width or other material recommended by sealant manufacturer. Self-adhesive masking materials shall be of low tack and completely strippable, leaving no adhesive residue behind when removed.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.

a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

B. Sawcut existing joints where indicated to provide a minimum width of 1/2-inch.

C. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

D. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION – GENERAL

A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

B. Install sealant backings to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability. Provide a 2:1 width to depth ratio unless otherwise indicated by the manufacturer.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Provide approximately 30% compression of backer materials.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads

of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 8A in ASTM C 1193, unless otherwise indicated.

F. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 079200

SECTION 079200.02 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Immersible joint sealants.
5. Mildew-resistant joint sealants.
6. Polysulfide joint sealants.
7. Butyl joint sealants.
8. Latex joint sealants.
9. Joint sealants in exterior decorative concrete paving.
10. Joint sealants in exterior plazas and decks.

B. Related Requirements:

1. Section 079219 "Acoustical Joint Sealants" for sealing joints in sound-rated construction.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review exterior materials and proposed sealants.
2. Review color selections.

1.4 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content and/or Extended Producer Responsibility (EPR) (take-back) program, in accordance with 018113 "Sustainable Design Requirements".
2. Environmental Product Declaration (EPD) :

a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
b. Include information on Building Product Disclosure and Optimization Calculator.

3. Material Ingredients - Material Ingredient Reporting:

a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.

4. Low Emitting Materials - Adhesives and Sealants:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

5. Low Emitting Materials - Paints and Coatings:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standards.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant designation.

a. Use same designation as indicated in the Schedule at the end of this Section.

2. Joint-sealant application and joint location.
3. Joint-sealant manufacturer and product name.
4. Joint-sealant formulation.
5. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.

B. Field-Adhesion-Test Reports: For each sealant application tested.

C. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each kind of sealant and joint substrate.
3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

    a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

        1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.8 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.9 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
2. Disintegration of joint substrates from causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content: Sealants and sealant primers shall comply with the following:

1. Architectural sealants shall have a VOC content of 250 g/L or less.

2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
3. Sealants and sealant primers for porous substrates shall have a VOC content of 775 g/L or less.

C. IEQ Low-emitting Materials (LEM), Interior Adhesives and Sealants:

1. Products applied wet on site, inside of the waterproofing membrane, shall disclose concentration levels of total VOCs when tested in accordance with CDPH Standard Method v1.2-2017.
2. Products applied wet on site shall not contain more than the allowable concentrations of VOCs listed in SCAQMD Rule 1168, October 6, 2017.

D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. GE Construction Sealants; SCS2700 SilPruf LM.
b. Sika Corporation U.S.; Sikasil WS-290 FPS.

B. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 758.
b. Polymeric Systems, Inc.; PSI-641.

2.3 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, provide the following or approved substitution:

a. Dupont (formerly Dow); DowSil 790.
b. Pecora Corporation; 890 FTS (field-tintable sealant).

2.4 URETHANE JOINT SEALANTS

A. Urethane, M, NS, 50, NT: Multicomponent, nonsag, plus 50 percent and minus 50 percent movement capability nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF; MasterSeal NP 2.
b. Pecora Corporation; Dynatrol II.

B. Urethane, M, P, 50, T, NT: Multicomponent, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 50, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. LymTal International, Inc.; Iso-Flex 888QC.

C. Urethane, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 25, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Pecora Corporation; Dynatrol II SG.

2.5 IMMERSIBLE JOINT SEALANTS

A. Immersible Joint Sealants. Suitable for immersion in liquids; ASTM C 1247, Class 2; tested in deionized water unless otherwise indicated

B. Urethane, Immersible, M, P, 25, T, NT, I: Immersible, multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type M, Grade P, Class 25, Uses T, NT, and I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Construction Chemicals - Building Systems; Sonolastic SL 2.
b. LymTal International, Inc.; Iso-Flex 880 GB.
c. Sika Corporation U.S.; Sikaflex 2c SL.

2.6 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Dow Corning Corporation; 786-M White.
b. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; Bondaflex Sil 100 WF.
c. Soudal USA; RTV GP.
d. Tremco Incorporated; Tremsil 200.

2.7 POLYSULFIDE JOINT SEALANTS

A. Polysulfide, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, polysulfide joint sealant; ASTM C 920, Type M, Grade P, Class 25, Uses T and NT.

1. Products: Subject to compliance with requirements, provide one of the following:

a. W.R. Meadows, Inc.; Deck-O-Seal 125.

2.8 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Bostik, Inc.; Chem-Calk 300.
b. Pecora Corporation; BC-158.

2.9 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide one of the following:

a. BASF Construction Chemicals - Building Systems; Sonolac.
b. May National Associates, Inc., a subsidiary of Sika Corporation U.S.; .
c. Pecora Corporation; AC-20.
d. Tremco Incorporated; Tremflex 834.

2.10 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. BASF Construction Chemicals - Building Systems.
    b. Construction Foam Products, a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C 1330, Type B (bicellular material with a surface skin) except as noted, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance, typically 1.5 times the joint size.

1. Basis-of-Design: Subject to compliance with requirements, provide the following, or comparable product:

    a. SOF-Rod Bi-Cellular Polyethylene Backer Rod.

2. At dual-line installations, provide Type O open-cell material at the in-board (primary) seal, to allow sealant out-gassing to pass through the backer rod.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.11 MISCELLANEOUS MATERIALS

A. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

B. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

   a. Perform 5 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
   b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

   a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

   a. Whether sealants filled joint cavities and are free of voids.
   b. Whether sealant dimensions and configurations comply with specified requirements.
   c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant JS-1:

1. Application: Exterior joints in horizontal traffic surfaces.
2. Locations:

    a. Expansion joint between paving and building exterior.
    b. Isolation and contraction joints in cast-in-place concrete slabs.
    c. Joints between plant-precast architectural concrete paving units.
    d. Tile control and expansion joints.
    e. Joints between different materials listed above.
    f. Other joints as indicated on Drawings.

3. Formulation: Urethane, M, P, 50, T, NT.
4. Color:As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant JS-2:

1. Application: Exterior joints in horizontal traffic surfaces subject to water immersion.
2. Locations:

    a. Joints in pedestrian plazas.
    b. Joints in swimming pool decks.
    c. Other joints as indicated on Drawings.

3. Formulation: Urethane, immersible, M, P, 25, T, NT, I.
4. Color:As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant JS-3:

1. Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
2. Locations:

    a. Construction joints in cast-in-place concrete.
    b. Joints between plant-precast architectural concrete units.
    c. Control and expansion joints in unit masonry.
    d. Joints in dimension stone cladding and anchored stone masonry veneer.
    e. Joints in glass unit masonry assemblies.
    f. Joints in exterior insulation and finish systems.
    g. Joints between metal panels.
    h. Joints between different materials listed above.
    i. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
    j. Control and expansion joints in ceilings and other overhead surfaces.
    k. Other joints as indicated on Drawings.

3. Formuation: Silicone, nonstaining, S, NS, 100/50, NT.
4. Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant JS-4:

1. Application: Interior joints in horizontal traffic surfaces.
2. Locations:

    a. Isolation joints in exposed cast-in-place concrete slabs.
    b. Control and expansion joints in stone flooring.
    c. Control and expansion joints in brick flooring.
    d. Control and expansion joints in tile flooring.
    e. Other joints as indicated on Drawings.

3. Formulation: Urethane, M, P, 25, T, NT, or Polysulfide M, P, 25, T, NT.
4. Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant JS-5:

1. Application: Interior joints in vertical surfaces and horizontal non-traffic surfaces.
2. Locations:

a. Control and expansion joints on exposed interior surfaces of exterior walls.
b. Tile control and expansion joints.
c. Vertical joints on exposed surfaces of unit masonry, concrete walls and partitions.
d. Joints on underside of plant-precast structural concrete beams and planks.
e. Other joints as indicated on Drawings.

3. Formulation: Urethane, M, NS, 50, NT.
4. Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant JS-6:

1. Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.
2. Locations:

a. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
b. Other joints as indicated on Drawings.

3. Formulation: Acrylic latex.
4. Color:As selected by Architect from manufacturer's full range of colors.

G. Joint-Sealant JS-7:

1. Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces.
2. Locations:

a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
b. Tile control and expansion joints where indicated.
c. Other joints as indicated on Drawings.

3. Formulation: Silicone, mildew resistant, acid curing, S, NS, 25, NT .
4. Color: As selected by Architect from manufacturer's full range of colors.

H. Joint-Sealant JS-8:

1. Application: Concealed mastics.
2. Locations:

a. Aluminum thresholds.
b. Sill plates.
c. Other joints as indicated on Drawings.

3. Formulation: Butyl-rubber based.
4. Color: Manufacturer's standard color.

END OF SECTION

SECTION 079219 - ACOUSTICAL JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Acoustical joint sealants.
2. Smoke and acoustic spray.
3. Acoustical outlet backer putty pads.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for elastomeric, latex, and butyl-rubber-based joint sealants for nonacoustical applications.

1.3 ACTION SUBMITTALS

A. Product Data: For each acoustical joint sealant.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content and/or Extended Producer Responsibility (EPR) (take-back) program, in accordance with 018113 "Sustainable Design Requirements".
2. Environmental Product Declaration (EPD) :

    a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
    b. Include information on Building Product Disclosure and Optimization Calculator.

3. Material Ingredients - Material Ingredient Reporting:

    a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.

4. Low Emitting Materials - Adhesives and Sealants:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

5. Low Emitting Materials - Paints and Coatings:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standards.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. Acoustical-Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each kind of acoustical joint sealant, for tests performed by a qualified testing agency.

B. Sample Warranties: For special warranties.

1.5 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace acoustical joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish acoustical joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E 90.

1. Sealant shall have a VOC content of 250 g/L or less.

B. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

2.2 ACOUSTICAL JOINT SEALANTS, AJS-1

A. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C 834.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Hilti; CS-SA Light Smoke and Acoustic Sealant.
b. Pecora Corporation; AC-20 FTR.
c. Tremco, Incorporated; Tremco Acoustical Sealant.
d. USG Corporation; SHEETROCK Acoustical Sealant.

2. Colors of Exposed Acoustical Joint Sealants: As selected by Architect from manufacturer's full range of colors.

2.3 SMOKE AND ACOUSTIC SEALANT, SJS-1

A. Spray-applied for sealing construction joint openings in non-fire-rated acoustical barriers and smoke partitions.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Hilti CP 506 or Hilti CS-S-SA Light or approved substitution.

2.4 SMOKE AND ACOUSTIC SPRAY, SJS-2

A. Spray-applied for sealing construction joint openings in non-fire-rated acoustical barriers and smoke partitions.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Hilti CP 572 or approved substitution.

2.5 PREFORMED SMOKE AND ACOUSTIC TOP TRACK SEAL , TTS-1

A. Basis-of-Design Product: Subject to compliance with requirements, provide Hilti CFS TTS-SA or approved substitution.

2.6 PREFORMED SMOKE AND ACOUSTIC BOTTOM TRACK SEAL , BTS-1

A. Basis-of-Design Product: Subject to compliance with requirements, provide Hilti CFS BTS or approved substitution.

2.7 ACOUSTICAL OUTLET BACKER PUTTY PADS

A. Moldable pad applied to backside of electrical boxes to maintain integrity of fire rated gypsum walls.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Flame Tech Putty Pads or approved substitution.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by acoustical-joint-sealant manufacturer where required for adhesion of sealant to joint substrates.

1. Low-Emitting Paints and Coatings: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1113 OR California Air Resource Board (CARB) 2007-Suggested Control Measures (SCM) for Architectural Coatings, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive acoustical joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing acoustical joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where recommended by acoustical-joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

A. Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.

B. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical joint sealant. Install acoustical joint sealants at both faces of partitions, at perimeters, and through penetrations. Comply with ASTM C 919, ASTM C 1193, and manufacturer's written recommendations for closing off sound-flanking paths around or through assemblies, including sealing partitions to underside of floor slabs above acoustical ceilings.

C. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of acoustical joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect acoustical joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated acoustical joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079219

SECTION 081113.02 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Interior standard steel doors and frames.

B. Related Requirements:

1. Section 081416 "Flush Wood Doors" for solid core wood doors installed in hollow-metal frames.
2. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.
3. Section 099123 "Interior Painting" for field painting of interior hollow-metal doors and frames.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD) :

   a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
   b. Include information on Building Product Disclosure and Optimization Calculator.

2. Sourcing of Raw Materials - Recycled Content:

   a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
   b. Include information on Building Product Disclosure and Optimization Calculator.

3. Material Ingredients - Material Ingredient Reporting:

   a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.
   b. Include information on Building Product Disclosure and Optimization Calculator.

4. Low Emitting Materials - Paints and Coatings:

   a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standards.
   b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

C. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware, including high-frequency hinge preparations.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

D. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.7 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of hollow-metal door and frame assembly, for tests performed by a qualified testing agency.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.

B. Material Ingredient Reporting: Provide materials/products with material ingredient reporting that meets the requirements for LEED.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ceco Door; ASSA ABLOY.
2. Curries Company; ASSA ABLOY.
3. Mesker Door Inc.
4. Republic Doors and Frames.
5. Rocky Mountain Metals, Inc.
6. Southwestern Hollow Metal Co.
7. Steelcraft; an Ingersoll-Rand company.
8. West Central Mfg. Inc.

B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.3 REGULATORY REQUIREMENTS

A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.

B. Fire-Rated, Borrowed-Lite Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.4 INTERIOR DOORS AND FRAMES

A. Construct interior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.

1. Physical Performance: Level B according to SDI A250.4.
2. Doors:

    a. Type: As indicated in the Door and Frame Schedule.
    b. Thickness: 1-3/4 inches.
    c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch (18 gauge).
    d. Edge Construction: Model 2, Seamless.
    e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.

3. Frames:

    a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (16 gauge).
    b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
    c. Construction: Full profile welded.

4. Exposed Finish: Prime.

2.5 BORROWED LITES

A. Hollow-metal frames of uncoated steel sheet, minimum thickness of 0.053 inch(16 gauge).

B. Construction: Full profile welded.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.7 MATERIALS

A. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

D. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

E. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

G. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

H. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.

I. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

J. Glazing: Comply with requirements in Section 088000 "Glazing."

K. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.8 FABRICATION

A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Hollow-Metal Doors:

1. Steel-Stiffened Door Cores: Provide minimum thickness 0.026 inch, steel vertical stiffeners of same material as face sheets extending full-door height, with vertical webs spaced not more than 6 inches apart. Spot weld to face sheets no more than 5 inches o.c. Fill spaces between stiffeners with glass- or mineral-fiber insulation.
2. Fire Door Cores: As required to provide fire-protection and temperature-rise ratings indicated.
3. Vertical Edges for Single-Acting Doors: Provide beveled or square edges at manufacturer's discretion.
4. Top Edge Closures: Close top edges of doors with inverted closures of same material as face sheets.
5. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
6. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
7. Electrical Raceways: Provide hollow metal doors to receive electrified hardware with concealed wiring harness and standardized Molex plug connectors on both ends to accommodate u to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware" and "Access Control Hardware." Wire nut connections are not acceptable.

C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 16 inches from top and bottom of frame. Space anchors not more than 32 inches o.c., to match coursing, and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.

    c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

6. Head Anchors: Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.
7. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

8. Electrical Thru-Wiring: Provide hollow metal frames receiving electrified hardware with loose wiring harness (not attached to open throat components or installed in closed mullion tubes) and standardized Molex plug connectors on one end to accommodate up to twelve wires. Coordinate connectors on end of the wiring harness to plug directly into the electric through-wire transfer hardware or wiring harness specified in hardware sets in Division 08 Sections "Door Hardware and "Access Control Hardware."
9. Electrical Knock- Out Boxes: Factory weld 18 gauge electrical knock-out boxes to frame for electrical hardware preps including but not limited to; electric through-wire transfer hardware, electrical raceways and wiring harnesses, door position switches, electric strikes, magnetic locks, and jamb mounted card readers as specified in hardware sets in Division 08 Sections "Door Hatdware" and "Access Control Hardware."

    a. Provide electrical knock-out boxes with dual 1/2 inch and 3/4 inch knockouts.
    b. Conduit to be coordinated and installed in the field (Division26) from middle hinge box and strike box to door position box.
    c. Electrical knock-out boxes to comply with NFPA requirements and fit electrical door hardware as specified in hardware sets in Division 08 Section "Door Hardware."
    d. Electrical knock-out boxes for continuous hinges should be located in the center of the vertical dimension of the hinge jamb.

D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.

E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.

F. High Frequency Hinge Preparations for Frames:

1. Provide auxiliary welded reinforcement at the top hinge of door frame to prevent potential door sag, as described in SDI-111-09.
2. Locations: Provide at all main entrance doors, rear exit doors, auditoriums, cafeterias, and gymnasiums.

G. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow-metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow-metal work.

5. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.9 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

a. Low-Emitting Paints and Coatings: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1113 OR California Air Resource Board (CARB) 2007-Suggested Control Measures (SCM) for Architectural Coatings, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

2.10 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.

B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

    a. At fire-rated openings, install frames according to NFPA 80.
    b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    c. Install frames with removable stops located on secure side of opening.
    d. Install door silencers in frames before grouting.
    e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    f. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    g. Field apply bituminous coating to backs of frames that will be filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

    a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with mineral-fiber insulation.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
8. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Steel Doors:

a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch.
b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch.
d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors and gaskets according to NFPA 105.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow-metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

E. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

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SECTION 081113 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Provide new steel exterior doors at roof access locations.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.

C. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing according to UL10C or NFPA 252 at positive pressure (neutral pressure at 40” above sill).

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amweld Building Products, LLC.
2. Ceco Door Products
3. Pioneer Industries, Inc., an Assa Abloy Group Company

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, CS, Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G90 or A60 metallic coating.

C. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z coating designation; mill phosphatized.

2.3 HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Comply with ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), minimum 16-gauge (0.053-inch) thick steel, Model 1 (Full Flush).
3. Core Construction: Manufacturer's standard, polystyrene, polyurethane, or polyisocyanurate.
4. Vertical Edges for Single-Acting Doors: Manufacturer's standard.
5. Beveled Edge: 1/8-inch in 2-inches (3 mm in 50 mm).
6. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.
7. Hinge Reinforcement: Minimum 7-gauge (3/16-inch) plate 1-1/4-inch x 9-inch.
8. Hardware Reinforcement: ANSI/SDI A250.6.
9. Door sweep: Heavy duty 1-inch vinyl with rain drip and finish cap, in finish to match door.

2.4 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8.

B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 14-gauge (0.067-inch-thick steel sheet).

C. Hardware Reinforcement: ANSI/SDI A250.6 with reinforcement plates from same material as frames.

D. Weather Stripping: Provide continuous perimeter weatherstripping with heavy duty vinyl bulb and reinforced aluminum holder, finish to match door.

E. Rain Drip Guard: Heavy duty aluminum rain drip, mounted to top of door frame, in finish to match door.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

2.6 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or ridged mechanical anchors.

B. Grout Guards: Formed from same materials as frames, not less than 0.016-inch (0.4 mm) thick.

C. Grout: ASTM C 476, except with a maximum slump of 4-inches, as measured according to ASTM C 143/C 143M.

2.7 FABRICATION

A. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

B. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors. Seal joints in top edges of doors against water penetration.
2. Glazed Lights: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing.

C. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
5. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Postinstalled Expansion Type: Locate anchors not more than 6-inches from top and bottom of frame. Space anchors not more than 26-inches on center.

6. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers.

    a. Single-Door Frames: Three door silencers.

7. Frame Undercoating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water-based frame undercoating or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame.

D. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 for preparation of hollow metal work for hardware.

2.8 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: ANSI/SDI A250.10.

B. Factory-Applied Paint Finish: ANSI/SDI A250.3.

1. Color and Gloss: As selected by Owner from standard color chart.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hollow Metal Frames: Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
2. General:

a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
b. Install door silencers in frames before grouting.
c. Remove temporary braces necessary for installation only after frames have been properly set and secured.
d. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

3. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces. Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
4. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

a. Squareness: Plus or minus 1/16-inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
b. Alignment: Plus or minus 1/16-inch, measured at jambs on a horizontal line parallel to plane of wall.
c. Twist: Plus or minus 1/16-inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
d. Plumbness: Plus or minus 1/16-inch, measured at jambs at floor.

B. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

3.2 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid-core doors with wood-veneer faces for transparent finish.
2. Factory finishing flush wood doors.
3. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:

1. Section 088000 "Glazing" for glass view panels in flush wood doors.
2. Section 088813 "Fire-Resistant Glazing" for fire-rated glass panels in flush wood doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD):

a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
b. Include information on Building Product Disclosure and Optimization Calculator.

2. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

3. Location Valuation Factor:

a. Submit product data or other published information verifying the location of manufacturing facility including name, address, and distance between manufacturing facility and the project site. Provide manufacturer's documentation indicating location where the base materials were extracted, mined, quarried, harvested, etc. and the distance between this location and the project site. Also include material cost (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

4. Material Ingredients - Material Ingredient Reporting:

a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.
b. Include information on Building Product Disclosure and Optimization Calculator.

5. Low Emitting Materials - Adhesives and Sealants:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

6. Low Emitting Materials - Paints and Coatings:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standards.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

7. Low Emitting Materials : Composite Wood:

a. Submit product data or other published information verifying the composite wood has low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; and the following:

1. Dimensions and locations of blocking.
2. Dimensions and locations of mortises and holes for hardware.
3. Dimensions and locations of cutouts.

4. Undercuts.
5. Requirements for veneer matching.
6. Doors to be factory finished and finish requirements.
7. Fire-protection ratings for fire-rated doors.

D. Samples for Initial Selection: For factory-finished doors.

E. Samples for Verification:

1. Corner sections of doors, approximately 8 by 10 inches (200 by 250 mm), with door faces and edges representing actual materials to be used.

a. Provide Samples for each species of veneer and solid lumber required.
b. Finish veneer-faced door Samples with same materials proposed for factory-finished doors.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is a licensee of WI's Certified Compliance Program.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in plastic bags or cardboard cartons.

C. Mark each door onbottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during remainder of construction period.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
b. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ASSA ABLOY Wood Doors (GR): GPD Series.
2. Eggers Industries.
3. Oshkosh Door Company.
4. VT Industries, Inc.(VT): Heritage Collection.

B. Source Limitations: Obtain flush wood doorsfrom single manufacturer.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, "Architectural Wood Flush Doors."

B. WDMA I.S.1-A Performance Grade:

1. Heavy Duty unless otherwise indicated.
2. Extra Heavy Duty: Classrooms, public toilets, janitor's closets, assembly spaces, exits, and where indicated.

C. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.

D. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

E. Local Valuation Factor: Provide materials/products that are extracted, harvested, or recovered, and manufactured and assembled within one-hundred (100) miles of the Project site.

F. Material Ingredient Reporting: Provide materials/products with material ingredient reporting that meets the requirements for LEED.

G. Fire-Rated Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Cores: Provide core specified or mineral core as needed to provide fire-protection rating indicated.
2. Edge Construction: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed edges.
3. Pairs: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.

H. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control, based on testing according to UL 1784.

I. Particleboard-Core Doors:

1. Composite Wood Products: Products shall be made without urea formaldehyde.
2. Low-Emitting Composite Wood: Provide materials/products that have low formaldehyde emissions that meet the California Air Resources Board (CARB) ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.
3. Particleboard: ANSI A208.1, Grade LD-2.
4. Particleboard: Straw-based particleboard complying with ANSI A208.1, Grade LD-2 or M-2, except for density.
5. Blocking: Provide wood blocking in particleboard-core doors as follows:

    a. 5-inch top-rail blocking, in doors indicated to have closers.
    b. 5-inch bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.

6. Provide doors with structural-composite-lumber cores instead of particleboard cores for doors indicated to receive exit devices.

J. Structural-Composite-Lumber-Core Doors:

1. Structural Composite Lumber: WDMA I.S.10.

    a. Screw Withdrawal, Face: 700 lbf.
    b. Screw Withdrawal, Edge: 400 lbf.

2.3 VENEER-FACED DOORS FOR TRANSPARENT FINISH

A. Interior Solid-Core Doors :

1. Grade: Custom (Grade A faces).
2. Species: Select white maple.
3. Cut: Quarter sliced.
4. Match between Veneer Leaves: Book match.
5. Assembly of Veneer Leaves on Door Faces: Running match.
6. Pair and Set Match: Provide for doors hung in same opening or separated only by mullions.

7. Exposed Vertical and Top Edges: Same species as faces or a compatible species - edge Type A.
8. Core: Particleboard, except use structural composite lumber for half-lite and full-lite doors.
9. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering. Faces are bonded to core using a hot press.

2.4 LIGHT FRAMES AND LOUVERS

A. Wood Beads for Light Openings in Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Wood Species: Same species as door faces.
2. Profile: M1 Flush Bead.
3. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

2.5 ELECTRICAL RACEWAYS

A. Provide flush wood doors receiving electrified hardware with concealed wiring harness and standardized Molex plug connectors on both ends to accommodate up to twelve (12) wires. Coordinate connectors on end of the wiring harness to plug directly into the electrified hardware and the through-wire transfer hardware or wiring harness specified in Section 087100 "Door Hardware." Wire nut connections are not acceptable.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.

1. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.

1. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
2. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Factory cut and trim openings through doors.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
3. Louvers: Factory install louvers in prepared openings.

2.7 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted onbottom edges, edges of cutouts, and mortises.

B. Factory finish doors that are indicated to receive transparent finish.

C. Transparent Finish:

1. Low-Emitting Paints and Coatings: Provide products that comply with South Coast Air Quality Management District (SCAQMD) Rule 1113 OR California Air Resource Board (CARB) 2007-Suggested Control Measures (SCM) for Architectural Coatings, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.
2. Grade: Custom.
3. Finish: WDMA TR-8/AWS System 9, UV Cured Acrylated Polyurethane.
4. Staining: As indicated on Drawings.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Installation Instructions: Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

1. Install fire-rated doors according to NFPA 80.
2. Install smoke- and draft-control doors according to NFPA 105.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Access doors and frames.
2. Fire-rated access doors and frames.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Submittals:

1. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

C. Other specified sustainable design requirements identified as such in this Section.

D. Product Schedule: For access doors and frames. Use same designations indicated on Drawings.

E. Coordination Drawings: Include Coordination Drawings showing access doors/panels and equipment to be accessed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges, AD-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Activar Construction Products Group, Inc. - JL Industries.
    b. ACUDOR Products, Inc.
    c. Babcock-Davis.
    d. Bauco Access Panel Solutions, Inc.
    e. Cendrex Inc.
    f. Elmdor/Stoneman Manufacturing Company; a division of Acorn Engineering Company.
    g. Karp Associates, Inc.
    h. Lane-Aire Manufacturing Corp.
    i. Larsens Manufacturing Company.
    j. Maxam Metal Products Limited.
    k. Metropolitan Door Industries Corp.
    l. MIFAB, Inc.
    m. Milcor; a division of Hart & Cooley, Inc.
    n. Nystrom.
    o. Williams Bros. Corporation of America (The).

2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
3. Locations: Wall and ceiling.
4. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage, factory primedfinished.
5. Stainless Steel Sheet for Door: Nominal 0.062 inch, 16 gage, ASTM A480/A480M No. 4 finish.
6. Frame Material: Same material, thickness, and finish as door.
7. Latch and Lock: Cam latch, key operated.
8. Locations: Typical, except as otherwise indicated.

B. Flush Access Doors with Concealed Flanges, AD-2:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Activar Construction Products Group, Inc. - JL Industries.
    b. ACUDOR Products, Inc.
    c. Babcock-Davis.
    d. Bauco Access Panel Solutions, Inc.
    e. Cendrex Inc.
    f. Elmdor/Stoneman Manufacturing Company; a division of Acorn Engineering Company.
    g. Karp Associates, Inc.
    h. Lane-Aire Manufacturing Corp.
    i. Larsens Manufacturing Company.

j. Maxam Metal Products Limited.
k. Metropolitan Door Industries Corp.
l. MIFAB, Inc.
m. Milcor; a division of Hart & Cooley, Inc.
n. Nystrom.
o. Williams Bros. Corporation of America (The).

2. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
3. Locations: Wall and ceiling.
4. Metallic-Coated Steel Sheet for Door: Nominal 0.064 inch, 16 gage factory primedfinished.
5. Stainless Steel Sheet for Door: Nominal 0.062 inch, 16 gage, ASTM A480/A480M No. 4 finish.
6. Frame Material: Same material and thickness as door.
7. Latch and Lock: Cam latch, key operated.
8. Locations: Where indicated on Drawings, and where higher-quality appearance is required.

2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Exposed Flanges, AD-10:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Cendrex Inc.
b. Lane-Aire Manufacturing Corp.
c. Metropolitan Door Industries Corp.
d. Milcor; a division of Hart & Cooley, Inc.

2. Description: Door face flush with frame, uninsulated; with exposed flange, self-closing door, and concealed hinge.
3. Optional Features: Gasketing.
4. Locations: Wall and ceiling.
5. Fire-Resistance Rating: Not less than that of adjacent construction.
6. Metallic-Coated Steel Sheet for Door: Nominal 0.040 inch, 20 gage, factory primed.
7. Frame Material: Same material, thickness, and finish as door.
8. Latch and Lock: Self-latching door hardware, operated by key.
9. Locations: Typical at fire-rated wall assemblies, except as otherwise indicated.

B. Fire-Rated, Flush Access Doors with Concealed Flanges, AD-11:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Activar Construction Products Group, Inc. - JL Industries.
b. ACUDOR Products, Inc.
c. Babcock-Davis.
d. Cendrex Inc.

e. Karp Associates, Inc.
f. Maxam Metal Products Limited.
g. Metropolitan Door Industries Corp.
h. MIFAB, Inc.
i. Milcor; a division of Hart & Cooley, Inc.
j. Nystrom.
k. Williams Bros. Corporation of America (The).

2. Description: Door face flush with frame, uninsulated; with concealed flange for gypsum board installation, self-closing door, and concealed hinge.
3. Optional Features: Gasketing.
4. Locations: Wall and ceiling.
5. Fire-Resistance Rating: Not less than that of adjacent construction.
6. Metallic-Coated Steel Sheet for Door: Nominal 0.040 inch, 20 gage, factory primedfinished.
7. Frame Material: Same material, thickness, and finish as door.
8. Latch and Lock: Self-closing, self-latching door hardware, operated by key.
9. Locations: Where indicated on Drawings, and where higher-quality appearance is required.

2.4 MATERIALS

A. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with minimum G60 or A60 metallic coating.

D. Stainless Steel Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

E. Aluminum Sheet: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

F. Frame Anchors: Same material as door face.

G. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.5 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
2. For concealed flanges with plaster bead for full-bed plaster applications, provide zinc-coated expanded-metal lath and exposed casing bead welded to perimeter of frames.

D. Recessed Access Doors: Form face of panel to provide recess for application of applied finish. Reinforce panel as required to prevent buckling. Provide access sleeves for each latch operator and install in holes cut through finish.

1. For recessed doors with plaster infill, provide self-furring expanded-metal lath attached to door panel.

E. Latch and Lock Hardware:

1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
2. Keys: Furnish two keys per lock and key all locks alike.
3. Mortise Cylinder Preparation: Where indicated, prepare door panel to accept cylinder specified in Section 087100 "Door Hardware."

F. Aluminum: After fabrication, apply manufacturer's standard protective coating on aluminum that will come in contact with concrete.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
2. Factory Finished: Apply manufacturer's standard baked-enamel or powder-coat finish immediately after cleaning and pretreating, with minimum dry-film thickness of 1 mil for topcoat.

a. Color: As selected by Architect from full range of industry colors.

E. Stainless Steel Finishes:

1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
2. Polished Finish: ASTM A480/A480M No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.

    a. Run grain of directional finishes with long dimension of each piece.
    b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

3. Locations: Public toilet rooms, locker rooms, food service areas, and other locations as indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Provide access doors and frames in locations as required to access mechanical, plumbing, fire protection, and electrical devices and controls. Install with required clearances for accessing items as required by device and controls manufacturers. Install in locations as required for equipment access by authorities having jurisdiction.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Owner will engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:

1. Fire-Rated Door Inspections: Inspect each fire-rated access door in accordance with NFPA 80, Section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated access door indicating compliance with each item listed in NFPA 80.

3.4 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION

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SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 "General Requirements" sections for Allowances, Alternates, Owner Furnished Contractor Installed, Project Management and Coordination.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
   a. "Metal Doors and Frames"
   b. "Flush Wood Doors"
   c. "Stile and Rail Wood Doors"
   d. "Interior Aluminum Doors and Frames"
   e. "Aluminum-Framed Entrances and Storefronts"
   f. "Stainless Steel Doors and Frames"
   g. "Special Function Doors"
   h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies

3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
   a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
   b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
   a. Wiring Diagrams: For power, signal, and control wiring and including:
      1) Details of interface of electrified door hardware and building safety and security systems.
      2) Schematic diagram of systems that interface with electrified door hardware.

3) Point-to-point wiring.
4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
   a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:
   a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
   b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
   c. Indicate complete designations of each item required for each opening, include:
      1) Door Index: door number, heading number, and Architect's hardware set number.
      2) Quantity, type, style, function, size, and finish of each hardware item.
      3) Name and manufacturer of each item.
      4) Fastenings and other pertinent information.
      5) Location of each hardware set cross-referenced to indications on Drawings.
      6) Explanation of all abbreviations, symbols, and codes contained in schedule.
      7) Mounting locations for hardware.
      8) Door and frame sizes and materials.
      9) Degree of door swing and handing.
      10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:
   a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
   b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
   c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
   d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
   e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
   f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:
   a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
   b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
   a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
   b. Catalog pages for each product.
   c. Final approved hardware schedule edited to reflect conditions as installed.
   d. Final keying schedule
   e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
   f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
   a. Fire door assemblies, in compliance with NFPA 80.
   b. Required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
   a. For door hardware: DHI certified AHC or DHC.
   b. Can provide installation and technical data to Architect and other related subcontractors.

c. Can inspect and verify components are in working order upon completion of installation.
d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
   a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
   b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:
   a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
   b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware
   a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:
   a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference
   a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      2) Preliminary key system schematic diagram.
      3) Requirements for key control system.
      4) Requirements for access control.
      5) Address for delivery of keys.

2. Pre-installation Conference
   a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

b. Inspect and discuss preparatory work performed by other trades.
c. Inspect and discuss electrical roughing-in for electrified door hardware.
d. Review sequence of operation for each type of electrified door hardware.
e. Review required testing, inspecting, and certifying procedures.
f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:
   a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.

C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.

B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.

D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
   a. Mechanical Warranty
      1) Locks
         a) Corbin Russwin ML2000 Series: 10 years
      2) Exit Devices
         a) Von Duprin: 10 years
      3) Closers
         a) LCN 4000 Series: 30 years
   b. Electrical Warranty
      1) Locks
         a) Corbin Russwin: 2 years
      2) Exit Devices
         a) Von Duprin: 3 years

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.

C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer’s recognized installation standards for application intended.
2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with “Metal Doors and Frames”, “Flush Wood Doors”, “Stile and Rail Wood Doors” to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

C. Cable and Connectors:

1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Ives 5BB series

2. Acceptable Manufacturers and Products:
   a. Hager BB1191/1279 series
   b. Best FBB series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
   a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
   b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. 2 inches or thicker doors:
   a. Exterior: Heavy weight, bronze or stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high
6. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
7. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
8. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins
9. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives
2. Acceptable Manufacturers:
   a. Roton
   b. Hager

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.

3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:
   a. Von Duprin EPT-10

2. Acceptable Manufacturers and Products:
   a. No Substitute

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. Von Duprin 98/35A series

2. Acceptable Manufacturers and Products:
   a. No Substitute

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide smooth touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.

10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.09 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer and Product:
   a. Corbin Russwin LFIC

2. Acceptable Manufacturers and Products:
   a. No Substitute

B. Requirements:

1. Provide cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

2.10 KEYING

A. Scheduled System:

1. Existing factory registered system:
   a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

B. Requirements:

1. Construction Keying:
   a. Replaceable Construction Cores.
      1) Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
         a) 3 construction control keys
         b) 12 construction change (day) keys.
      2) Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2. Permanent Keying:
   a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
      1) Master Keying system as directed by the Owner.
   b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
   c. Provide keys with the following features:
      1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
      2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
   d. Identification:
      1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
      2) Identification stamping provisions must be approved by the Architect and Owner.
      3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
      4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
      5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
   e. Quantity: Furnish in the following quantities.
      1) Permanent Control Keys: 3.
      2) Master Keys: 6.
      3) Change (Day) Keys: 3 per cylinder/core that is keyed differently
      4) Key Blanks: Quantity as determined in the keying meeting.

2.11 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Telkee

2. Acceptable Manufacturers:
   a. HPC
   b. Lund

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
   a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
   b. Provide hinged-panel type cabinet for wall mounting.

2.12 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
   a. LCN 4040XP series

2. Acceptable Manufacturers and Products:
   a. No Substitute

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter piston with 5/8-inch (16 mm) diameter double heat-treated pinion journal. QR code with a direct link to maintenance instructions.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards. Provide snap-on cover clip, with plastic covers, that secures cover to spring tube.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck. Provide graphically labelled instructions on the closer body adjacent to each adjustment valve. Provide positive stop on reg valve that prevents reg screw from being backed out.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.
11. Closers shall be capable of being upgraded by adding modular mechanical or electronic components in the field.

2.13 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns

b. Trimco

B. Requirements:

1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

2.14 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.15 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:
   a. Glynn-Johnson

2. Acceptable Manufacturers:
   a. Rixson
   b. Sargent

B. Requirements:

1. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.16 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.17 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Zero International

2. Acceptable Manufacturers:
   a. National Guard
   b. Reese

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

2.18 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:
   a. Ives

2. Acceptable Manufacturers:
   a. Burns
   b. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.19 FINISHES

A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.

B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.

C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.

I. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.

J. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

K. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

L. Continuous Hinges: Re-locate the door and frame fire rating labels where they will remain visible so that the hinge does not cover the label once installed.

M. Door Closers & Auto Operators: Mount closers/operators on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers/operators so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.

N. Overhead Stops/Holders: Mount overhead stops/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.

O. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.

P. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

Q. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

R. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

S. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

T. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door can close freely from an open position of 30 degrees.
2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
3. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items per manufacturer's instructions to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.

C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.

D. Hardware Sets:

Abbreviation	Name
C-R	Corbin Russwin Architectural Hardware
GLY	Glynn-Johnson Corp
IVE	H.B. Ives
LCN	LCN Commercial Division
SCE	Schlage Electronic Security
VON	Von Duprin
ZER	Zero International Inc

Legend:
Link to catalog cut sheet
Electrified Opening

Hardware Group No. 01-ALT4

For use on Door #(s):
213.1

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	CONST LATCHING BOLT	FB51P/FB61P AS REQ'D		630	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	OFFICE/ENTRANCE LOCK	ML2053 NSA CT6		626	C-R
1	EA	MORTISE CYLINDER	CR1070 CT6R		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	COORDINATOR	COR X FL		628	IVE
2	EA	MOUNTING BRACKET	MB1/MB2 AS REQ'D		BLK	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
2	EA	KICK PLATE	8400 8" X 1" LDW B-CS		BLK	IVE
2	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	SET	MEETING STILE	328AA-S		AA	ZER
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 02-ALT4

For use on Door #(s):

1S1	2S1	2S2	4S1	4S2	5S1
5S2	6S1	6S2	GS1		

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONT. HINGE	224XY		628	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-06		626	VON
1	EA	CLOSER, SURFACE	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 8" X 1" LDW B-CS		BLK	IVE
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8192AA		AA	ZER
1	EA	THRESHOLD	545A		A	ZER

Hardware Group No. 04-ALT4

For use on Door #(s):

227B	227C	401	402	500A	500B
600A	600B				

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	PRIVACY W/INDICATOR	ML2030 NSA V20			
1	EA	CLOSER, SURFACE	4040XP REG		689	LCN
1	EA	MOP PLATE	8400 4" X 1" LDW B-CS		630	IVE
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8192AA		AA	ZER

Hardware Group No. 05-ALT4

For use on Door #(s):

213.2	219	220	221	222	223
224	225	403	404	405	406
407	408	409	410	411	412
413	414	415	416	417	418
419	420	421	422	423	424
425	426	431A	431B	431D	505
506	507	508	509	510	511
514	517	518	519	520	521
522	523	524	525	527	528.2
615					

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	OFFICE/ENTRANCE LOCK	ML2053 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	CLOSER, SURFACE	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8192AA		AA	ZER

Hardware Group No. 05A-ALT4

For use on Door #(s):

212B	212C	212D	212E	212F	214A
214B	218A	218B	218C	218D	218E
218F	218G	218H	218I	226A	429A
501	502	503	504	512A	512B
526A	529	603	605	606	609
611	612	614	616	617	618
621	622				

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	OFFICE/ENTRANCE LOCK	ML2053 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8192AA		AA	ZER

Hardware Group No. 05B-ALT4

For use on Door #(s):

212G	528.1

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	OFFICE/ENTRANCE LOCK	ML2053 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	OH STOP	100S		630	GLY
1	EA	CLOSER, SURFACE	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8192AA		AA	ZER

Hardware Group No. 05C-ALT4

For use on Door #(s):
427A

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	OFFICE/ENTRANCE LOCK	ML2053 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	OH STOP	100S		630	GLY
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8192AA		AA	ZER

Hardware Group No. 05D-ALT4

For use on Door #(s):
516

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	OFFICE/ENTRANCE LOCK	ML2053 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 8" X 1" LDW B-CS		BLK	IVE
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	DOOR SWEEP	8192AA		AA	ZER

Hardware Group No. 06-ALT4

For use on Door #(s):

218.1	218.2	218K	226	427	429
431C	607	625.2			

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	POWER TRANSFER	EPT10		689	VON
1	EA	ELECTRIFIED LOCK	ML20906 NSA M92 X SEC CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	CLOSER, SURFACE	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	CREDENTIAL READER	(BY DIV 28)		BLK	SCE
1	EA	DOOR POSITION SWITCH-DPDT	GRI 19512W (BY DIV 28)		WHT	GEN
1	EA	POWER SUPPLY	(BY DIV 28)		LGR	SCE

DOOR NORMALLY CLOSED AND LOCKED
ACCESS BY VALID CREDENTIAL, KEY OVERRIDE OR SECURITY TIME ZONE
FREE EGRESS AT ALL TIMES
DOOR REMAINS LOCKED WITH LOSS OF POWER OR ACTIVATION OF FIRE ALARM (FAIL SECURE)
DOOR MONITORED

Hardware Group No. 06A-ALT4

For use on Door #(s):

512.1 512.2 526 530 625.3

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER			FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED			652	IVE
1	EA	POWER TRANSFER	EPT10		✓	689	VON
1	EA	ELECTRIFIED LOCK	ML20906 NSA M92 X SEC CT6		✓	626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM			626	C-R
1	EA	SURFACE CLOSER	4040XP EDA			689	LCN
2	EA	KICK PLATE	8400 8" X 2" LDW B-CS			BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439			630	IVE
1	EA	GASKETING	488SBK PSA			BK	ZER
1	EA	CREDENTIAL READER	(BY DIV 28)		✓	BLK	SCE
1	EA	DOOR POSITION SWITCH-DPDT	GRI 19512W (BY DIV 28)		✓	WHT	GEN
1	EA	POWER SUPPLY	(BY DIV 28)		✓	LGR	SCE

DOOR NORMALLY CLOSED AND LOCKED
ACCESS BY VALID CREDENTIAL, KEY OVERRIDE OR SECURITY TIME ZONE
FREE EGRESS AT ALL TIMES
DOOR REMAINS LOCKED WITH LOSS OF POWER OR ACTIVATION OF FIRE ALARM (FAIL SECURE)
DOOR MONITORED

Hardware Group No. 06B-ALT4

For use on Door #(s):
212 214 625.1

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	POWER TRANSFER	EPT10	✓	689	VON
1	EA	CONST LATCHING BOLT	FB51P/FB61P AS REQ'D		630	IVE
1	EA	ELECTRIFIED LOCK	ML20906 NSA M92 X SEC CT6	✓	626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	COORDINATOR	COR X FL		628	IVE
2	EA	MOUNTING BRACKET	MB1/MB2 AS REQ'D		BLK	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
2	EA	KICK PLATE	8400 8" X 1" LDW B-CS		BLK	IVE
2	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
2	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	SET	MEETING STILE	328AA-S		AA	ZER
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	CREDENTIAL READER	(BY DIV 28)	✓	BLK	SCE
2	EA	DOOR POSITION SWITCH-DPDT	GRI 19512W (BY DIV 28)	✓	WHT	GEN
1	EA	POWER SUPPLY	(BY DIV 28)	✓	LGR	SCE

DOORS NORMALLY CLOSED AND LOCKED
ACCESS BY VALID CREDENTIAL OR KEY OVERRIDE
FREE EGRESS AT ALL TIMES
DOORS REMAIN LOCKED WITH LOSS OF POWER OR ACTIVATION OF FIRE ALARM (FAIL SECURE)
DOOR MONITORED

Hardware Group No. 07-ALT4

For use on Door #(s):
608

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	CLASSROOM LOCK	ML2055 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	OH STOP	100S		630	GLY
1	EA	CLOSER, SURFACE	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 08-ALT4

For use on Door #(s):
428S

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	STOREROOM LOCK	ML2057 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 08A-ALT4

For use on Door #(s):

209C	218J	227D	430A	433	531A
534A	610	624			

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	CONST LATCHING BOLT	FB51P/FB61P AS REQ'D		630	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	STOREROOM LOCK	ML2057 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	COORDINATOR	COR X FL		628	IVE
2	EA	MOUNTING BRACKET	MB1/MB2 AS REQ'D		BLK	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH		689	LCN
2	EA	KICK PLATE	8400 8" X 1" LDW B-CS		BLK	IVE
2	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
2	EA	SILENCER	SR64		GRY	IVE

Hardware Group No. 08B-ALT4

For use on Door #(s):

213A	215A	227A	429B	433A	434A
534B	535A	600C	613		

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	STOREROOM LOCK	ML2057 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 08C-ALT4

For use on Door #(s):
216 218L 526B

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	STOREROOM LOCK	ML2057 NSA CT6		626	C-R
1	EA	PERMANENT CORE	PER FACILITY KEY SYSTEM		626	C-R
1	EA	SURFACE CLOSER	4040XP EDA		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 10-ALT4

For use on Door #(s):
428

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	PASSAGE SET	ML2010 NSA		626	C-R
1	EA	CLOSER, SURFACE	4040XP REG		689	LCN
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER

Hardware Group No. 10A-ALT4

For use on Door #(s):
427C

Each to Have:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 SIZE/WEIGHT AS SPECIFIED		652	IVE
1	EA	PASSAGE SET	ML2010 NSA		626	C-R
1	EA	KICK PLATE	8400 8" X 2" LDW B-CS		BLK	IVE
1	EA	STOP AS REQUIRED	WS406/407CCV OR FS439		630	IVE
3	EA	SILENCER	SR64		GRY	IVE

END OF SECTION

SECTION 087100.02 - DOOR HARDWARE - ENVELOPE

PART 1 - GENERAL

1.1 SUMMARY

A. This section specifies requirements for the following Scope of Work:
   1. Provide door hardware at the two (2) new access door locations.

1.2 SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product in each finish specified.

C. Door hardware schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance and door hardware, as well as procedures and diagrams. Coordinate final entrance and door hardware schedule with doors, frames and related work to ensure proper size, thickness, hand, function and finish of entrance door hardware.

D. Sample Warranties.

E. Maintenance Data.

F. Sample warranties.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Architect, and Owner about door hardware and keying.
   1. Scheduling Responsibility: Preparation of door hardware and keying schedule.

B. Means of Egress Doors: Latches do not require more than 15 lnf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

1.4 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Three (3) years from date of Substantial Completion unless otherwise indicated below:
      a. Exit Devices: Two (2) years from date of Substantial Completion.
      b. Manual Closers: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide products for each door that comply with requirements indicated in Part 2 and Part 3 Door Hardware Schedule.

2.2 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

2.3 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule in Part 3.

B. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

C. Mortise Lock: BHMA A156.2. See hardware schedule in Part 3.

2.4 LOCK CYLINDERS

A. Lock Cylinders: As indicated in door hardware schedule in Part 3.

2.5 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock.
   1. Master Key System: Change keys and a master key operate cylinders.
   2. Existing System:
      a. Master Key locks to Owner’s system.
   3. Keyed Alike: Key all cylinders to same change keys.

B. Keys: Nickel silver.
   1. Quantity: Provide one extra key blank for each lock.

2.6 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; as indicated in door hardware schedule in Part 3.

2.7 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

2.8 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved. Coordinate installation with electrical security mechanisms provided by others.

B. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

C. Lock Cylinders: Install cores per manufacturer’s instructions.

D. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

3.2 ADJUSTING

A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.3 DOOR HARDWARE SCHEDULE

A. Third Floor Roof (Library)

Qty	Manufacturer	Part Number	Description	Finish
1	Corbin Russwin	ML2057-NSA-626-LH	Storeroom Function Lockset – NSA Trim – Left Handed	626
1	Corbin Russwin	1070-114-A02-626	I-Core Housing	626
1	Corbin Russwin	8000-N6-626	I-Core Cylinder – N6 Keyway	626
1	LCN	4040XP RW/PA ALUM TBWMS	Door Closer- Push Side Mount	Aluminum

3	Hager	BB1279 4-1/2 x 4-1/2	Hinges (Assumes 3 per door)	626

B. Sixth Floor Roof (Tower)

Qty	**Manufacturer**	**Part Number**	**Description**	**Finish**
1	Corbin Russwin	ML2057-NSA-626-RH	Storeroom Function Lockset – NSA Trim – Right Handed	626
1	Corbin Russwin	1070-114-A02-626	I-Core Housing	626
1	Corbin Russwin	8000-N6-626	I-Core Cylinder – N6 Keyway	626
1	LCN	4040XP RW/PA ALUM TBWMS	Door Closer- Push Side Mount	Aluminum
3	Hager	BB1279 4-1/2 x 4-1/2	Hinges (Assumes 3 per door)	626

END OF SECTION 087100.02

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Glass for windows, doors, interior borrowed lites, storefront framing.
2. Glazing sealants and accessories.

B. Related Requirements:

1. Section 078700.01 "Smoke Containment Barriers (Smoke Baffles) for glazing as part of a smoke containment barrier system.
2. Section 081113 "Hollow Metal Doors and Fames" for hollow metal doors and frames to receive glazing specified in this Section.
3. Section 081416 "Flush Wood Doors" for flush wood doors to receive glazing specified in this Section.
4. Section 084113 "Aluminum Framed Entrances and Storefronts" for storefront systems to receive glazing specified in this Section.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD):

a. Submit product data or other published information verifying that this product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
b. Include information on Building Product Disclosure and Optimization Calculator.

2. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

3. Material Ingredients - Material Ingredient Reporting:

a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.
b. Include information on Building Product Disclosure and Optimization Calculator.

4. Low-Emitting Materials - Adhesives and Sealants:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOCs after 14 days.

C. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

D. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch lengths.

E. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

F. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Preconstruction adhesion and compatibility test report.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Install glazing in mockups specified in Section 084113 "Aluminum-Framed Entrances and Storefronts" to match glazing systems required for Project, including glazing methods.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Compatibility: All glazing system materials shall be proven aesthetically and functionally compatible over the anticipated exposure conditions and design service life of the glazing.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

C. Do not use capillary tubes with the insulating glass units unless necessary to accommodate altitude changes encountered prior to arrival on-site. Immediately upon equalization of the internal pressure of the units to the on-site atmospheric pressure, seal the capillary tubes per the written instructions of the insulating glass manufacturer, in order to achieve durable hermetic seals.

1. Breather tubes that are larger in diameter than capillary tubes are not permitted.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.11 WARRANTY

A. Glazing Fabricator's Special Warranty for Coated-Glass Products: Glazing fabricator agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Glazing Fabricator's Special Warranty for Insulating Glass: Glazing fabricator agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Glass Product: Subject to compliance with requirements, provide product indicated in glass schedule at the end of this Section, or comparable product by one of the following:

1. Guardian Industries Corp.
2. Oldcastle BuildingEnvelope.
3. Viracon, Inc.

4. Vitro S.A.B. de C.V. (formerly PPG).

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

1. Obtain tinted glass from single source from single manufacturer.
2. Obtain reflective-coated glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300. Glazing requiring structural evaluation beyond the scope of the graphical analysis procedure ("Basic Procedure") within ASTM E 1300 shall be properly evaluated through finite element analyses per IBC Chapter 24 "Glass and Glazing" as performed by a registered design professional. Implement edge captures with sufficient engagement to ensure that the glazing remains retained under all design service conditions and with a margin of safety.

1. Design Wind Pressures: As indicated on Drawings.
2. Design Snow Loads: As indicated on Drawings.
3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
4. Thermal Stress Management: Heat-treat glazing where indicated, and where necessary to prevent breakage associated with differential thermal exposure. Use heat treatment for heat-strengthening rather than tempering, except where tempering is already indicated.

D. Safety Glazing: Where safety glazing is required, provide glazing that complies with 16 CFR 1201, Category II.

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBNL's WINDOW computer program, expressed as Btu/sq. ft. x h x deg F.
4. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBNL's WINDOW computer program.
5. Visible Reflectance: Center-of-glazing values, according to NFRC 300 and based on LBNL's WINDOW computer program.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Glazing Manual."
2. IGMA Publication: "IGMA Technical Binder."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

F. Environmental Product Declarations (EPDs): Materials/products in this Section have an EPD to meet the requirements for LEED.

G. Recycled Content: Building materials in this Section must have post- and/or pre-consumer recycled content by weight of total product.

H. Material Ingredient Reporting: Materials/products in this section have material ingredient reporting to meet the requirements for LEED.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Acid-Etched (Translucent) Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

1. Provide tempered glass where required by code.

C. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

D. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Spacer: Manufacturer's standard warm-edge spacer material and construction.

a. Color: Black.

3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

C. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 50, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 995.

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore A Durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications. Maintain consistency with applicable guidance published by the National Glass Association (NGA).

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Where temporary construction films are necessary to protect the glazing, the films shall be transparent and colorless in order to limit the potential for induced thermal stress breakage of the glass.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 MONOLITHIC GLASS SCHEDULE

A. GLASS TYPE GL-MA: Clear, annealed float glass.

1. Minimum Thickness: 6.0 mm.

B. GLASS TYPE GL-MB: Clear, heat-strengthened float glass.

1. Minimum Thickness: 6.0 mm.

C. GLASS TYPE GL-MC (T): Clear, fully tempered float glass.

1. Minimum thickness: 6.0 mm.
2. Provide safety glazing labeling.

3.9 INSULATING GLASS SCHEDULE

A. Glass Type GL-1A: VISION GLASS (Clear Insulated Glazing), Low-E-coated, clear insulating glass.

1. Basis-of-Design Product: Guardian SunGuard SN54, Clear.
2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 1/4 inch (6 mm).
4. Outdoor Lite: Clear HS (heat-strengthened) float glass, except provide FT (fully tempered) where required by code for safety glazing.
5. Tint Color: None.
6. Interspace Content: Air.
7. Indoor Lite: Clear annealed float glass, except provide FT (fully tempered) where required by code for safety glazing.
8. Low-E Coating: Sputtered on second surface.
9. Winter Nighttime U-Factor: 0.29 maximum.
10. Summer Daytime U-Factor: 0.27 maximum.
11. Visible Light Transmittance: 54 percent, minimum.
12. Solar Heat Gain Coefficient: 0.28 maximum.

B. Glass Type GL-1B: ACID-ETCHED TRANSLUCENT GLASS (Translucent Insulated Glazing), Low-E-coated, clear, acid-etched insulating glass.

1. Basis-of-Design Product: Guardian SunGuard SN54, Clear.
2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 1/4 inch (6 mm).
4. Outdoor Lite: Tinted HS (heat-strengthened) float glass, except provide FT (fully tempered) where required by code for safety glazing.
5. Tint Color: None.
6. Interspace Content: Air.
7. Indoor Lite: Clear annealed float glass, except provide FT (fully tempered) where required by code for safety glazing.
8. Etched Glass: Acid-etched on third surface, Match Viracon V1085 Simulated Acid-Etch Silk-Screeen #3058, 100 percent coverage.
    a. Guardian SatinDeco is not acceptable.
9. Low-E Coating: Sputtered on second surface.
10. Winter Nighttime U-Factor: 0.29 maximum.
11. Summer Daytime U-Factor: 0.27 maximum.
12. Visible Light Transmittance: 38 percent, minimum.
13. Solar Heat Gain Coefficient: 0.23 maximum.

END OF SECTION 088000

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SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing systems.
2. Suspension systems.
3. Grid suspension systems.
4. Kneewall connector.

B. Related Requirements:

1. Section 054000 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; and roof rafters and ceiling joists.
2. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking installed in non-structural metal framing.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Framing systems.
2. Suspension systems.
3. Grid suspension systems.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".
2. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".
3. Recycled Content: Provide manufacturer documentation for recycled content, indicating postconsumer and preconsumer recycled content.

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

B. Evaluation Reports: For high-strength steel studs and tracks. firestop tracks, post-installed anchors, and power-actuated fasteners, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Notify manufacturer of damaged materials received prior to installation.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, in accordance with ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

C. Horizontal Deflection: For composite and non-composite wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft., except as noted.

1. Provide deflection limit of 1/360 for walls finished with ceramic tiling

D. Design framing systems in accordance with AISI S220, "North American Specification for the Design of Cold-Formed Steel Framing - Nonstructural Members," unless otherwise indicated.

2.2 FRAMING SYSTEMS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Framing Members, General: Comply with AISI S220 for conditions indicated.

1. Steel Sheet Components: Comply with AISI S220 requirements for metal unless otherwise indicated
2. Protective Coating: Comply with AISI S220; ASTM A653/A653M, G40; or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.

a. Coating demonstrates equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction.

C. Studs and Track: AISI S220.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CEMCO; California Expanded Metal Products Co.
b. ClarkDietrich.
c. Custom Stud.
d. Jaimes Industries.
e. Marino\\WARE.
f. MBA Building Supplies.
g. MRI Steel Framing, LLC.
h. Phillips Manufacturing Co.
i. SCAFCO Steel Stud Company.
j. Steel Construction Systems.
k. Steel Network, Inc. (The).
l. Telling Industries.

2. Minimum Base-Steel Thickness: As required by performance requirements for horizontal deflection, except as noted.

a. Provide not less than 20 ga. studs behind surfaces indicated to have ceramic tiling or wall-hung cabinets.

3. Depth: As indicated on Drawings.

D. High-Strength Steel Studs and Tracks: Roll-formed with surface deformations to stiffen the framing members.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CEMCO; California Expanded Metal Products Co.
b. ClarkDietrich.
c. Marino\\WARE.
d. MBA Building Supplies.
e. Phillips Manufacturing Co.
f. SCAFCO Steel Stud Company.
g. Steel Construction Systems.
h. Steel Network, Inc. (The).
i. Telling Industries.

2. Minimum Base-Steel Thickness: As required by performance requirements for horizontal deflection, except as noted.

a. Provide not less than 20 ga. studs behind surfaces indicated to have ceramic tiling or wall-hung cabinets.

3. Depth: As indicated on Drawings.

E. Slip-Type Head Joints: Where indicated, provide the following:

1. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) CEMCO; California Expanded Metal Products Co.
2) ClarkDietrich.
3) Marino\\WARE.
4) MBA Building Supplies.
5) Metal-Lite.
6) SCAFCO Steel Stud Company.
7) Steel Construction Systems.
8) Telling Industries.

F. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CEMCO; California Expanded Metal Products Co.
b. ClarkDietrich.
c. Fire Trak Corp.
d. Marino\\WARE.
e. Metal-Lite.
f. SCAFCO Steel Stud Company.
g. Steel Construction Systems.
h. Steel Network, Inc. (The).

G. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ClarkDietrich.
b. Marino\\WARE.
c. MBA Building Supplies.
d. MRI Steel Framing, LLC.
e. SCAFCO Steel Stud Company.
f. Steel Construction Systems.
g. Steel Network, Inc. (The).

2. Backing Plate Requirements: Provide requirements as indicated on Drawings, but not less than 0.0478 inch (18 gauge) thickenss, 6-inch width, and extended to nearest stud past cabinet or equipment on both sides. Secure backing to stud with three (3) #10 SMS per stud, typical.

H. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch- wide flanges.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ClarkDietrich.
b. Marino\\WARE.
c. MBA Building Supplies.
d. MRI Steel Framing, LLC.
e. SCAFCO Steel Stud Company.
f. Steel Construction Systems.

2. Depth: As indicated on Drawings.
3. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

I. Hat-Shaped, Rigid Furring Channels:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ClarkDietrich.
b. Jaimes Industries.
c. Marino\\WARE.
d. MBA Building Supplies.
e. MRI Steel Framing, LLC.
f. SCAFCO Steel Stud Company.
g. Steel Construction Systems.

2. Minimum Base-Steel Thickness: As indicated on Drawings.
3. Depth: As indicated on Drawings.

J. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ClarkDietrich.
b. Marino\\WARE.
c. MBA Building Supplies.
d. MRI Steel Framing, LLC.
e. SCAFCO Steel Stud Company.
f. Steel Construction Systems.

2. Configuration: As indicated on Drawings.

K. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges.

1. Depth: As indicated on Drawings.
2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

2.3 KNEEWALL CONNECTOR

A. Description: Rigid connector to resist overturning moment at the base of interior partial-height walls.

B. Basis-of-Design: Subject to compliance with requirements, provide Simpson RCKW Kneewall Connector for Cold-Formed Steel Construction or comparable product from another manufacutrer.

1. Material: RCKW and RCKWS, 171 mil (7 ga), 33 ksi.
2. Coating: Galvanized (G90).
3. Fasteners: Manufacturer's recommended screw fasteners and fastening pattern.

2.4 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

B. Hanger Attachments to Concrete:

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 AC193 AC58 AC308 as appropriate for the substrate.

a. Uses: Securing hangers to structure.
b. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
c. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Flat Hangers: Steel sheet, in size indicated on Drawings.

E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.

1. Depth: As indicated on Drawings.

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
2. Steel Studs and Tracks:

a. Depth: As indicated on Drawings.

3. High-Strength Steel Studs and Tracks:

a. Depth: As indicated on Drawings.

4. Hat-Shaped, Rigid Furring Channels: 7/8 inch deep.

a. Minimum Base-Steel Thickness: As indicated on Drawings.

5. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.

a. Configuration: As indicated on Drawings.

2.5 GRID SUSPENSION SYSTEMS

A. Grid Suspension Systems for Gypsum Board Ceilings: ASTM C645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Armstrong Ceiling & Wall Solutions.
b. Certainteed; SAINT-GOBAIN.
c. Rockfon; ROCKWOOL International.
d. USG Corporation.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLATION OF FRAMING SYSTEMS

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
2. Multilayer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
3. Tile Backing Panels: As required by horizontal deflection performance requirements unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
    c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:

    a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
    b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLATION OF SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches o.c.
2. Carrying Channels (Main Runners): 48 inches o.c.
3. Furring Channels (Furring Members): 24 inches o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

3.6 INSTALLATION OF GRID SUSPENSION SYSTEMS

A. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.7 FIELD QUALITY CONTROL

A. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

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SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.
3. Sound-attenuation blankets.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for rated firestopping in gypsum board walls.
2. Section 079219 "Acoustical Joint Sealants" for acoustical sealants in gypsum board walls.
3. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include product data indicating compliance with UL Assemblies indicated on Drawings.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD) :

a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
b. Include information on Building Product Disclosure and Optimization Calculator.

2. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

3. Location Valuation Factor :

    a. Submit product data or other published information verifying the location of manufacturing facility including name, address, and distance between manufacturing facility and the project site. Provide manufacturer's documentation indicating location where the base materials were extracted, mined, quarried, harvested, etc. and the distance between this location and the project site. Also include material cost (excluding costs of installation).
    b. Include information on Building Product Disclosure and Optimization Calculator.

4. Material Ingredients - Material Ingredient Reporting:

    a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.
    b. Include information on Building Product Disclosure and Optimization Calculator.

5. Low-Emitting Materials - Adhesives and Sealants:

    a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
    b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

6. Low-Emitting Materials - Ceiling and Wall Materials:

    a. Submit product data or other published information verifying compliance with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Build mockups for the following:

    a. Each level of gypsum board finish indicated for use in exposed locations.
    b. Each texture finish indicated.
    c. Trim accessories with architectural intersections.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.

3. Simulate finished lighting conditions for review of mockups.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.

B. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

C. Local Valuation Factor: Provide materials/products that are extracted, harvested, or recovered, and manufactured and assembled within one-hundred (100) miles of the Project site.

D. Material Ingredient Reporting: Provide materials/products with material ingredient reporting that meets the requirements for LEED.

E. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Wallboard: ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. American Gypsum.
    b. CertainTeed Corporation.
    c. Georgia-Pacific Building Products.
    d. National Gypsum Company.
    e. PABCO Gypsum.
    f. USG.

2. Thickness: As indicated on Drawings.
3. Long Edges: Tapered.

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. American Gypsum.
    b. CertainTeed Corporation.
    c. Georgia-Pacific Building Products.
    d. National Gypsum Company.
    e. PABCO Gypsum.
    f. USG.

2. Thickness: 5/8 inch.
3. Long Edges: Tapered.

C. Abuse-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. American Gypsum.
    b. CertainTeed Corporation.
    c. Georgia-Pacific Building Products.
    d. National Gypsum Company.
    e. PABCO Gypsum.

f. USG.

2. Core: 5/8 inch, Type X.
3. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
4. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
5. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 2 requirements.
6. Long Edges: Tapered.

D. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Gypsum.
b. CertainTeed Corporation.
c. Georgia-Pacific Building Products.
d. National Gypsum Company.
e. PABCO Gypsum.
f. USG.

2. Core: 5/8 inch, Type X.
3. Long Edges: Tapered.
4. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. CertainTeed Corporation.
b. Georgia-Pacific Building Products.
c. National Gypsum Company.

2. Core: 5/8 inch, Type X.

B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. C-Cure.
b. Custom Building Products.
c. FinPan, Inc.
d. James Hardie Building Products, Inc.
e. National Gypsum Company.

f. United States Gypsum Company.

2. Thickness: 5/8 inch.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
2. Shapes:

a. Cornerbead.
b. Curved-Edge Cornerbead: With notched or flexible flanges.
c. LC-Bead: J-shaped; exposed long flange receives joint compound.
d. L-Bead: L-shaped; exposed long flange receives joint compound.
e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
f. Expansion (control) joint beads.

1) Architectural intersections.

a) Where vertical and horizontal expansion (control) joints intersect, provide manufacturer's fabricated architectural intersection bead to match expansion (control) joint bead profile.

g. Shadow and reveal beads.

1) Architectural intersections.

a) Where vertical and horizontal expansion (control) joints intersect, provide manufacturer's fabricated architectural intersection bead to match shadow and reveal bead profile.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Fry Reglet Corporation.
b. Gordon, Inc.
c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221 , Alloy 6063-T5.
3. Finish: As indicated on Drawings.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

    a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Adhesives shall have a VOC content of 50 g/L or less.

2. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
2. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: All surfaces except as otherwise indicated.
2. Type X: Where required for fire-resistance-rated assembly. Type X is also permitted in lieu of Wallboard Type.
3. Abuse-Resistant Type: As indicated on Drawings.
4. Mold-Resistant Type: On non-tile surfaces in restrooms, and in locker rooms without showers.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) or horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers .

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch- long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions. Install with 1/4-inch gap where panels abut other construction or penetrations.

1. Install glass-mat backing panels in the following locations:

a. Tile walls in restrooms and locker rooms, except at showers.

B. Cementitious Backer Units: ANSI A108.11.

1. Install cementitious backer units in the following locations:

a. All showers and other wet locations where indicated on Drawings.

C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. Curved-Edge Cornerbead: Use at curved openings.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use where indicated.
6. Shadow and Reveal Beads: Use where indicated.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 3: Where indicated on Drawings.
4. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

5. Level 5: Where indicated on Drawings .

E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

F. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Porcelain floor tile.
2. Glazed wall tile.
3. Waterproof membrane for thinset applications.
4. Crack isolation membrane.
5. Metal edge strips.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 092900 "Gypsum Board" for cementitious backer units and glass-mat, water-resistant backer board.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

E. Large and Heavy Tiles (LHT): Tiles with at least one side greater than 15 inches and/or weighing over 5 pounds per square foot.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD) :

a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
b. Include information on Building Product Disclosure and Optimization Calculator.

2. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

3. Material Ingredients - Material Ingredient Reporting:

a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.
b. Include information on Building Product Disclosure and Optimization Calculator.

4. Low-Emitting Materials - Adhesives and Sealants:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

5. Low-Emitting Materials - Paints and Coatings:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standards.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

D. Samples for Initial Selection: For tile, grout, and accessories involving color selection.

E. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of trim and accessory for each color and finish required.
3. Metal edge strips in 6-inch lengths.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer is a five-star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.
2. Installer employs at least one installer for Project that has completed the Advanced Certification for Tile Installers (ACT) certification for installation of membranes, large heavy tile (LHT), and shower receptors.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of floor tile installation.
2. Build mockup of each type of wall tile installation.

3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Waterproof membrane.
2. Crack isolation membrane.
3. Metal edge strips.

2.2 PRODUCTS, GENERAL

A. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

B. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

C. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

D. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.3 TILE PRODUCTS

A. Ceramic Tile Type: Unglazed porcelain floor tile.

1. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or approved substitution from one of the following:

a. American Marazzi Tile, Inc.
b. American Olean; a division of Dal-Tile Corporation.
c. Bedrosians Tile and Stone.
d. Capco Tile and Stone.
e. Concept Surfaces, LLC.
f. Daltile.
g. Emser Tile.
h. Interceramic.
i. Pental Surfaces.
j. Spec Ceramics.

2. Certification: Tile certified by the Porcelain Tile Certification Agency.
3. Face Size: As indicated on Drawings.
4. Thickness: As indicated on Drawings.
5. Face: As indicated on Drawings.

6. Dynamic Coefficient of Friction: Not less than 0.42 as measured per the DCOF AcuTest contained in ANSI A137.1-2012, Section 9.6.
7. Tile Color, Glaze, and Pattern: As indicated on Drawings.
8. Grout Color: As indicated on Drawings.
9. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. As indicated on Drawings.

B. Ceramic Tile Type: Glazed wall tile.

1. Manufacturers: Subject to compliance with requirements, provide product indicated on Drawings or approved substitution from one of the following:

    a. American Marazzi Tile, Inc.
    b. American Olean; a division of Dal-Tile Corporation.
    c. Bedrosians Tile and Stone.
    d. Capco Tile and Stone.
    e. Concept Surfaces, LLC.
    f. Crossville, Inc.
    g. Daltile.
    h. Emser Tile.
    i. Pental Surfaces.
    j. Spec Ceramics.

2. Module Size: As indicated on Drawings.
3. Thickness: As indicated on Drawings.
4. Finish: As indicated on Drawings glaze.
5. Tile Color and Pattern: As indicated on Drawings.
6. Grout Color: As indicated on Drawings.
7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes as follows, selected from manufacturer's standard shapes:

    a. As indicated on Drawings.

2.4 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. ARDEX GmbH; Ardex S 1-K One-Component Waterproofing Compound.
    b. Custom Building Products; RedGard Waterproofing and Crack Prevention Membrane.
    c. Laticrete International, Inc; Laticrete Hydro Ban.
    d. MAPEI Corporation; Mapelastic AquaDefense.

2. Low-Emitting Paints and Coatings: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1113 OR California Air Resource Board (CARB) 2007-Suggested Control Measures (SCM) for Architectural Coatings, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

2.5 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, modified-bituminous sheet with fabric reinforcement facing; 0.040-inch nominal thickness.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Custom Building Products; Crack Buster Pro-Crack Prevention Mat Underlayment.
b. Laticrete International, Inc.; Latricrete Fracture Ban.
c. MAPEI Corporation; Mapeguard 2Mapesonic 2.

C. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Custom Building Products; RedGard Waterproofing and Crack Prevention Membrane.
b. Laticrete International, Inc; Latricete Hydro Ban.
c. MAPEI Corporation; Mapelastic AquaDefense.

2. Low-Emitting Paints and Coatings: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1113 OR California Air Resource Board (CARB) 2007-Suggested Control Measures (SCM) for Architectural Coatings, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

2.6 SETTING MATERIALS

A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.

1. Cleavage Membrane: Asphalt felt, ASTM D 226/D 226M, Type I (No. 15); or polyethylene sheeting, ASTM D 4397, 4.0 mils thick.
2. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A 185/A 185M and ASTM A 82/A 82M, except for minimum wire size.

3. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

B. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Custom Building Products; VersaBond Flex Professional Thin-Set Mortar.
b. Laticrete International, Inc.; Laticrete 253 Gold.
c. MAPEI Corporation; MAPEI Porcelain Tile Mortar.

2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

C. LHT (formerly medium-bed) Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15; Provide product that is approved by manufacturer for application thickness of up to 3/4 inch.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Custom Building Products; ProLite Premium Large Format Tile Mortar.
b. Laticrete International, Inc; Laticrete 4 XLT.
c. MAPEI Corporation; MAPEI ULtraflex LFT.

2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.15.

2.7 GROUT MATERIALS

A. High-Performance Tile Grout: ANSI A118.7.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Custom Building Products; Prism Color Consistent Grout.
b. Laticrete International, Inc; Laticrete PERMACOLOR Select.
c. MAPEI Corporation; MAPEI Ultracolor Plus.

B. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content of 65 g/L or less.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ARDEX WA.
b. Custom Building Products; CEG-Lite 100% Solids Commercial Epoxy Grout.
c. Laticrete International, Inc; Laticrete SPECTRALOCKPRO Premium Epoxy Grout.
d. MAPEI Corporation; MAPEI Kerapoxy Epoxy Grout.

2. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; Finish as indicated on drawings, exposed-edge material.

1. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated on Drawings or comparable products by one of the following:

a. Blanke Corporation.
b. Profilitec.
c. Schluter Systems L.P.

2. For bevel face tiles, provide metal edge strip height to match cut edge thickness.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Custom Building Products; Aqua Mix Concentrated Stone & Tile Cleaner.

D. Floor Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Custom Building Products; Aqua Mix Sealer's Choice Gold.

2. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

E. Grout Release: Manufacturer's high-performance sacrificial coating that protects tile surfaces from grout stains, improves cleanability, and reduces the risk of grout haze or film residue.

1. Products: Subject to compliance with requirements, provide Mapei UltraCare Grout Release, or comparable product by one of the following:

a. Custom Building Products.
b. Laticrete International.
c. Mapei Corporation.

2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:

    a. Exterior tile floors.
    b. Tile floors in wet areas.
    c. Tile swimming pool decks.
    d. Tile floors in laundries.
    e. Tile floors consisting of tiles 8 by 8 inches or larger.
    f. Tile floors consisting of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Glazed Wall Tile: 1/8 inch minimum.
2. Porcelain Floor Tile:1/8 inch minimum.
3. Perimeter Movement Joints (Sealant): Not less than 1/4 inch.
4. Movement Joints at Change-of-Plane (Sealant): Same as grout joint but not less than 1/8 inch.

H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

I. Perimeter Movement Joints: Provide perimeter movement joints as described in TCNA EJ171 including as follows:

1. Where tilework abuts restraining surfaces such as perimeter walls, dissimilar floor finishes, curbs, columns, pipes, ceilings and where changes occur in backing materials, but not at drain strainers.
2. Inside corners in interior and exterior tilework.
3. Outside corners at exterior tilework only.

J. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

K. Metal Edge Strips: Install where indicated on Drawings.

L. Sealer: Apply sealer to cementitious grout joints in tile according to sealer manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.5 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.6 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.7 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.8 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation: TCNA F113 and TCNA F113A; thinset mortar.

a. Ceramic Tile Type: Large and Heavy Tile (LHT) on floors.
b. Thinset Mortar: Medium-bed, Improved modified dry-set mortar.
c. Grout: Water-cleanable epoxy grout.

1) At epoxy grout, use grout release to protect tile.

d. Locations: At typical large and heavy tile (LHT) floor locations, except as specified otherwise.

2. Ceramic Tile Installation: TCNA F122 and 122A; thinset mortar on waterproof membrane.

a. Ceramic Tile Type: Ceramic floor tile, unglazed, with waterproof membrane.
b. Thinset Mortar: Improved modified dry-set mortar.
c. Grout: Water-cleanable epoxy grout.

1) At epoxy grout, use grout release to protect tile.

d. Locations: At floor tile in public toilets.

3. Ceramic Tile Installation: TCNA F125-Partial; thinset mortar on crack isolation membrane.

a. Ceramic Tile Type: Ceramic floor tile.
b. Thinset Mortar: As specified in other installations.
c. Grout: As specified in other installations.
d. Crack Isolation Membrane: as specified.
e. Locations: Install under floor tile at cracks and control joints in concrete slab.

B. Interior Wall Installations, Wood or Metal Studs or Furring:

1. Ceramic Tile Installation: TCNA W231/W241 and ANSI A108.1C; cement mortar bed (thickset).

a. Ceramic Tile Type: Large and Heavy Tile (LHT).
b. Bond Coat for Wet-Set Method: Improved modified dry-set mortar.
c. Bond Coat for Cured-Bed Method: Improved modified dry-set mortar.
d. Grout: Water-based epoxy grout.

1) At epoxy grout, use grout release to protect tile.

e. Locations: At Large and Heavy Tile (LHT) wall locations unless specified otherwise.

2. Ceramic Tile Installation: TCNA W245 or TCNA W248; thinset mortar on glass-mat, water-resistant gypsum backer board.

a. Ceramic Tile Type: Ceramic wall tile.
b. Thinset Mortar: Improved modified dry-set mortar.
c. Grout: Water-cleanable epoxy grout.

1) At epoxy grout, provide grout release to protect tile.

d. Locations: Tile walls in toilet rooms.

END OF SECTION 093013

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SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Acoustical panels and exposed suspension systems for interior ceilings.

B. Related Requirements:

1. Section 095400.01 "Seamless Acoustical Ceiling and Wall System" for seamless acoustical ceilings.
2. Section 098436 "Sound-Absorbing Ceiling Units" for sound-absorbing/sound-reflecting ceilings.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD):

a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
b. Include information on Building Product Disclosure and Optimization Calculator.

2. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

3. Material Ingredients - Material Ingredient Reporting:

a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.
b. Include information on Building Product Disclosure and Optimization Calculator.

4. Low-Emitting Materials - Adhesives and Sealants:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer¢¢s claims of compliance must also state the range of total VOC content after 14 days.

5. Low-Emitting Materials - Ceiling Materials:

a. Submit product data or other published information verifying compliance with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer¢¢s claims of compliance must also state the range of total VOC content after 14 days.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 1 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.

B. Material Ingredient Reporting: Provide materials/products with material ingredient reporting that meets the requirements for LEED.

C. Low-Emitting Ceiling Materials: Provide materials/products, installed within the weatherproofing system, that comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

D. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A C according to ASTM E 1264.
2. Smoke-Developed Index: 50 or less.

E. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL or from the listings of another qualified testing agency.

F. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273, ASTM D 3274, or ASTM G 21 and evaluated according to ASTM D 3274 or ASTM G 21.

2.3 ACOUSTICAL PANELS

A. Basis-of-Design Product(s): Subject to compliance with requirements, provide product(s) indicated on Drawings or comparable product(s) by one of the following:

1. Armstrong World Industries, Inc.

a. Contact Kelly Hedlund, kshedlund@armstrongceilings.com.

2. CertainTeed Corporation.
3. Chicago Metallic Corporation.
4. Rockfon, part of the Rockwool Group.
5. United States Gypsum Company.

B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

D. Acoustical Panel: ACP-1

1. Basis-of-Design: Armstrong Ultima, #2080.
2. Classification:

a. Type and Form: Type IV, mineral base with membrane-faced overlay; Form 2, water felted.
b. Pattern: E (lightly textured).

3. Color: White.
4. Light Reflectance (LR): Not less than 0.85.
5. Ceiling Attenuation Class (CAC): Not less than 35.
6. Noise Reduction Coefficient (NRC): Not less than 0.85.
7. Articulation Class (AC): 170.
8. Edge/Joint Detail: Square, Lay-in.
9. Thickness: 15/16 inch.
10. Modular Size: 24 inch x 24 inch.

11. Grid: USG Donn Brand DX/DXL 15/16 inch, color: White.

E. .Acoustical Panel:ACP-2

1. Basis-of-Design: Armstrong Calla #2820.
2. Classification:

    a. Type and Form:Type IV, mineral base with membrane-faced overlay, Form 2.
    b. Pattern: E (lightly textured).

3. Light Reflectance (LR): Not less than 0.86.
4. Ceiling Attenuation Class (CAC): Not less than 35.
5. Noise Reduction Coefficient (NRC): Not less than 0.85.
6. Articulation Class (AC): 170.
7. Edge/Joint Detail: Square, Lay-in.
8. Thickness: 1 inch.
9. Modular Size: 24 inch x 24 inch.
10. Grid: USG Donn Brand DX/DXL 15/16 inch, color: White.

2.4 METAL SUSPENSION SYSTEM

A. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated in this Section or comparable product by one of the following:

1. Armstrong World Industries, Inc.
2. CertainTeed Corporation.
3. Chicago Metallic Corporation.
4. United States Gypsum Company.

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C 635/C 635M.

C. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

D. Wide-Face, Capped, Double-Web, Fire-Rated, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 15/16-inch- wide metal caps on flanges.

1. Structural Classification: Intermediate-duty system.
2. Face Design: Flat, flush.
3. Cap Material: Cold-rolled steel.
4. Cap Finish: Painted.

E. Narrow-Face, Capped, Double-Web, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized, G30 coating designation; with prefinished 9/16-inch- wide metal caps on flanges.

1. Structural Classification: Intermediate-duty system.
2. Face Design: Flat, flush.
3. Cap Material: Cold-rolled steel.
4. Cap Finish: Painted.

F. Wide-Face, Aluminum-Capped, Double-Web, Hot-Dip Galvanized, G60 , Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; hot-dip galvanized, G60 coating designation; with prefinished, 15/16-inch- wide aluminum caps on flanges.

1. Structural Classification: Intermediate-duty system.
2. Face Design: Flat, flush.
3. Cap Finish: Painted white.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch- diameter wire.

2.6 ACOUSTICAL SEALANT

A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

B. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

1. Fire-Rated Assembly: Install fire-rated ceiling systems according to tested fire-rated design.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. Arrange directionally patterned acoustical panels as follows:

    a. As indicated on reflected ceiling plans.

2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

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SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient molding accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD):

a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
b. Include information on Building Product Disclosure and Optimization Calculator.

2. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

3. Material Ingredients - Material Ingredient Reporting:

a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.
b. Include information on Building Product Disclosure and Optimization Calculator.

4. Low-Emitting Materials - Adhesives and Sealants:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

5. Low-Emitting Materials - Flooring:

a. Submit product data or other published information verifying that hard surface flooring meets testing and product requirements of FloorScore.

C. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

D. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 50 linear feet of cove base, and 10 linear feet of each accessory, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

B. Transport resilient moldings in a manner to minimize stretching. Do not carry over-the-shoulder.

1.6 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.

B. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

C. Material Ingredient Reporting: Provide materials/products with material ingredient reporting that meets the requirements for LEED.

2.2 THERMOPLASTIC-RUBBER BASE

A. Manufacturers: Subject to compliance with requirements, provide products indicated on Drawings or comparable product by one of the following:

1. Armstrong World Industries, Inc.
2. Johnsonite; A Tarkett Company.
3. Mannington Commercial.
4. Mondo Rubber International, Inc.
5. Roppe Corporation, USA.

B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).

1. Group: I (solid, homogeneous).
2. Style and Location:

    a. Style B, Cove: Provide where indicated on Drawings.

C. Thickness: 0.125 inch.

D. Height: As indicated on Drawings.

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed or preformed.

G. Inside Corners: Job formed or preformed.

H. Colors: As indicated on Drawings.

2.3 RUBBER MOLDING ACCESSORY

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Johnsonite; A Tarkett Company.
2. Roppe Corporation, USA.
3. VPI, LLC, Floor Products Division.

B. Description: Rubber transition strips.

C. Profile and Dimensions: As indicated on Drawings.

D. Locations: Provide rubber molding accessories in areas indicated on Drawings.

E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less.

2. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.

a. Form without producing discoloration (whitening) at bends.

2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.

a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

1. Begin installation of resilient moldings only after the work of all other trades have been completed.
2. Do not stretch transitional moldings during delivery or installation, to avoid gaps that will need to be reworked under warranty.

a. Maximum allowable gap after 6 months is 1/16 inch.

3. Areas to receive resilient moldings shall be clean, fully enclosed, weathertight, and maintained at uniform temperature of at least 65 degrees for 24 hours before, during, and after the installation is competed. Condition transitional moldings and adhesives in the same manner.
4. Provide a floor surface that is smooth, flat, level, permanently dry, clean, and free of all foreign material such as dust, paint, grease, oils, solvents, curing and hardening compounds, sealers, asphalt, and old adhesive residue.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from exposed surfaces.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Luxury vinyl tile (LVT).

B. Related Requirements:

1. Section 096513 "Resilient Base and Accessories" for rubber floor transitions.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include adhesive and RH level of performance.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD):

a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
b. Include information on Building Product Disclosure and Optimization Calculator.

2. Sourcing of Raw Materials - Recycled Content:

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Building Product Disclosure and Optimization Calculator.

3. Material Ingredients - Material Ingredient Reporting:

a. Submit product data or other published information verifying product uses any of the following programs to demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm): Manufacturer inventory of all ingredients; Health Product Declaration (HPD), Cradle-to-Cradle v2 Basic or v3 Bronze; or other USGBC-approved program, if applicable.
b. Include information on Building Product Disclosure and Optimization Calculator.

4. Low-Emitting Materials - Adhesives and Sealants:

a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

5. Low-Emitting Materials - Flooring:

a. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario, and meets testing and product requirements of FloorScore.

C. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of special patterns.

D. Samples for Verification: Full-size units of each color and pattern of floor tile required.

E. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Testing Results: For alkalinity and adhesion testing, and moisture testing, including anhydrous calcium chloride test and relative humidity test.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box or 2 percent of total material, whichever is greater, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.

C. Recycled Content: Provide materials/products that have post- and/or pre-consumer recycled content, by weight of total product.

D. Material Ingredient Reporting: Provide materials/products with material ingredient reporting that meets the requirements for LEED.

E. Low-Emitting Flooring: Provide hard surface flooring that meets the requirements of the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario, and also meets testing and product requirements of FloorScore.

2.2 LUXURY VINYL FLOOR TILE (LVT)

A. Basis-of-Design Product(s): Subject to compliance with requirements, provide product(s) indicated on Drawings, or approved substitution by one of the following:

1. Amtico International Inc.
2. Armstrong World Industries, Inc.
3. Johnsonite; A Tarkett Company.
4. Mannington.
5. Mohawk Group.

B. Tile Standard: ASTM F 1700.

1. Class: As indicated by product designations.
2. Type: As indicated by product designations.

C. Thickness: As indicated by product designations .

D. Size: As indicated by product designations .

E. Wear Layer: Manufacturer's standard, but not less than 0.020 in (0.50mm) for commercial applications.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation up to 95 percent relative humidity, except as noted.

1. Adhesives shall have a VOC content of 50 g/L or less.

2. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.
3. Provide adhesive for use over high-moisture concrete slabs where required, up to 100 percent relative humidity.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

    a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

1) Where warranted by flooring manufacturer, installation over higher RH levels is permitted.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in pattern indicated on Drawings.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles in pattern of colors and sizes indicated on Drawings.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

1. Include manufacturer's "post-installation maintenance" when indicated.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover floor tile until Substantial Completion.

END OF SECTION

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SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Modular carpet tile.

B. Related Requirements:

1. Section 096513 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:

a. Review delivery, storage, and handling procedures.
b. Review ambient conditions and ventilation procedures.
c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".

2. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content, in accordance with 018113 "Sustainable Design Requirements".
3. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".
4. Product Data: For adhesives, indicating VOC content.
5. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
6. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For carpet tile installation, plans showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.

E. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Moisture Testing Reports: Include PH, Calcium-Chloride, and relative humidity (RH).

B. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.

2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with the Carpet and Rug Institute's CRI 104.

1.10 FIELD CONDITIONS

A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, the following:

a. More than 10 percent edge raveling, snags, and runs.
b. Dimensional instability.

c. Excess static discharge.
d. Loss of tuft-bind strength.
e. Loss of face fiber.
f. Delamination.

3. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 CARPET TILE

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or approved substitution by one of the following:

1. Collins and Aikman Floor Coverings.
2. Interface, LLC.
3. Mannington Mills, Inc.
4. Milliken & Company.
5. Mohawk Group (The); Mohawk Carpet, LLC.
6. Shaw Contract Group; a Berkshire Hathaway company.
7. Tandus; a Tarkett company.

B. Color: As indicated on Drawings.

C. Pattern: As indicated on Drawings.

D. Fiber Content: 100 percent nylon 6, 6.

E. Primary Backing/Backcoating: Manufacturer's standard composite materials .

F. Secondary Backing: Manufacturer's standard material for moisture barrier.

G. Size: As indicated on Drawings.

H. Applied Treatments:

1. Soil-Resistance Treatment: Manufacturer's standard treatment.

a. Carpets coated with PFAS-based stain-resistant treatments are not permitted.

2. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:

a. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.

I. Performance Characteristics:

1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D7330.
2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.
3. Dry Breaking Strength: Not less than 100 lbf according to ASTM D2646.
4. Tuft Bind: Not less than 10 lbf according to ASTM D1335.
5. Delamination: Not less than 3.5 lbf/in. according to ASTM D3936.
6. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.
7. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
8. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
9. Colorfastness to Light: Not less than 4 after 60 AFU (AATCC fading units) according to AATCC 16, Option E.
10. Electrostatic Propensity: Less than 3.5 kV according to AATCC 134.

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

1. Adhesives shall have a VOC content of 50 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

B. Examine carpet tile for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Alkalinity and Adhesion Testing: Perform tests recommended by carpeting manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
2. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

1) Where warranted by flooring manufacturer, installation over higher RH levels is permitted.

c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.

E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer.

C. Maintain dye-lot integrity. Do not mix dye lots in same area.

D. Maintain pile-direction patterns indicated on Drawings.

E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

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SECTION 098453.01 - SOUND BARRIER MULLION TRIM CAP

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes sound barrier mullion trim caps providing sound transmission control at adjacent storefront.

B. Related Requirements:

1. Section 079200 "Joint Sealants" for joint sealing.
2. Section 084113 "Aluminum-Framed Entrances and Storefronts" for adjacent storefront.
3. Section 092216 "Non-Structural Metal Framing" for adjacent stud framing.
4. Section 092116 "Gypsum Board Assemblies" for adjacent wall board.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sound barrier wall end cap system.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements"• .
2. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content, in accordance with 018113 "Sustainable Design Requirements"• .
3. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is required; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements"• .

C. Shop Drawings:

1. Include typical dimensioned cross-section(s) at the location where drywall partition terminates at the perimeter curtain wall, indicating:

a. Dimensions
b. Finish

D. Samples: For each exposed product and for each color and texture specified.

1. Size: 6 inch sound barrier mullion trim cap sample and minimum 2 inch x 3 inch custom color paint sample.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are approved by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver sound barrier mullion trim caps until spaces to receive them are clean, dry, and ready for their installation.

B. Store sound barrier mullion trim caps in original undamaged packaging inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity. Division 01 Section "Product Requirements."

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace sound barrier mullion trim caps that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Ten years limited warranty from date of Substantial Completion.
2. Limited warranty does not cover adjacent products or improper installation.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. General: Provide sound barrier mullion trim caps of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in lengths of sufficient additional length to allow for field trimming to required length to match variations in construction tolerances of adjacent systems.

2.2 PERFORMANCE REQUIREMENTS

A. Sound Transmission:

1. Double-Sided Installations: STC 55 or higher.

B. Fire-Rating: UL/ULC 2079/S115: Provide fire-rated mullion trim cap not less than wall rating indicated on drawings.

1. One-Hour-Rated Assembly: UL WW-S-1039.
2. Two-Hour-Rated Assembly: UL WW-S-1041.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Mullion trim cap to be sized to accommodate thermal movement.

2.3 SOUND BARRIER MULLION TRIM CAP

A. Basis-of-Design: Subject to compliance with requirements, provide Mull-It-Over 55 Mullion Trim Cap, or approved substitution by one of the following:

1. Gordon Incorporated; Mullion Mate Adjustable Partition Closure.
2. Mull-It-Over Products; Mullion Trim Cap.

B. Profile: Gordon Mullion Mate Plus or comparable product.

2.4 COMPONENTS

A. Aluminum Extrusions:

1. Thickness: Manufacturer's standard, but not less than 0.125 inches.
2. Profile: As selected and approved by Architect to allow solid attachment and fastening to the partition wall framing.

B. Sound Absorbing Foam:

1. Resistant to smoke, flame, and microbial growth.
2. Fire Rating: ASTM E 84 Class 1.
3. Fungi Resistance: Zero rating per ASTM G 21.

C. Compressible Foam: Between edge of extrusion and interior face of curtain wall glass.

1. Thickness: Standard 1/2 inch, or 1 inch to accommodate a larger mullion deflection.
2. Color: Manufacturer's standard.

D. Fasteners:

1. Self Tapping or appropriate threaded fastener.
2. Compatible with all materials fasteners will contact with and not causing galvanic corrosion.

E. Snap Cover: Snap-on fastener cover.

F. Acoustical Sound Sealant: Acrylic latex based.

2.5 ACCESSORIES

A. Provide necessary and related parts and tools to complete installation.

2.6 FABRICATION

A. Extrusions and generic profiles to be shipped in custom lengths as required to meet project requirements or shipped in standard incremental foot lengths and cut to exact length on jobsite.

2.7 FINISHES

A. Finish:

1. Color Anodized Finish; A-M10 C22 A41 Class I (0.7 to 1.0 thick anodic coating).

a. Color: Selected by Architect from manufacturer's full range of standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine walls and adjacent curtain wall for suitable conditions where sound barrier wall end cap will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Measure and cut sound barrier wall end cap to proper lengths.

B. Notch around horizontal mullions, sills, or other obstructions leaving appropriate gap for differential movement between the sound barrier wall end cap and the obstruction.

C. Apply continuous bead of acoustical sealant to the unexposed side of extruded aluminum surface that will be in contact with the drywall edge.

D. Place sound barrier wall end cap on the vertical surface of the drywall partition wall and loosely install fasteners in the top and bottom slotted holes of the wall end cap.

E. Plumb the wall end cap leaving recommended gap spacing between the interior glass surface and the wall end cap. Foam gasket to be in contact with glass.

F. Tighten top and bottom fasteners to secure end cap.

G. Install additional fasteners at 12 inches on center, minimum.

H. Install snap cover to conceal fasteners.

I. Apply color matched sealant at joints of dissimilar materials as desired.

3.3 CLEANING

A. After work is complete in adjacent areas, clean exposed surfaces with suitable cleaner that will not harm or attack the finish.

3.4 PROTECTION

A. Protect sound barrier wall end caps from damage during installation, general construction activities, and until turnover of structure.

END OF SECTION 098453.01

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SECTION 099100 – ROOF-RELATED PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for following Scope of Work:

1. Prepare, prime, and paint exterior roof access doors and framing.

1.2 SPECIAL JOB CONDITIONS

A. Coating products shall not contain: asbestos, zinc chromate, strontium chromate, or lead.

B. Color to be selected by Owner.

C. The building may be occupied during construction. Coordinate with the Owner to segregate occupants from the immediate work area(s).

D. Provide all necessary temporary protection and barriers to segregate work area from pedestrian and vehicular traffic and prevent damage to the building and its occupants.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Paints shall be delivered in sealed containers that legibly show designated name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name of manufacturer.

B. Paints and thinner shall be stored in accordance with manufacturer's written directions and as a minimum stored off ground, under cover, with sufficient ventilation to prevent build-up of flammable vapors and at temperatures between 40 and 95 degrees F.

1.4 ENVIRONMENTAL CONDITIONS

A. Unless otherwise recommended by paint manufacturer, ambient temperature shall be between 45 and 95 degrees F when applying coatings.

1.5 SUBMITTALS

A. Manufacturer's Instructions

1. Paint application instructions
2. Paint color charts for Owner's selection of color

3. Material Safety Data Sheets (MSDS)

B. Schedule for Paint application

C. Applicators Qualifications consisting of evidence showing satisfactory application of proposed paint at a minimum of two sites. Give names and contacts at sites.

PART 2 - PRODUCTS

2.1 PAINT, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
3. Paints shall comply with applicable state and local laws enacted to insure compliance with Federal Clean Air Standards and shall conform to restrictions of local air pollution control authority.
4. Paints and primer, shall be lead and chromate free.

2.2 PRIMER AND PAINT

A. Primer for exterior doors and storefront frames Rust-inhibitive industrial acrylic primer, such as Pro Industrial Pro-Cryl Universal Acrylic Primer by Sherwin Williams or approved equal.

B. Paint for exterior surfaces and doors and storefront frames: Alkyd Semi-Gloss Enamel by Sherwin Williams or approved equal.

C. Colors shall be as selected by Owner from manufacturer’s standard colors, as indicated. Color of undercoats shall vary slightly from color of next coat.

2.3 ACCESSORIES

A. Paint application shall be performed by brush or roller only. No spraying shall be permitted unless approved in advance by Owner.

B. Masking tapes, sheets, and sealants shall be compatible with materials they are applied to and shall not leave stains on adjacent surfaces.

2.4 PAINT SCHEDULE

A. Exterior doors and frames:

1. Primer

a. Number of Coats: One, dry film thickness, 1.7 mils

2. Paint

a. Number of Coats: Two, dry film thickness, 1.3 mils per coat.

PART 3 - EXECUTION

3.1 GENERAL

A. Prior to surface preparation and coating applications, remove mask or otherwise protect all adjacent surfaces. Repair or replace items damaged in course of painting to Owner's satisfaction.

B. Before applying succeeding coats, undercoats shall be completely integral and shall perform function for which they are specified. Properly prepare and touch up all scratches, abrasions or other disfigurements and remove any foreign matter before proceeding with following coat. All spot-priming or painting shall be featheredged into adjacent areas to produce smooth monolithic appearance.

C. Post "Wet Paint" signs as required.

3.2 PREPARATION

A. Clean all surfaces to be painted as required to remove dust and dirt. Sand as necessary to properly prepare surfaces to receive primer and paint.

B. Wipe off dust and grit from properly prepared surfaces prior to applying primer.

C. Remove dirt, scale, loose coatings and particles, grease, oil, disintegrated coatings, and other substances deleterious to coating performance for component substrates in accordance with SSPC SP-1, Power Tool Cleaning, to remove rust and loose coatings as well as to remove glossy surfaces of existing paint films.

D. Ferrous Surfaces: Ferrous surfaces including those that have been shop-coated, shall be solvent-cleaned. Surfaces that contain loose rust, loose mill scale, and other foreign substances shall be cleaned mechanically with hand tools according to SSPC SP 2, power tools according to SSPC SP 3. Shop-coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

3.3 APPLICATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Apply products in accordance with manufacturer’s instructions. Rate of application of coating shall be as specified but shall not exceed that as recommended by paint manufacturer for purpose of surface involved.

C. Allow sufficient drying time between coats as recommended by coating manufacturer.

D. Lightly sand and dust between each coat to remove defects visible from 5-feet. Finish coats shall be smooth, free from brush marks, streaks, laps, sags, skips, holidays, etc.

E. Do not apply additional coats until previously installed coat has been reviewed and accepted by Owner. Only accepted coats of paint will be considered in determining number of coats applied.

F. Refinish entire sections if areas which have been previously repaired are rejected.

3.4 CLEANING

A. Repair brush marks, scratches, abrasions, and minor surface defects in coatings finish in accordance with manufacturer’s printed instructions. Finish of repaired surfaces shall be uniform and free from blemishes and variations in color and surface texture.

END OF SECTION 099100

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:

1. Concrete.
2. Steel and iron.
3. Galvanized metal.
4. Wood.
5. Gypsum board.
6. Code-required marking and identification of walls.

B. Related Requirements:

1. Section 051200 "Structural Steel Framing" for shop priming structural steel.
2. Section 055000 "Metal Fabrications" for shop priming metal fabrications.
3. Section 055113 "Metal Pan Stairs" for shop priming metal pan stairs.
4. Section 055213 "Pipe and Tube Railings" for shop priming pipe and tube railings.
5. Section 062023 "Interior Finish Carpentry" for field-painting wood trim.
6. Section 099600 "High-Performance Coatings" for tile-like coatings.
7. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.3 DEFINITIONS

A. Coat of Paint: An application of paint, applied not less than the manufacturer's recommended duration for recoat based on relative humidity and ambient temperature.

B. MPI Gloss Level 1 (Flat): Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 2 (Low Sheen): Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 3 (Eggshell): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

E. MPI Gloss Level 4 (Satin): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

F. MPI Gloss Level 5 (Semi-Gloss): 35 to 70 units at 60 degrees, according to ASTM D 523.

G. MPI Gloss Level 6 (Gloss): 70 to 85 units at 60 degrees, according to ASTM D 523.

H. MPI Gloss Level 7 (High-Gloss): More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Indicate VOC content.

B. Sustainable Design Submittals:

1. Product Data: For paints and coatings, indicating VOC content.
2. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide basis-of-design products indicated in this Section, or approved substitutions by one of the following :

1. Benjamin Moore & Co.
2. PPG Paints.
3. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Rust-Preventive Coatings: 100 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
7. Pretreatment Wash Primers: 420 g/L.
8. Shellacs, Clear: 730 g/L.
9. Shellacs, Pigmented: 550 g/L.

C. Low-Emitting Materials: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Colors: As indicated on Drawings.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Wood: 15 percent.
3. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2.
2. SSPC-SP 3.

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Apply coats of paint per manufacturer's recommendations based on relative humidity and ambient temperature, but not less than 24-48 hours between coats for temperatures below 45 degrees F, and not less than 4 hours between coats applied above 45 degrees F.
2. Use applicators and techniques suited for paint and substrate indicated.
3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:

a. Tanks that do not have factory-applied final finishes.
b. Natural gas lines, if any.

2. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

B. All Surfaces, preparation, and paint applications may be inspected.

C. Painted exterior and interior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the Painting Inspection Agency inspector:

1. Brush / roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, and foreign materials in paint coatings.
2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and reentrant angles.
3. Damage due to touching before paint is sufficiently dry or any other contributory cause.
4. Damage due to application on moist surfaces or caused by inadequate protection from the weather.
5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).

D. Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces:

1. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
2. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 39 inches.
3. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
4. When the final coat on any surface exhibits a lack of uniformity of color, sheen, texture, and hiding across full surface area.

E. Painted surfaces rejected by the inspector shall be made good at the expense of the Contractor. Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be removed by scraper or by sanding prior to application of paint.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

1. Extend paint to from wall corner-to-corner, or corner-to-control-joint, or control-joint-to control-joint, when touch-up extents are otherwise visible.

3.6 CODE-REQUIRED MARKING AND IDENTIFICATION OF WALLS, BARRIERS, AND PARTITIONS WITH PROTECTED OPENINGS AND PENETRATIONS

A. Stencil all fire walls, fire barriers, smoke barriers, non-rated smoke partitions, and any other wall required to have protected openings or penetrations with lettering not less than 3-inches in height with minimum 3/8" stroke in a contrasting color, in accessible concealed floor, floor-ceiling, or attic spaces. Identify the names and hour rating of the partition, wall, or barrier approximately 8-inches above the ceiling within 15 feed of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall or partition on both sides and at least one in every space. Labels may include, but are not limited to, the following:

1. SMOKE PARTITION
2. 1-HR FIRE PARTITION
3. 1-HR FIRE BARRIER
4. 1-HR SMOKE BARRIER
5. 1-HR FIRE WALL

6. 2-HR FIRE WALL

3.7 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC.

1) Benjamin Moore: Ultra Spec Interior/Exterior 100% Acrylic Sealer 608, at 5.3 mils wet, 0.95 mils dry.
2) PPG Paints: Speedhide Zero Interior Latex Sealer, 6-4900XI Series; applied at 1.4 mils dft.
3) Sherwin-Williams: Loxon Concrete & Masonry Primer Sealer, LX02W50, at 8.0 mils wet, 3.2 mils dry.

b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, eggshell (MPI Gloss Level 3).

1) Benjamin Moore: Ultra Spec 500 Eggshell T538, 4.3 mils wet, 1.8 mils dry per coat.
2) PPG Paints: Speedhide Zero Interior Latex Eggshell, 6-4310XI Series; applied at 1.4 mils dft per coat.
3) Sherwin-Williams: ProMar 200 Zero VOC Latex Eg-Shel, B20-12600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.

d. Location(s): Exposed interior concrete walls.

2. Dryfall Waterborne System:

a. First Coat: Waterborne Acrylic Dryfall, same as topcoat.
b. Topcoat:

1) Benjamin Moore: Latex Dry Fall Semi-Gloss (397), 3.8 mils wet, 1.4 mils dry.
2) PPG Paints: Speedhide Super-Tech Acrylic Waterborne Dry-Fall, 6-725 Series, 2.1 - 2.6 mils dry.
3) Sherwin-Williams: Pro Industrial Waterborne Acrylic Dryfall Flat, B42-181 Series, 6.0 mils wet, 1.5 mils dry.

c. Location: Exposed concrete ceilings.

B. Concrete Substrates, Traffic Surfaces:

1. Water-Based Concrete Floor Sealer System:

a. First Coat: Sealer, water based, for concrete floors, matching topcoat.
b. Topcoat: Sealer, water based, for concrete floors.

1) Benjamin Moore: Coronado Texcrete Silicone Water Repellent 194 Line, at 100-200 sq. ft. per gal.
2) PPG Paints: Perma-Crete Plex-Seal WB Interior/Exterior 100% Acrylic Clear Sealer, 4-6200XI Series; applied at 0.8 mils dft per coat.
3) Sherwin-Williams: H&C Clarishield Water-Based Wet-Look Concrete Sealer, at 100 to 200 sq. ft. per gal.

c. Location: Exposed horizontal concrete surfaces.

C. Steel Substrates:

1. High-Performance Architectural Latex System:

a. Prime Coat: Shop primer specified in Section where substrate is specified.
b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
c. Topcoat: Latex, interior, high performance architectural, semi-gloss (MPI Gloss Level 5).

1) Benjamin Moore: Ultra Spec HP D.T.M. Acrylic Semi-Gloss HP29, at 4.0-5.4 mils wet, 1.8-2.5 mils dry, per coat.
2) PPG Paints: Pitt-Glaze WB-1, Pre-Catalyzed Acrylic Semi-Gloss Epoxy, 16-510 Series; applied at 1.5 mils dft per coat.
3) Sherwin-Williams: Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.

d. Location(s): Hollow metal doors and frames, wall grilles, other steel/iron except as noted.

2. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer, rust-inhibitive, water based.

1) Benjamin Moore: High Performance HP1100 Acrylic Metal Primer at 4.0-5.3 mils wet, 1.8-2.3 mils dry.
2) PPG Paints: Pitt-Tech Interior/Exterior Industrial DTM Primer, 90-712 Series, applied at 2 mils dft.
3) Sherwin-Williams: Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5).

1) Benjamin Moore:High Performance HP3410 Pre-Catalyzed Waterborne Epoxy Semi-Gloss at 3.6-4.6 mils wet, 1.5-1.9 mils dry.
2) PPG Paints: Pitt-Glaze WB1, Pre-Catalyzed Acrylic Semi-Gloss Epoxy, 16-510 Series; applied at 1.5 mils dft per coat.
3) Sherwin-Williams: Pro Industrial Pre-Catalyzed Water-Based Epoxy, K46-151 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

d. Location: Interior steel stairs and fabricated steel handrails, other steel intended for human touch.

D. Galvanized-Metal Substrates:

1. High-Performance Architectural Latex System:

a. Prime Coat: Primer, galvanized, water based.

1) Benjamin Moore: High Performance HP1100 Acrylic Metal Primer at 4.0-5.3 mils wet, 1.8-2.3 mils dry.
2) PPG Paints: Pitt-Tech Plus Interior/Exterior Industrial DTM Primer/Finish, 4020 PF Series; applied at 2.2 mils dft.
3) Sherwin-Williams: Pro Industrial Pro-Cryl Universal Primer, B66-2310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.

b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.

c. Topcoat: Latex, interior, high performance architectural, semi-gloss (MPI Gloss Level 5).

1) Benjamin Moore: Ultra Spec HP D.T.M. Acrylic Semi-Gloss HP29, at 4.0-5.4 mils wet, 1.8-2.5 mils dry.
2) PPG Paints: Pitt-Glaze WB1, Pre-Catalyzed Acrylic Semi-Gloss Epoxy, 16-510 Series; applied at 1.5 mils dft per coat.
3) Sherwin-Williams: Pro Industrial Acrylic Semi-Gloss,m B66-650 Series, at 2.5 to 4.0 mils dry, per coat.

d. Location(s): Galvanized steel within typical reach range or intended for human touch.

E. Wood Substrates: Wood trim and Architectural woodwork.

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer, latex, for interior wood.

1) Benjamin Moore: Fresh Start: High-Hiding All Purpose Primer 046 at 3.8 mils wet, 1.4 mils dry.
2) PPG Paints: 6-4900XI SpeedHide Zero 0-VOC Low Odor Latex Primer.
3) Sherwin-Williams: TBD.

b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.

c. Topcoat: Latex, interior, institutional low odor/VOC, eggshell (MPI Gloss Level 3).

1) Benjamin Moore: Ultra Spec: 500 Interior Eggshell T538 at 4.0-4.6 mils wet, 1.7-2.0 mils dry.
2) PPG Paints: 6-351 1ZV SpeedHide 0-VOC Low Odor Latex Satin.

3) Sherwin-Williams: TBD.

d. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (MPI Gloss Level 5).
1) Benjamin Moore: Ultra Spec: 500 Interior Semi-Gloss T546 at 4.0-4.6 mils wet, 1.5-1.7 mils dry.
2) PPG Paints: 6-500ZV Series SpeedHide 0-VOC Low Odor Latex Semi-Gloss.
3) Sherwin-Williams: TBD.

e. Location(s): Interior wood trim.

2. High-Performance Architectural Latex System:

a. Prime Coat: Primer, latex, for interior wood, MPI #39.

1) Benjamin Moore: Fresh Start: High-Hiding All Purpose Primer 046 at 3.8 mils wet, 1.4 mils dry.
2) PPG Paints: TBD.
3) Sherwin-Williams: TBD.

b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
c. Topcoat: Latex, interior, high performance architectural, low sheen (MPI Gloss Level 2), MPI #138.

1) Benjamin Moore: Scuff-X: Interior Matte Finish N484 at 3.6-4.0 mils wet, 1.4-1.6 mils dry.

d. Topcoat: Latex, interior, high performance architectural, semi-gloss (MPI Gloss Level 5), MPI #141.

1) Benjamin Moore: Scuff-X: Interior Semi-Gloss Finish N487 at 3.6-4.0 mils wet, 1.3-1.5 mils dry.
2) PPG Paints: TBD.
3) Sherwin-Williams: TBD.

e. Location(s): Interior architectural woodwork (Benches with cushions).

F. Gypsum Board Substrates:

1. Institutional Low-Odor/VOC Latex System:

a. Prime Coat: Primer sealer, interior, institutional low odor/VOC.

1) Benjamin Moore: Ultra Spec 500 Waterborne Interior Primer Sealer N534, at 4.3 mils wet, 1.4 mils dry.
2) PPG Paints: Speedhide Zero Interior Latex Sealer, 6-4900XI Series; applied at 1.4 mils dft.
3) Sherwin-Williams: ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.5 mils dry.

b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, eggshell (MPI Gloss Level 3)
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1) Benjamin Moore: Ultra Spec 500 Eggshell T538, 4.3 mils wet, 1.8 mils dry per coat.
2) PPG Paints: Speedhide Zero Interior Latex Eggshell, 6-4310XI Series; applied at 1.4 mils dft per coat.
3) Sherwin-Williams: ProMar 200 Zero VOC Latex Eg-Shel, B20-12600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.

d. Location(s): Typical gypsum board paint, except as otherwise noted.

2. Water-Based Light Industrial Coating System:

a. Prime Coat: Primer sealer, latex, interior.

1) Benjamin Moore: Ultra Spec 500 Waterborne Interior Primer Sealer N534 at 4.3 mils wet, 1.4 mils dry.
2) PPG Paints: Speedhide Zero Interior Latex Sealer, 6-4900XI; applied at 1.4 mils dft.
3) Sherwin-Williams: ProMar 200 Zero VOC Latex Primer, B28-2600, at 4.0 mils wet, 1.0 mils dry.

b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5).

1) Benjamin Moore: High Performance HP3410 Pre-Catalyzed Waterborne Epoxy Semi-Gloss at 3.6-4.6 mils wet, 1.5-1.9 mils dry.
2) PPG Paints: Pitt-Glaze WB1 Pre-Catalyzed Acrylic Semi-Gloss Epoxy, 16-510 Series; applied at 1.5 mils dft per coat.
3) Sherwin-Williams: Pro Industrial Pre-Catalyzed Water Based Epoxy, K46-1151 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

d. Location(s): Gypsum board paint in toilet rooms.

END OF SECTION

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SECTION 099300 - STAINING AND TRANSPARENT FINISHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and application of wood stains and transparent finishes on the following substrates:

1. Interior Substrates:

a. Dressed lumber (finish carpentry or woodwork).

B. Related Requirements:

1. Section 099123 "Interior Painting" for stains and transparent finishes on concrete floors.

1.3 DEFINITIONS

A. MPI Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

D. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

E. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
2. Indicate VOC content.

B. Sustainable Design Submittals:

1. Environmental Product Declaration (EPD):

    a. Submit product data or other published information indicating that product has an EPD in accordance with Div 01 Section "Sustainable Design Requirements."
    b. Include information on Building Product Disclosure and Optimization Calculator.

2. Low-Emitting Materials - Paints and Coatings:

    a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standards.
    b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer¢¢s claims of compliance must also state the range of total VOC content after 14 days.

C. Samples for Verification: For each type of finish system and in each color and gloss of finish required.

1. Submit Samples on representative samples of actual wood substrates, 8 inches long.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Stains and Transparent Finishes: 5 percent, but not less than 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each finish system indicated and each color selected to verify preliminary selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each type of finish system and substrate.

    a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
    b. Other Items: Architect will designate items or areas required.

2. Final approval of stain color selections will be based on mockups.

    a. If preliminary stain color selections are not approved, apply additional mockups of additional stain colors selected by Architect at no added cost to Owner.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply finishes when relative humidity exceeds 85 percent, at temperatures less than 5 deg F above the dew point, or to damp or wet surfaces.

C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.2 MATERIALS, GENERAL

A. Environmental Product Declaration (EPD): Materials/products have an EPD that meet the requirements for LEED.

B. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."

C. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

D. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:

1. Clear Wood Finishes, Varnishes: 350 g/L.

2. Clear Wood Finishes, Lacquers: 550 g/L.
3. Shellacs, Clear: 730 g/L.
4. Stains: 250 g/L.

E. Low-Emitting Paints and Coatings: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1113 OR California Air Resource Board (CARB) 2007-Suggested Control Measures (SCM) for Architectural Coatings, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

F. Stain Colors: Match Architect's samples.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Interior Wood Substrates: 10 percent, when measured with an electronic moisture meter.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with finish application only after unsatisfactory conditions have been corrected.

1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.

1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean and prepare surfaces to be finished according to manufacturer's written instructions for each substrate condition and as specified.

1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.

2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.

D. Interior Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
3. Sand surfaces exposed to view and dust off.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dry.

3.3 APPLICATION

A. Apply finishes according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for finish and substrate indicated.
2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

A. Wood Substrates: Architectural woodwork (interior wood guardrails).

1. Polyurethane Varnish over Stain System, MPI INT 6.3E:

a. Stain Coat: Stain, semitransparent, for interior wood, MPI #186.

1) Benjamin Moore Lenmar Interior Waterborne Wiping Wood Stain 1WB-1300.
2) Sherwin Williams Wood Classics 250 g/l Stain, A49W800 series.

b. Intermediate Coat: Polyurethane varnish matching topcoat.
c. Topcoat: Varnish, interior, polyurethane, oil modified, Gloss (MPI Gloss Level 6), MPI #130.

1) Benjamin Moore Benwood Stays Clear Acrylic Polyurethane High Gloss, N422/F422.
2) Sherwin Williams Wood Classics WB Polyurethane A68, Satin.

2. Polyurethane Varnish System, MPI INT 6.3K:

a. Prime Coat: Polyurethane varnish matching topcoat.
b. Intermediate Coat: Polyurethane varnish matching topcoat.
c. Topcoat: Varnish, interior, polyurethane, oil modified, Gloss (MPI Gloss Level 6), MPI #130.

1) Benjamin Moore Benwood Stays Clear Acrylic Polyurethane High Gloss, N422/F422.
2) Sherwin Williams Wood Classics WB Polyurethane A68, Satin.

END OF SECTION

SECTION 099600 – HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and application of high-performance coating systems on the following substrates:
   a. Exterior Substrates: Architecturally exposed structural steel (AESS).

B. Related Requirements:

   1. Section 051213 “Architecturally Exposed Structural Steel Framing” for steel pergolas

1.3 DEFINITIONS

A. Terms Paint or Painting shall in a general sense have reference to sealers, primers, oil, alkyd, latex, polyurethane, epoxy, and enamel type coatings and application of these materials.

B. Dry Film Thickness (DFT): Thickness, measured in mils, of a coat of paint in cured state.

C. Conform to ASTM D16 for interpretation of terms used in this Section.

1.4 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's literature describing products to be provided, giving manufacturer's name, product name, and product line number for each material. Submit technical data sheets for each coating, giving descriptive data, curing times, mixing, thinning, and application requirements. Provide material analysis, including vehicle type and percentage by weight and by volume of vehicle, resin, and pigment.

B. Samples for Initial Selection: Submit color charts displaying manufacturer's full range of standard colors for initial selection by Architect.

   1. Sample Size: Not less than 6 inches by 6 inches.

C. Samples for Verification: For each type of coating system in each color and gloss of topcoat indicated.
   1. Submit samples on indicated substrate on rigid backing, 8 inches square.
   2. Step coats of samples to show each coat required for system.
   3. Label each coat of each Sample
   4. Label each Sample for location and application area.

1.5 QUALITY ASSURANCE / CONTROL SUBMITTALS

A. Test Reports: Provide certified test reports, prepared by an independent testing laboratory, confirming compliance with specified performance criteria.

B. Certificates: Coatings manufacturer shall certify that coating materials utilized are "non-lead" (less than 0.06% lead by weight in dried film) as defined in Part 1303 of Consumer Product Safety Act. Provide certification that specialized equipment as may be required by manufacturer for proper application of coating materials shall be utilized for work of this Section. Provide manufacturer's certification that products to be used comply with specified requirements and are suitable for intended application.

C. Qualifications: Submit listing of not less than 5 of applicator's most recent applications representing similar scope and complexity to Project requirements. List shall include:

1. Project name and address.
2. Name of owner.
3. Name of contractor.
4. Name of Architect/Engineer.
5. Date of completion.

D. Manufacturer's Instructions: Submit manufacturer's installation procedures which shall be basis for accepting or rejecting actual installation procedures.

E. Coating Thickness Verification: Submit documentation as noted in section 3.4 below.

1.6 QUALIFICATIONS

A. Manufacturer’s Qualifications: Company specializing in manufacture of high performance coatings with a minimum of 10 years’ experience. Materials shall be products of a single manufacturer or items standard with manufacturer of specified coating materials. Provide secondary materials which are produced or are specifically recommended by coating system manufacturer to ensure compatibility of system.

B. Applicator shall be trained in application techniques and procedures of coating materials and shall demonstrate a minimum of 2 years successful experience in such application. Maintain, throughout duration of application, a crew of painters who are fully qualified to satisfy specified qualifications.

1.7 REGULATORY REQUIREMENTS

A. Comply with applicable codes and ordinances for flame, fuel, smoke, and volatile organic compound (VOC) ratings requirements for finishes at time of application.

1.8 PACKING AND DELIVERY

A. Packing, Shipping, Handling, and Unloading: Deliver products in manufacturer's original unopened containers. Each container shall have manufacturer's label, intact and legible.

Containers shall fully identify brand, type, grade, class, and other qualifying information used to describe contents. Include on label for each container:

1. Manufacturer's name.
2. Type of coating.
3. Manufacturer's stock number.
4. Color name and number.
5. Instructions for thinning, where applicable.

1.9 STORAGE AND PROTECTION

A. Store materials in a protected area, away from construction activities. Restrict storage area to paint materials and related equipment.

B. Maintain temperature in area of storage between 40 degrees F and 110 degrees F.

C. Comply with health and fire safety regulations.

D. Remove damaged materials from Project site.

1.10 PROJECT CONDITIONS

A. Environmental Requirements: Apply coating materials under conditions required by manufacturer, however air temperature shall not be below 35 degrees F or above 110 degrees F; relative humidity shall be no higher than 85%; and for exterior spray application, wind velocity shall be less than 15 mph.

B. Refer to specific product information sheets for minimum surface temperature requirements. Surface temperatures shall be at least 5 degrees F above dew point and in a rising mode.

C. Verify atmosphere is relatively free of airborne dust.

1.11 SEQUENCE

A. Perform work in proper sequence with work of other trades to avoid damage to finished work. Where coatings are scheduled to be applied over shop applied coatings, coordinate work of such shop applied products to ensure compatibility with field applied coating systems.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
   1. Tnemec Company Incorporated.

B. Materials specified herein are cited as minimum standard of quality for materials, size, and design of specific listed products.

2.2 COATING MATERIALS - STRUCTURAL STEEL

A. Primer: Aromatic urethane, zinc-rich, two-component, moisture-cured primer.

1. Tnemec Company Incorporated; Tneme-Zinc Series 90-97 (3.0-5.0 mils DFT).

B. Intermediate Coat: Polyamide epoxy.

1. Tnemec Company Incorporated; Hi-Build Epoxoline II Series N69 (5.0-10.0 mils DFT).

C. Top Coat: Thermoset Solution Fluoropolymer.

1. Tnemec Company Incorporated; Fluoronar Series 1071 Semi-Gloss (6.5-9.5 mils DFT).

D. Color Selection

1. Landscape Architect to approve color for Top Coat.

2. All three coats must be differently colored.

3. Select intermediate coat coloration so as not to show through top coat.

2.3 ACCESSORIES

A. Coating Application Accessories: Provide application accessories as indicated in coating manufacturer's application instructions, including but not limited to cleaning agents, etching agents, cleaning cloths, sanding materials, and clean-up materials. Material not specifically identified, but needed for proper application, shall be of a quality not less than specified products.

2.4 MIXES

A. Mix Materials according to manufacturer’s latest printed instructions paying particular attention to mixing times, thinning requirements and limitations and temperatures.

2.5 SHOP FINISHING

A. Surface Preparation: Clean surfaces of loose scale, rust, oil, dirt, and other foreign matter, immediately prior to priming. Surfaces to be coated shall be clean, dry, smooth, and free from dust and foreign matter which will adversely affect adhesion or appearance. Prior to application of primer, structural steel shall be prepared to receive coating system in compliance with Steel Structures Painting Council SP-6 (minimum). Verify recommended surface preparation with manufacturer’s published data.

B. Shop Applied Coatings: Steel members shall be provided with one coat of shop primer. Application of first coat shall follow immediately after surface preparation and cleaning and within an eight hour working day. Cleaned areas not receiving first coat within an eight hour period shall be re-cleaned prior to application of first coat.

C. Apply materials at film thicknesses specified by methods recommended by manufacturer in compliance with SSPC PA-1. Allow each coat of paint to dry thoroughly before applying succeeding coats. Make finish topcoats smooth, uniform in color, and free of laps, runs, dry spray, over-spray, and skipped or missed areas. Environmental conditions shall be in compliance with coating manufacturer's printed instructions.

D. Coating Thickness Verification: Take measurements and submit photographic documentation as noted in section 3.4 for all shop coats.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification of Conditions: Examine areas and conditions under which application of coating systems shall be performed for conditions that will adversely affect execution, permanence, or quality of coating system application.

B. Correct conditions detrimental to timely and proper execution of Work. Do not proceed until unsatisfactory conditions have been corrected.

C. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance.

3.2 PREPARATION

A. Protection: Take precautionary measures to prevent fire hazards and spontaneous combustion. Remove empty containers from Project site. Place cotton waste, cloths and hazardous materials in containers, and remove from site daily. Provide drop cloths, shields, and other protective equipment. Protect elements surrounding work of this Section from damage or disfiguration. As Work proceeds, promptly remove spilled, splashed, or splattered materials from surfaces. During application of coating materials, post Wet Paint signs. During application of solvent-based materials, post No Smoking signs.

B. Surface Preparation:

1. General Requirements: Prior to application of primer, surfaces shall be prepared to receive specified coating system in compliance with manufacturer's recommendations and specifications of Steel Structures Painting Council. Clean surfaces of residual deposits of grease, scale, rust, oil, dirt, and other foreign matter, immediately prior to priming. Surfaces to be coated shall be clean, dry, smooth and free from dust and foreign matter which will adversely affect adhesion or appearance.
2. Ferrous Metal Surfaces: Clean structural steel and metal joist in the shop or prior to erection in accordance with SSPC-SP6 Commercial Sand Blast Cleaning. Surfaces shall be free of residual deposits of grease, rust, scale, dirt, dust, and oil prior to blasting.

    a. For shop primed surfaces, sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Field welds and touch-ups shall be prepared to conform to original surface preparation standards.

b. Shop applied prime coatings which are damaged during transportation, construction, or installation shall be thoroughly cleaned and touched up in field. Use repair procedures which insure complete protection of adjacent primer. Repair methods and equipment may include wire brushing, hand or power tool cleaning, or dry air blast cleaning. In order to prevent injury to surrounding painted areas, blast cleaning may necessitate use of lower air pressure, small nozzle and abrasive particle sizes, short blast nozzle distance from surface, shielding and masking. If damage is too extensive to tough-up, item shall be re-cleaned and coated or painted.

c. For surfaces not shop primed, surfaces shall be cleaned in compliance with specifications of Steel Structures Painting Council.

3. Lightweight Metals: Prepare surfaces in compliance with SSPC SP2 or SP3.

3.3 APPLICATION

A. Apply coating systems in compliance with manufacturer's instructions and using application method best suited for obtaining full, uniform coverage of surfaces to be coated.

B. Apply primer, intermediate, and finish coats to comply with wet and dry film thicknesses and spreading rates for each type of material as recommended by manufacturer. Application rates in excess of those recommended and fewer numbers of coats than specified shall not be accepted.

C. Number of coats specified shall be minimum number acceptable. Apply additional coats as needed to provide a smooth, even application. Closely adhere to re-coat times recommended by manufacturer. Allow each coat to dry thoroughly before applying next coat. Provide adequate ventilation for tank interior to carry off solvents during drying phase.

D. Employ only application equipment that is clean, properly adjusted, and in good working order, and of type recommended by coating manufacturer.

E. After surface preparation, interior weld seams shall be brush applied.

F. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping.

3.4 COATING THICKNESS VERIFICATIONS

A. Once each coat has cured, measure dry film thickness of coating in at least three locations along each member. Take photographic evidence of meter readings and submit as a package for each coat.

B. Testing shall be performed in approximately the same locations for all members and for all coats.

C. At intermediate and top coats, note thickness of previous coats. DFT thickness for each coat noted above is the required thickness of that top coat, not a cumulative total.

D. Design team, Owner, and/or Special Inspector may visit the site to take independent thickness measurements. Remediation may be required if results differ significantly.

3.5 REPAIR / RESTORATION

A. At completion of Work, touch-up and restore finishes where damaged.

B. Defects in Finished Surfaces: When stain, dirt, or undercoats show through final coat, correct defects, and cover with additional coats until coating is of uniform finish, color, appearance, and coverage. Correct defects visible from a distance of 5 feet. Runs shall not be permitted.

C. Touch-up of minor damage shall be acceptable where result is not visibly different from surrounding surfaces. Where result is visibly different, either in color, sheen, or texture, recoat entire surface.

3.6 MANUFACTURER'S FIELD SERVICE

A. Coatings manufacturer shall be available to provide on-site inspections, technical assistance, and guidance for application of coating system as needed.

3.7 CLEANING

A. At completion of day's work, remove from Project site rubbish and accumulated materials.

B. Clean paint spots and other soiling from prefinished surfaces and surfaces with integral finish. Use solvents which will not damage finished surface.

C. Leave storage area clean and in same condition indicated for equivalent spaces in Project.

3.8 PROTECTION

A. Protect work against damage until fully cured. Provide signs identifying wet surfaces until surfaces are adequately cured.

3.9 WASTE MANAGEMENT

A. Place materials defined as hazardous or toxic waste in designated containers.

B. Return solvent and oil soaked rags for contaminant recovery and laundering or for proper disposal.

C. Do not dispose of paints or solvents by pouring on ground. Place in designated containers for proper disposal.

D. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

END OF SECTION 099600

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SECTION 101419 - DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cutout dimensional characters.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.
4. Show locations of electrical service connections.
5. Include diagrams for power, signal, and control wiring.

D. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer of products.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify locations of electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved substitution:

1. ACE Sign Systems, Inc.
2. ASI Sign Systems, Inc.
3. Avalis Wayfinding Solutions, Inc.
4. Colorado Sign Systems (CSS).
5. Gemini Incorporated.
6. GraphicWorks, LLC.
7. Metal Arts; Division of L & H Mfg. Co.

2.2 DIMENSIONAL CHARACTERS

A. Cutout Characters Insert drawing designation: Characters with uniform faces; square-cut, smooth, eased edges; precisely formed lines and profiles; and as follows:

1. Character Material: Sheet or plate aluminum.
2. Character Height: As indicated on Drawings.
3. Thickness: As indicated on Drawings.

4. Finishes:

    a. Integral Aluminum Finish: Anodized color as selected by Architect from full range of industry colors and color densities.

5. Mounting: As indicated on Drawings.
6. Typeface: As indicated on Drawings.

2.3 DIMENSIONAL CHARACTER MATERIALS

A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

C. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. For exterior exposure, furnish stainless-steel devices unless otherwise indicated.
3. Sign Mounting Fasteners:

    a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
    b. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
6. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
7. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

B. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

2.7 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed characters and signs that do not comply with specified requirements. Replace characters with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101419

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SECTION 101423 - PANEL SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Room-identification signs.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for temporary Project identification signs and for temporary information and directional signs.
2. Section 015639 "Temporary Tree and Plant Protection" for temporary protection-zone signage.
3. Section 097200 "Wall Coverings" for custom graphic vinyl wall coverings.
4. Divisions 22, 23, and 26 for labels, tags, and nameplates for plumbing, HVAC, and electrical systems and equipment.
5. Section 265100 "Interior Lighting" for illuminated, self-luminous, and photoluminescent exit sign units.

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 COORDINATION

A. Furnish templates for placement of sign-anchorage devices embedded in permanent construction by other installers.

B. Furnish templates for placement of electrical service embedded in permanent construction by other installers.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Sign Schedule: Use same designations specified or indicated on Drawings or in a sign schedule.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Provide and install paper mockups for review prior to fabrication. Provide full-scale black/white sheets displaying the proposed graphics. Fasten to substrate with removable tape.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices and electrical service embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for signs.

2.2 SIGNS

A. Manufacturers: Suabject to compliance with requirements, provide products by one of the following or approved substitution:

1. American Cyanamid.
2. ASI Sign Systems, Inc.
3. Avalanche Sign Contracting.
4. Avalis Wayfinding Solutions, Inc.
5. Best Sign Systems Inc.
6. Colorado Sign Systems (CSS).
7. Du Pont (Lucite).
8. FastSigns of DTC, CO.
9. GraphicWorks, LLC.
10. InPro Corporation.
11. Innerface Architectural Signage, Inc.
12. Rohm and Haas (Plexiglass).
13. Shapiro Graphics, LLC.
14. Signworks, LLC.
15. Takeform.

B. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Laminated-Sheet Sign: Acrylic face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.

a. Composite-Sheet Thickness: 0.25 inch.
b. Face Sheet:

1) Thickness: 0.125 inch.
2) Finish: Clear matte acrylic with painted subsurface .

a) Subsurface (Second-Surface) Color: As indicated on Drawings.

c. Backing Sheet:

1) Thickness: 0.080 inch.
2) Color: As indicated on Drawings.

d. Surface-Applied Graphics: Applied vinyl graphics bonded to the backing sheet.

1) Thickness: 1/32 inch.
2) Color: As indicated on Drawings.

2. Sign-Panel Perimeter: Finish edges smooth.

a. Edge Condition: Square cut.
b. Corner Condition in Elevation: Rounded to radius indicated.

3. Mounting: Surface mounted to wall with two-face tape.
4. Text and Typeface: Accessible raised characters and Braille typeface matching Architect's sample. Finish raised characters to contrast with background color, and finish Braille to match background color.

2.3 PANEL-SIGN MATERIALS

A. Acrylic Sheet: ASTM D 4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

B. Paints and Coatings for Sheet Materials: Inks, dyes, and paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

A. Adhesive: As recommended by sign manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less.
2. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

1. Basis-of-Design: Provide 3M "VHB Heavy Duty Mounting Tape" or comparable product.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Preassemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
3. Comply with AWS for recommended practices in welding and brazing. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
4. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
5. Internally brace signs for stability and for securing fasteners.
6. Provide rebates, lugs, and brackets necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

B. Signs with Changeable Message Capability: Fabricate signs to allow insertion of changeable messages as follows:

1. For slide-in changeable inserts, fabricate slot without burrs or constrictions that inhibit function. Furnish initial changeable insert. Subsequent changeable inserts are by Owner.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

D. Organic, Anodic, and Chemically Produced Finishes: Apply to formed metal after fabrication but before applying contrasting polished finishes on raised features unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Verify that sign-support surfaces are within tolerances to accommodate signs without gaps or irregularities between backs of signs and support surfaces unless otherwise indicated.

C. Verify that anchor inserts are correctly sized and located to accommodate signs.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
4. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Room-Identification Signs and Other Accessible Signage: Install in locations on walls as indicated on Drawings, and according to accessibility standard.

C. Mounting Methods:

1. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

D. Signs Mounted on Glass: Install self-adhering vinyl to the face-of-glass and fasten the sign over the vinyl. Provide vinyl size to match the sign size, and color to match the sign backing color.

1. Vinyl Thickness: 1/32 inch.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Childcare accessories.
3. Underlavatory guards.

B. Related Requirements:

1. Section 011000 "Summary" for Owner-furnished items, including accessories.

1.2 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".
2. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content, in accordance with 018113 "Sustainable Design Requirements".

3. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required using designations indicated on Drawings.

D. Delegated Design Submittal: For grab bars.

1. Include structural design calculations indicating compliance with specified structural-performance requirements.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Toilet Tissue (Roll) Dispenser, T-7:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or approved substitution by one of the following:

a. American Specialties, Inc.
b. Bobrick Washroom Equipment, Inc.
c. Bradley Corporation.

B. Paper Towel (Roll) Dispenser, Manual, T-4:

1. Basis-of-Design Product: Subject to compliance with requirements, provide , or approved substitution by one of the following:

a. American Specialties, Inc.
b. Bobrick Washroom Equipment, Inc.
c. Bradley Corporation.

C. Soap Dispenser, T-5:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or approved substitution by one of the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Bradley Corporation.

D. Grab Bar, T-1, T-2:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or approved substitution by one of the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Bradley Corporation.

2. Length: As indicated on Drawings.

E. Sanitary-Napkin Disposal Unit, T-8:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or approved substitution by one of the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Bradley Corporation.

F. Seat-Cover Dispenser, T-9 :

1. Manufacturers: Subject to compliance with requirements, provide products indicated on Drawings, or approved substitution by one of the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Bradley Corporation.

G. Mirror Unit, T-3, T-10:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or approved substitution by one of the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Bradley Corporation.

2. Size: As indicated on Drawings.

H. Hook, H-11:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or approved substitution by one of the following:

    a. American Specialties, Inc.
    b. Bobrick Washroom Equipment, Inc.
    c. Bradley Corporation.

2.3 CHILDCARE ACCESSORIES

A. Diaper-Changing Station, T-6:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings, or approved substitution by one of the following:

    a. American Specialties, Inc.
    b. Bradley Corporation.
    c. Koala Kare Products: a Division of Bobrick.

2. Color/Finish: Color to be selected by Architect from manufacturer's full range of standard colors.

2.4 UNDERLAVATORY GUARDS

A. Underlavatory Guard:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the following, or approved substitution.

    a. Plumberex Specialty Products, Inc. "PRO-EXTREME" molded plastic covers.
    b. Truebro by IPS Corporation, "LAVGUARD 2" Undersink Piping Covers.

2.5 MATERIALS

A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch- minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch- minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 hot-dip zinc coating.

D. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.

F. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.6 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Remove temporary labels and protective coatings.

B. Grab Bars: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

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SECTION 104300.01 - EMERGENCY AID CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Portable AED device and cabinet, combined package.
2. Bleeding Control Cabinets.

B. Related Sections:

1. Division 06 Rough Carpentry Sections for wood blocking.
2. Division 26 Sections for electrical requirements.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for cabinets.

1. Show location of knockouts for tie in to fire alarm and campus security system.

B. Sustainable Design Submittals:

1. Recycled Content :

a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
b. Include information on Material Tracking Worksheets.

2. Material Source:

a. Submit product data or other published information verifying the location of manufacturing facility including name, address, and distance between manufacturing facility and the project site. Provide manufacturer's documentation indicating location where the base materials were extracted, mined, quarried, harvested, etc. and the distance between this location and the project site. Also include material costs (excluding costs of installation).
b. Include information on Material Tracking Worksheets.

C. Shop Drawings: For emergency aid cabinets. Include plans, elevations, sections, details, and attachments to other work.

D. Samples for Initial Selection: provide material samples for each type of emergency aid cabinet indicated.

E. Maintenance Data: For emergency aid cabinets to include in maintenance manuals.

1.3 COORDINATION

A. Coordinate size of emergency aid cabinets to ensure that type and capacity of AED devices indicated are accommodated.

B. Coordinate sizes and locations of emergency aid cabinets with wall depths.

1.4 SEQUENCING

A. Apply decals on field-painted, emergency aid cabinets after painting is complete.

PART 2 - PRODUCTS

2.1 PORTABLE AED DEVICE AND CABINET, COMBINED PACKAGE

A. AED combined device and recessed cabinet, provided and installed by Contractor.

1. Basis-of-Design: Subject to compliance with requirements provide Zoll AED Plus Small Vusiness Value Package, or approved substitution.

a. Include the following:

1) AED Wall cabinet, basic.
2) AED Device, Fully-automatic.
3) AED/CPR Electrode Pad and Battery Combination.
4) AED Check Inspection Tag.
5) AED Window/Wall Decal.

B. MATERIALS

1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

2.2 BLEEDING CONTROL CABINETS

A. Basis-of-Design: Subject to compliance with requirements provide True Rescue Standard Bleeding Control Cabinet, or approved substitution.

1. Standard recessed bleeding control cabinet - small.

2.3 FABRICATION

A. Emergency Aid Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Provide factory-drilled mounting holes.
3. Prepare doors and frames to receive locks.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum ½ inch thick.
2. Miter and weld perimeter door frames.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

A. Manage indoor air quality in accordance with provisions of Section 018113.13. Documentation shall be submitted to satisfy the requirements of that section.

3.2 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

A. Manage construction waste in accordance with provisions of Section 017419. Documentation shall be submitted to satisfy the requirements of that section.

3.3 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 INSTALLATION

A. General: Install defibrillator cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

1. Cabinet door pull shall be at 42" AFF.

3.5 ADJUSTING AND CLEANING

A. Verify AED is in working order.

B. Train owner on how to operate the cabinet, where AED instructions are located, and general maintenance requirements of system.

C. Remove temporary protective coverings and strippable films, if any, as defibrillator cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

D. Adjust defibrillator cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

E. On completion of defibrillator/AED device cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

F. Touch up marred finishes, or replace defibrillator cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by defibrillator cabinet and mounting bracket manufacturers.

G. Replace defibrillator cabinets or AED devices that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:

a. Portable fire extinguisher.

B. Related Requirements:

1. Section 104416 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets

1.2 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to fire-protection cabinets, including, but not limited to, the following:

a. Schedules and coordination requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".
2. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content, in accordance with 018113 "Sustainable Design Requirements".
3. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".

C. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 FIRE-PROTECTION CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Activar Construction Products Group, Inc. - JL Industries.
    b. Babcock-Davis.
    c. Guardian Fire Equipment, Inc.
    d. Larsens Manufacturing Company.
    e. Nystrom.
    f. Potter Roemer LLC; a Division of Morris Group International.

B. Cabinet Construction: Nonrated, and fire rated where required to match Wall Type.

C. Cabinet Material: Cold-rolled steel sheet.

D. Recessed Cabinet, FEC-1:

1. Basis-of-Design: Larsen's 2409-R2.
2. Exposed Flat Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

E. Semirecessed Cabinet, FEC-2: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

1. Basis-of-Design: Larsen's 2409-6R.
2. Rolled-Edge Trim: 2-1/2-inch backbend depth.

F. Surface-Mounted Cabinet, FEC-3: Cabinet box fully exposed and mounted directly on wall with no trim.

1. Basis-of-Design: Larsen's 2409-SM.

G. Cabinet Trim Material: Same material and finish as door.

H. Door Material: Steel sheet.

I. Door Style: Fully glazed panel with frame.

J. Door Glazing: Acrylic sheet.

1. Acrylic Sheet Color:

a. Clear transparent acrylic sheet.

K. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide recessed door pull and friction latch.

L. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Handle: Manufacturer's standard recessed handle.
3. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.

a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet door.
2) Application Process: Decals.
3) Lettering Color: Red.
4) Orientation: Horizontal.

M. Materials:

1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.

   a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
   b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   c. Color: As selected by Architect from manufacturer's full range.
2. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

2.4 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Miter corners and grind smooth.
3. Provide factory-drilled mounting holes.
4. Prepare doors and frames to receive locks.
5. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.

1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames and grind smooth.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed and semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed fire-protection cabinets.
2. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification:

1. Apply decals at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes portable, hand-carried fire extinguishers, and mounting brackets for fire extinguishers.

B. Related Requirements:

1. Section 104413 "Fire Protection Cabinets."

1.3 UNIT PRICES - Not Used. **--ADD-4--**

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".
2. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content, in accordance with 018113 "Sustainable Design Requirements".
3. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".

C. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function.

1.5 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.7 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10.
b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Commercial-grade, of type, size, and capacity for each fire-protection cabinet , and mounting bracket indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Guardian Fire Equipment, Inc.

b. JL Industries, Inc.; a division of the Activar Construction Products Group.
c. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
d. Larsens Manufacturing Company.

2. Valves: Manufacturer's standard.
3. Handles and Levers: Stainless steel.
4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type: UL-rated 4-A:80-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

1. Locations: Provide in all locations, except where other types are specified in this Section.

2.3 MOUNTING BRACKETS

A. Mounting Brackets, FEC-0: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.

1. Location: Where indicated on Drawings.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 122113 - LOUVER BLINDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Horizontal louver blinds with polymer slats.

B. Related Requirements:

1. Section 061053 "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting horizontal louver blinds and accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".
2. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content, in accordance with 018113 "Sustainable Design Requirements".
3. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is required; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".
4. IEQ Low-emitting Materials (LEM), Furnishings: Submit certificate from SCS Indoor Advantage Gold, UL Greenguard Gold, MAS certified green, or other documentation of compliance with the emissions limits of California Dept. of Public Health (CDPH) standards, in accordance with 018113 "Sustainable Design Requirements".

C. Shop Drawings: For horizontal louver blinds, include fabrication and installation details.

D. Samples: For each exposed product and for each color and texture specified, 12 inches long.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.6 WARRANTY

A. Standard Warranty: Provide manufacturer's standard warranties against defects in materials or workmanship, including the following:

1. Limited lifetime warranty.
2. Three-year warranty for operating cords.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet-work and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

2.2 HORIZONTAL LOUVER BLINDS, POLYMER SLATS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hunter Douglas Contract.

2. Levolor Contract; a Newell Rubbermaid company.
3. Springs Window Fashions; SWFcontract.

B. Flame-Resistance Rating: Comply with NFPA 701; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

C. Slats: Polymers that are lead free, UV stabilized, integrally colored, opaque, and will not crack or yellow; antistatic, dust-repellent treated.

1. Formulation: Manufacturer's standard.
2. Width: 1 inches .
3. Thickness: 0.105 inch .
4. Spacing: Manufacturer's standard.
5. Profile: Crowned.
6. Features:

a. Lift-Cord Rout Holes: Minimum size required for lift cord and located near back (outside) edge of slat to maximize slat overlap and minimize light gaps between slats.
b. Perforated Slats: Openness factor of 6 to 7 percent.

D. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrail fully encloses operating mechanisms on three sides and ends.

1. Capacity: One blind(s) per headrail unless otherwise indicated.
2. Manual Lift Mechanism:

a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within full operating range.

3. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.

E. Bottom Rail: Secures and protects ends of ladders and lift cords.

1. Type: Manufacturer's standard.

F. Lift Cord: Manufacturer's standard braided cord.

G. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.

1. Type: Braided cord.

H. Valance: Manufacturer's standard.

I. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.

1. Type: As indicated.
2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.

J. Hold-Down Brackets and Hooks or Pins: Manufacturer's standard.

K. Colors, Textures, Patterns, and Gloss:

1. Slats: As selected by Architect from manufacturer's full range.
2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

2.3 HORIZONTAL LOUVER BLIND FABRICATION

A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch per side or 1/2 inch total, plus or minus 1/8 inch . Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch , plus or minus 1/8 inch .
2. Outside of Jamb Installation: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.

D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.

E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

F. Color-Coated Finish:

1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.

1. Locate so exterior slat edges are not closer than 1 inch from interior faces of glass and not closer than 1/2 inch from interior faces of glazing frames through full operating ranges of blinds.
2. Install mounting and intermediate brackets to prevent deflection of headrails.
3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.

B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

END OF SECTION 122113

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SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Plastic-laminate countertops.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".
2. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".
3. Sourcing of Raw Materials - Recycled Content:

    a. Submit product data or other published information indicating total weight of product to be provided for the Project, percent of post-consumer recycled material by weight and percent of post-industrial recycled material by weight. Include material costs (excluding costs of installation).
    b. Include information on Building Product Disclosure and Optimization Calculator.

4. Low-Emitting Materials - Adhesives and Sealants:

    a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
    b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

5. Low-Emitting Materials : Composite Wood:

    a. Submit product data or other published information verifying the composite wood has low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

C. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show locations and sizes of cutouts and holes for plumbing fixtures, soap dispensers, grommets, installed in plastic-laminate countertops.

D. Samples for Verification:

1. Plastic laminates, 8 by 10 inches, for each color, pattern, and surface finish.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop is a certified participant in AWI's Quality Certification Program.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver countertops until painting and similar operations that could damage countertops have been completed in installation areas. If countertops must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.

B. Grade: Custom.

C. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS.

1. Basis-of-Design Product: Subject to compliance with requirements, provide products indicated on Drawings, or approved substitution by one of the following:

a. Formica Corporation.
b. Lamin-Art, Inc.
c. Panolam Industries International, Inc.
d. Wilsonart International Holdings, Inc.

D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As indicated on Drawings.

E. Edge Treatment: 3-mm PVC edging.

F. Core Material: Particleboard.

G. Core Material at Sinks: Particleboard made with exterior glue or medium-density fiberboard made with exterior glue or exterior-grade plywood.

H. Core Thickness: 3/4 inch.

1. Build up countertop thickness at front, back, and ends with additional layers of core material laminated to top, thickness as indicated on Drawings.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Composite Wood Products: Products shall be made without urea formaldehyde.

2. Low-Emitting Composite Wood: Provide materials/products that have low formaldehyde emissions that meet the California Air Resources Board (CARB) ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.
3. Particleboard: ANSI A208.1, Grade M-2 and Grade M-2-Exterior Glue.

2.3 ACCESSORIES

A. Grommets for Cable Passage through Countertops: 2-inch OD, black, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Doug Mockett & Company, Inc.; OG Series.

2.4 MISCELLANEOUS MATERIALS

A. Adhesives: Do not use adhesives that contain urea formaldehyde.

B. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

2.5 FABRICATION

A. Fabricate countertops to dimensions, profiles, and details indicated on Drawings.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.

1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.

C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.

1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
2. Secure backsplashes to walls with adhesive.
3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 123623.13

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SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid surface countertops.
2. Solid surface backsplashes.
3. Solid surface apron fronts.

B. Related Requirements:

1. Division 22 "Plumbing Fixtures" for non-integral sinks and plumbing fittings.

1.3 ACTION SUBMITTALS

A. Product Data: For countertop materials .

B. Sustainable Design Submittals:

1. MR Building Product Disclosure and Optimization (BPDO), Environmental Product Declarations (EPD): An EPD is preferred; submit in accordance with 018113 "Sustainable Design Requirements".
2. MR Building Product Disclosure and Optimization (BPDO), Sourcing of Raw Materials: Submit documentation of applicable pre-consumer and post-consumer recycled content, in accordance with 018113 "Sustainable Design Requirements".
3. MR Building Product Disclosure and Optimization (BPDO), Material Ingredients: A material ingredient inventory is preferred; submit a Health Product Declaration (HPD), Cradle2Cradle (C2C) certificate at Bronze level or higher, Declare product label, or other acceptable material ingredient inventory in accordance with 018113 "Sustainable Design Requirements".
4. Low-Emitting Materials - Adhesives and Sealants:

    a. Submit product data or other published information verifying the VOC (Volatile Organic Compound) content is less than or equal to the allowable VOC content established by the governing standard.
    b. Submit product data or other published information verifying compliance with California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario. Manufacturer's claims of compliance must also state the range of total VOC content after 14 days.

5. Low-Emitting Materials : Composite Wood:

    a. Submit product data or other published information verifying the composite wood has low formaldehyde emissions that meet the California Air Resources Board ATCM for formaldehyde requirements for ultra-low-emitting formaldehyde (ULEF) resins or no added formaldehyde resins.

C. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

1. Show locations and details of joints.
2. Show direction of directional pattern, if any.

D. Samples for Verification: For the following products:

1. Countertop material, 6 inches square.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.7 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.

1. Basis-of-Design Product(s): Subject to compliance with requirements, provide product(s) indicated on Drawings or approved substitution.

2. Type: Provide Standard type unless Special Purpose type is indicated.
3. Colors and Patterns: Match Architect's samples.

2.2 COUNTERTOP FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Custom.

B. Countertops: Provide thickness and edge profile as indicated on Drawings, solid surface material.

C. Backsplashes: Provide thickness as indicated on Drawings, solid surface material.

D. Fabricate with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

E. Joints: Fabricate countertops in sections for joining in field.

1. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.
2. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to provide snug fit.

F. Cutouts and Holes:

1. Undercounter Plumbing Fixtures (where indicated): Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.

a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.

2. Counter-Mounted Plumbing Fixtures (where indicated): Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

1. Adhesives shall have a VOC content of 70 g/L or less.
2. Low-Emitting Adhesives and Sealants: Provide products, applied on-site within the weatherproofing system, that comply with South Coast Air Quality Management District (SCAQMD) Rule 1168 for VOC content, and comply with the California Department of Public Health (CDPH) Standard Method v1.1-2010, using the applicable exposure scenario.

B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

1. Install metal splines in kerfs in countertop edges at joints where indicated. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.

1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

I. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION 123661.16

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SECTION 210101 - FIRE SUPPRESSION GENERAL PROVISIONS

PART 1 - GENERAL

1.1 SUMMARY

A. General provisions and requirements for all fire suppression work.

1.2 RELATED SECTIONS

A. Requirements of this section generally supplement requirements of Division 01.

1.3 REFERENCES

A. NFPA 10: Portable Fire Extinguishers.

B. NFPA 241: Safeguarding Construction, Alteration, and Demolition Operations.

1.4 SYSTEM DESCRIPTION

A. The full set of Contract Documents applies to work of Division 21.

B. Visit the site and study all aspects of the project and working conditions, as required by General and Supplementary Conditions, Bidding and Contracting Requirements, Drawings, and Specifications. Verify field dimensions.

C. The work covered in technical sections includes the furnishing of all labor, equipment and materials, and the performance of all operations pertinent to the work described.

D. Except as required otherwise in Division 01, promptly obtain and pay for, including all necessary signatures and paperwork, all permits, fees and inspections required for work of this division by authorities having jurisdiction, including any utility connection or extension charge. No payment will be made until a copy of the permit is forwarded to the Owner.

E. Fire suppression work of this project includes, as a brief general description, the following:

1. Extension of existing wet pipe sprinkler system from zone control valves in adjacent exit stairs to serve the Library within Macklin Tower.

F. See Division 01 for requirements related to Owner's occupancy of the premises, limits on use of site, time restrictions on work, limits on utility outages or shutdowns, and phasing (sequencing) and scheduling.

1.5 PRODUCT OPTIONS

A. Except as modified by provisions of Bidding and Contracting Requirements and Division 01, the following options apply to Division 21 specifications.

1. Products specified by reference standards or by description only: Any product meeting those standards or description.

2. Products specified by naming one or more manufacturers, or model name or catalog reference number: Products specified establish a standard of quality, options to be included, and performance.

    a. Where other acceptable manufacturers are named, Contractor may provide products of those named manufacturers only, which meet the specifications.
    b. Where specification permits "equal" products, without naming other acceptable manufacturers, Contractor may use products of any manufacturer, which meet the specifications.

3. Products specified by naming one manufacturer and particular product, with no provision for other options: No options or substitutions allowed.

B. Where Contractor is permitted to use a product other than the specified item and model named as the basis of design, Contractor is responsible for all coordination and additional costs as specified in the article "Substitutions," below for substitutions.

1.6 SUBSTITUTIONS

A. Substitutions will be considered only as permitted or required by the Bidding and Contracting Requirements and Division 01. Except as modified by those requirements, the requirements below apply to Division 21 specifications.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed substitution with contract documents.

D. A request constitutes a representation that the Bidder or Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the substitution as for the specified product.
3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution submittal procedure is specified in Bidding and Contracting Requirements and Division 01.

1.7 MATERIALS AND EQUIPMENT

A. All materials and equipment shall be new and the best of their respective kinds, suitable for the conditions and duties imposed on them by the project and of representative manufacture. The description, characteristics and requirements of the materials to be used shall be in accordance with the specifications.

B. All equipment, construction and installation must meet requirements of local, state and federal governing codes.

C. Singular number: In cases where material, a device, or part of the equipment is referred to in the singular number in the specifications, it is intended that such reference shall apply to as many items of material, devices, or parts of the equipment as are required to complete the installation as shown on the drawings or required for proper operation of the system.

D. Terms have the following meanings:

1. Furnish: Supply item
2. Install: Mount and connect item
3. Provide: Furnish and install.

E. All materials and equipment shall be installed and completed in a first class and workmanlike manner and in accordance with the best modern methods, practice and manufacturers' instructions. Any work which shall not present an orderly and neat or workmanlike appearance shall be removed and replaced with satisfactory work when so directed in writing by the Architect.

F. The specifications and drawings are intended to define the minimum requirements, as to quality of materials, construction, finish and overall workmanship.

G. General Conditions describe the correlation and intent of the Contract Documents. In case of discrepancies between the specifications and drawings, the specifications should be followed as to the general methods and principles and the drawings followed as to sizes, capacities and specifics for corresponding parts. If sizes are omitted, the Architect will determine sizes to be utilized.

H. In all cases of doubt, uncertainty, or conflict as to the true meaning of the specifications or drawings, it is the responsibility of the Contractor to notify the Architect of said uncertainty, doubt, or conflict and obtain a decision as to the intent before starting any work which may be affected by this decision.

1.8 COORDINATION

A. Should a situation develop during construction to prevent the proper installation of any equipment or item where shown on the drawings, call the situation to the attention of the Architect and await a written decision.

B. Plan and coordinate all work to proceed in an orderly and continuous manner without undue delay, and in conformance with project schedule. Submit samples, shop drawings, schedules, insurance policies and certificates, and the like in time to avoid delays in actual construction. Coordinate work so that work of each trade is completed before other construction begins which would obstruct it.

C. Coordinate trades to ensure that proper clearances between work of the various trades allow access to items which require operation and maintenance.

D. Coordinate location and elevation of all piping, equipment, and appurtenances in such a manner that the finished installation is as indicated on drawings. In the event difficulties are encountered which prevent this, it is the Contractor's responsibility to bring this to the attention of the Architect prior to initiation of work. Correct improperly coordinated installation at no additional cost.

E. The Contractor's assistants shall include a competent mechanical foreman, who shall be on the premises at all times to check, layout, coordinate and superintend the installation of work. The foreman shall establish all grades and lines relative to the work before starting, and be responsible for the accuracy thereof.

1.9 SUBMITTALS

A. Manufacturers' and subcontractors' lists:

1. As specified in Division 01, submit a complete list of proposed manufacturers for all equipment, materials and subcontractors used for the work of this division. Lists shall follow the sequence of the specifications. No considerations will be given for partial or incomplete lists. After review of lists, submit shop drawings and product data.

B. Shop drawings and product data:

1. Submit in accordance with the requirements of Division 01 or as established at the preconstruction conference, the required number of copies of shop drawings and product data for every item of equipment. Shop drawings or product data will not be considered until manufacturers' lists have been approved. Shop drawings and product data shall be submitted, as required by the General Conditions, with sufficient time for checking, return to Contractor, and resubmission as required before Contractor shall install any item.
2. Each item submitted shall be properly labeled, indicating the specific service for which the equipment or material is to be used, section and paragraph number of specification or drawing number to which it applies, Contractor's name and project name and number. Data submitted shall be specific and shall include product data and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents. Clearly identify each item within the data. Data of a general nature will not be accepted. Each sheet must clearly show the project name and number.
3. The review of a shop drawing or product data shall not be considered as a guarantee of the measurements or building conditions or that the shop drawings or product data have been checked to see that item submitted properly fits the building conditions. This review shall not relieve the Contractor of the responsibility for furnishing material or performing work as required by the contract documents, for correctness of dimensions and quantities, or for proper coordination of details and interfaces among trades.

4. All exclusively electrical items furnished as items associated with fire suppression items but not specifically described in the fire suppression item submission, shall be submitted as a separate submittal but shall be clearly marked as associated with the fire suppression item by identification specification paragraph.
5. Product data sheets shall be 8.5-inches by 11-inches cut sheets for operating and maintenance manual.

C. Submit at least three copies of the results of every test required under any section in this division.

D. Specialist shall submit a list of at least three projects similar to this project in type, size, and quality, which have been in place and operating satisfactorily for at least five years.

1. Include project name, address, name and phone number of owner's representative, and project type and size.

E. After the work is completed, submit all required certificates of approval from approved inspection agencies and authorities having jurisdiction over work of this division. Certificates of approval must be received by the Architect prior to final acceptance of the work.

F. LEED submittals:

1. EQ Credit 2: Low emitting materials:

a. For interior wet-applied adhesives, sealants, paints, coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method V1.1-2010 and VOC content in g/L.

1.10 SPECIALIST

A. The term "Specialist" as used in the specification shall mean an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field,) which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the specification requires installation by a specialist, the term shall also be deemed to mean the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer's direct supervision.

1.11 CONTRACT CLOSEOUT SUBMITTALS

A. Project record documents:

1. Maintain on site one set of the following record documents; record actual revisions to the work of this division:

a. Contract drawings.
b. Specifications.
c. Addenda.
d. Change orders and other modifications to the Contract.
e. Reviewed shop drawings, product data, and samples.

2. Maintain record documents separate from documents used for construction.
3. Record information concurrent with construction progress.
4. Specifications: Legibly mark and record in each section a description of actual products installed, including the following:

    a. Manufacturer's name and product model and number.
    b. Product options, substitutions, or alternates utilized.
    c. Changes made by addenda and modifications.

5. Record documents and shop drawings: Legibly mark each item to record actual construction, including:

    a. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
    b. Field changes of dimension and detail.
    c. Details not on original Contract Drawings.

6. Submit documents as specified in Division 01.

B. Operation and maintenance data:

1. Submit sets prior to final inspection as specified in Division 01. Unless otherwise specified in Division 01, submit no fewer than three sets. In addition to requirements specified in Division 01, submit operating and maintenance manuals for the work of this division as specified below.
2. Binders: Three-ring binders with vinyl-covered hard covers. Provide large enough binders, and sufficient quantity, that the required contents can be easily turned, removed, and reinserted.
3. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," and title of project. Print on spine of binder "O & M INSTRUCTIONS." If more than one binder is required, print covers and spines with volume numbers. Include in the front of every binder an index to all binders.
4. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
5. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, typed on white paper.
6. Part 1: Directory, listing names, addresses, and telephone numbers of mechanical engineers; Contractor; mechanical subcontractors; and major mechanical equipment suppliers.
7. Part 2: Operation and maintenance instructions, arranged by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:

    a. Significant design criteria, including pump curves and similar performance charts.
    b. List of equipment, including operating weight of each piece.
    c. Parts list for each component, including recommended spare parts list.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
    g. Valve charts, including locations of flow fittings.

8. Part 3: Project documents and certificates, including the following:

    a. Shop drawings and product data.
    b. Photocopies of certificates.
    c. Photocopies of warranties and guarantees.
    d. Test reports: Copies of the results of all tests required under all sections of specifications.

9. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with Engineer comments. Revise content of documents as required prior to final submittal.
10. Submit final volumes revised, within ten days after final inspection.

1.12 REGULATORY REQUIREMENTS

A. When these specifications call for materials or construction of a better quality or larger sizes than required by the following codes and standards, the provisions of the specifications shall take precedence.

B. Provide, without extra charge, any additional materials and labor that may be required for compliance with these codes and standards even though the work is not mentioned in these specifications or shown on the contract drawings.

C. Perform the work of this division in strict accordance with the following authorities. The latest revision of these codes accepted by the authority having jurisdiction as of the date of the contract documents shall apply.

1. The plumbing, mechanical, electrical, building, fire, and safety codes of the state and county or city in which the work is being performed.
2. The National Electric Code, NFPA 70 (NEC).
3. The National Fire Protection Association Code. (NFPA).
4. International Energy Conservation, Fire, Fuel Gas, Mechanical, and Plumbing Codes (ICC).

1.13 REFERENCE STANDARDS

A. Perform the work of this division using the standards of the following organizations, as referred to in technical sections, as a minimum requirement for construction and testing. Unless otherwise specified in Bidding and Contract Documents or Division 01, the latest revision current as of the date of the contract documents shall apply. Products shall be certified by manufacturers to meet the requirements of referenced standards.

1. American National Standards Institute (ANSI)
2. ASME International (ASME)
3. American Society for Testing and Materials (ASTM)
4. American Society of Sanitary Engineering (ASSE)
5. American Water Works Association (AWWA)
6. International Code Council (ICC)
7. Manufacturer's Standardization Society of the Valve and Fittings Industry Inc. (MSS)
8. National Electrical Code, NFPA 70 (NEC)
9. National Electrical Manufacturer's Association (NEMA)
10. National Fire Protection Association (NFPA)
11. National Sanitary Foundation (NSF)

12. The Occupational Safety and Health Act (OSHA)
13. Piping and Drainage Institute (PDI)
14. Underwriters Laboratory Inc. (UL)
15. Maryland Occupational Safety and Health Act (MOSHA)

1.14 TEMPORARY STORAGE

A. Maintain upon premises, where directed, a storage area, and be responsible for all contents within these areas. Provide all security measures necessary for this area.

B. Maintain the area and return it to its original condition at project completion.

1.15 PROTECTION

A. Control dust resulting from construction work to prevent its spread beyond the immediate work area, and to avoid creation of a nuisance.

1. Do not use water to control dust. Use drop cloths or other suitable barriers.
2. In areas where dirt or dust is produced as a result of the work, sweep daily, or more often as required.
3. Provide walk-off mats at entries and replace them at regular intervals.
4. Construct dust partitions, where indicated on the drawings or as required.
5. Protect areas occupied by Owner's personnel or equipment.
6. Seal off all return air registers and other mechanical systems to prevent dust from entering.

B. Each trade and subcontractor is responsible for preventing damage and soiling of work performed by other trades or subcontractors. Each trade and subcontractor is responsible for providing temporary protection of its own work.

1. Protect work from spills, splatters, drippings, adhesives, bitumens, mortars, paints, plasters, and damage from welding or burning.
2. Protect finished work from damage, defacement, staining, or scratching.
3. Protect finishes from cleaning agents, or grinding and finishing equipment.
4. Protect adjacent and finished work from damage, using tape, masking, covers or coatings and protective enclosures.
5. Coordinate installations and temporarily remove items to avoid damage from finishing work.

C. Repair all damage or soiling to the complete satisfaction of the Architect; replace any materials or work damaged to such an extent that they cannot be restored to their original condition, all at no addition to the Contract Sum.

D. Protect work stored in place and supplies stored in the building.

1. Store materials and products, subject to damage from moisture, in dry locations. If necessary, provide in protective wraps or covers.
2. Store plastics, other materials, and products subject to damage from heat or cool at manufacturer's recommended temperatures.

E. Use of sidewalk or roadway areas outside of the property lines shall be with permission and approval of the local authorities having jurisdiction.

1.16 FIRE PROTECTION

A. As a minimum, provide hand-carried, portable, UL-rated extinguishers with each work crew working inside the building.

B. Select extinguishers in accordance with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

1.17 PROJECT CONDITIONS

A. Drawings showing utilities in concealed locations are based on the best information available but are not represented as being precisely correct. Work of the contract includes digging, cutting, drilling, using nondestructive methods, and other methods of locating concealed utilities in the field, as well as patching and repairing as specified in "Cutting and Patching" below.

B. If, in the course of the work, workers encounter a material they suspect to present some hazard:

1. Promptly notify the Architect in writing.
2. Do not perform any work which would disturb the suspected material until written instructions have been received.

1.18 WARRANTY

A. All work and equipment provided as work of this division shall be fully warranted under the general project warranty. In addition, provide added special warranties specified in individual sections.

B. During the correction period, the Contractor shall begin correcting any work found to be not in accordance with the requirements of the Contract Documents within 4-hours of receiving written notice from the Owner. Provide detailed schedule for completion of work within 24-hours of receiving written notice from the Owner and revise schedule based on any Owner comments generated. Except as otherwise required in General Conditions and Division 01, the correction period is one year after the date of substantial completion of the work. Work requiring correction shall promptly be repaired or completely replaced at no addition to the Contract Sum.

1. Service reports for warranty work shall be provided to the Owner.

C. When use of the permanent equipment has been permitted for temporary heating or ventilation of the building, the warranty and correction periods shall nevertheless begin at the time of substantial completion, unless another date of acceptance has been agreed to by the Owner.

D. Special warranties are warranties required by individual specification sections, incidental product warranties, manufacturers' standard warranties, installer or subcontractor service agreements, and other individual warranties in addition to the general project warranty.

E. Provide copies of warranties as required for Operation and Maintenance Manual specified above, and by Division 01.

F. For items of work delayed beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

B. Cut walls, floors, partitions, roofs, and other appurtenances for the passage or accommodation of pipes, ducts and appurtenances. Close superfluous openings and remove all debris caused by work of this division.

C. No cutting of any structure or finish shall be done until the condition requiring such cutting has been examined and approved by the Architect.

D. New or existing surfaces disturbed as a result of such cutting or otherwise damaged shall be restored to match original work and all materials used for any patching or mending shall conform to the class of materials originally installed.

E. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

3.2 TEMPORARY FACILITIES

A. Temporary water facilities, electricity, telephone, toilet facilities, and temporary heat, shall be provided as specified in Division 01.

3.3 PROGRESS MEETINGS

A. Progress meetings shall be held as specified in Division 01, and also when and if the Contractor or Architect finds them necessary or advantageous to progress of work.

B. Contractor, those subcontractors and those material suppliers concerned with current progress or with the scheduling of future progress, Architect and Owner shall each be represented at these meetings by persons familiar with the details of work and authorized to conclude matters relating to work progress.

END OF SECTION 210101

SECTION 210500 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SUMMARY

A. Requirements applicable to more than one section of Division 21.

B. Basic material and equipment required for the fire suppression piping work.

C. Identification of fire suppression systems and equipment.

D. Cleaning and painting.

E. Operating instructions.

F. Piping tests.

1.2 RELATED SECTIONS

A. Project and special warranties: Division 01 and Section 210101.

B. Operation and Maintenance Manuals: Division 01 and Section 210101.

C. Painting: Division 09.

1.3 REFERENCES

A. American National Standards Institute

1. ANSI 13.1: Standard for Identification of Pipes

B. ASME

1. ASME B31.9: Building Services Piping

C. ASTM International

1. ASTM A 234: Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
2. ASTM E 548: Standard Guide for General Criteria Used for Evaluating Laboratory Competence

D. American Welding Society

1. AWS D1.1: Structural Welding - Steel
2. AWS D10.9: Specification for Qualification of Welding Procedures and Welders for Piping and Tubing
3. AWS QC1: Specification for AWS Certification of Welding Inspectors

E. National Fire Protection Association

1. NFPA 70: National Electric Code

1.4 DEFINITIONS

A. Project correction period: A period after Substantial Completion of the work during which the Contractor shall correct every part of the work found to be not in accordance with the requirements of the contract documents, promptly after receipt of written notice.

B. Qualified testing agency: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

C. DN: Dimension Nominale, nominal pipe size in millimeters, in accordance with the metric system for construction, Systeme Internationale (SI).

D. NPS: Nominal pipe size in inches, in accordance with standard U.S. designations for manufactured pipe. Pipe sizes do not change when projects are designed and built in metric units; each size has a consistent name (nominal dimension) in each system.

1.5 DESIGN REQUIREMENTS

A. The drawings and system performances have been designed based on using the particular manufacturer's products specified and scheduled on the drawings.

B. Products of other manufacturers that are listed under the article "Acceptable Manufacturers," or permitted as "equal," are permitted provided:

1. Product shall meet the specifications.
2. Contractor shall make, without addition to the contract sum, all adjustments for deviations so that the final installation is complete and functions as the design basis product is intended.

C. Do not propose products with dimensions or other characteristics different from the design basis product that render their use impractical, or cause functional fit, access, or connection problems.

1.6 SUBMITTALS

A. Shop drawings: Schedule of welding and brazing procedures proposed for fire suppression piping.

B. Certifications: Proof of operator and testing agency personnel qualifications as required for welding and brazing in the article "Quality Assurance" below.

C. Test reports: Field test results for each piping system as specified in Part 3 below.

1.7 QUALITY ASSURANCE

A. Provide materials and perform work in accordance with the plumbing, mechanical, electrical, building, fire, health and safety, and other applicable codes and regulations of the state, county or city in which the work is performed.

B. Welding procedures and operator qualifications for structural welding: AWS D1.1, Structural Welding Code Steel, electric arc process.

C. Welding, brazing, and soldering procedures and operator qualifications for fire suppression piping:

1. AWS D10.9, Qualification of Welding Procedures and Welders for Piping and Tubing.
2. ASME B31.9, Building Services Piping.

D. Qualifications of independent testing laboratory personnel:

1. Welding inspectors: AWS QC1, Certification of Welding Inspectors.

PART 2 - PRODUCTS

2.1 GENERAL

A. General piping techniques, testing, identification, painting, and operating instructions specified in this section apply to products specified in other sections of Division 21.

2.2 PIPING MATERIALS

A. Weldolets and thredolets: Fittings designed for installing branches on piping, with either welded or threaded connection to branch; conforming to ASTM A 234.

B. Pipe jointing compound:

1. Polytetrafluoroethylene (PTFE) pipe thread tape, "Teflon."
2. Pipe cement and oil.

2.3 IDENTIFICATION DEVICES AND MATERIALS

A. Stenciling materials:

1. Stencils: Manufactured standard stencils prepared for required applications, conforming to ANSI A13.1 for color and size of legend letters, including arrows showing direction of flow.
2. Paint: Exterior type enamel, colors conforming to ANSI A13.1, or black.

B. Equipment identification tags:

1. Laminated plastic with adhesive back, white core and black outer layers, which, when engraved, will produce white letters and numerals on a black background.
2. Tags installed on curved surfaces shall be aluminum or brass.

C. Valve tags: Brass, 1.5 inches (40 mm) in diameter with black-filled numbers not less than 0.25 inches (6 mm) high, complete with brass attachment chains.

D. Ceiling identification tags: Laminated plastic with adhesive back, engraved black letters on white background, minimum 0.5 inches (15 mm) wide and length as required for letters 0.375 inches (10 mm) high for name of concealed device and number.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS AND EQUIPMENT

A. Manufacturers' instructions: Except as modified by drawings or specifications, install products and equipment in accordance with manufacturers' instructions and recommendations applicable to the project conditions.

1. Immediately notify Architect if a difference or discrepancy is found between manufacturers' instructions and the drawings or specifications.

B. The contract drawings are diagrammatic and do not indicate all fittings or offsets in pipe, all access panels, or all specialties required. Provide required fittings, offsets, access panels, and specialties to coordinate the work.

C. No pipe shall be run below the head of a window or door.

D. Equipment and pipes installed in areas without a suspended ceiling shall be as tight to structure as possible, but at least above a height of 6'-8", unless otherwise noted.

E. Items which require access for operation or maintenance shall be easily accessible. Do not cut or form hand holes for operation or maintenance of appliances through walls or ceilings.

F. Provide installations compliant with NFPA 70

3.2 PIPE INSTALLATION

A. Install pipe exposed to view parallel to building lines and as close to walls, columns, and ceilings as may be practical, maintaining proper clearances for access at all parts requiring servicing.

B. Install pipe a sufficient distance from other work to permit a clearance of not less than 0.5 inch (15 mm) between its finished covering and adjacent work.

C. Remove burrs resulting from cutting pipe or from any other operation.

D. Interface with other products:

1. Where pipe is provided through walls, provide finished, permanent, waterproof installation complete with inserts, sleeves, supports or hangers, seals, and other appurtenances as required. Do not pierce, cut, or notch any footing or other structural member.
2. Waterproofing and dampproofing of the building shall be unharmed by the installation of the work. Where pipe has to pierce waterproofing or dampproofing, including outside walls, the penetration shall be made watertight. Waterproofing damaged or destroyed shall be repaired or replaced with new waterproofing.

E. Thoroughly clean pipe and fittings before they are installed, and keep them clean until the acceptance of the completed work. Cap or plug the ends of the lines so as to prevent earth and other debris from entering during construction.

F. Threaded connections:

1. Cut threads full and clean.
2. Apply specified pipe jointing compound or tape on male threads only.

G. Do not weld galvanized piping.

H. Use welding fittings, tees, wyes, reducers, eccentric reducers, and caps as required. Branches at least two nominal pipe sizes less than the main may be made with "Weldolets" or "Thredolets" installed with full size opening in larger pipe and in accordance with manufacturer's printed instructions. Flanges shall be welded neck or slip-on pattern of class to suit the valves or equipment connections. Flanges shall have machine bolts with hex nuts and washers.

3.3 IDENTIFICATION

A. General: Do not apply identification until insulation and finish painting work is complete.

B. Equipment:

1. Stencil equipment with letters 2-inches (50-mm) high minimum or provide identification tags. Clearly identify function, equipment served, and area served.
2. Firmly fasten identification tags to equipment with drive screws, sheet metal screws, or rivets. Do not interfere with operation of, or damage the item being marked.

C. Piping:

1. Mark by stenciling.
2. Mark to identify service with arrows showing direction of flow. Apply markings near building walls where pipes enter or leave an accessible space and in intermediate locations so that markings are no more than 30 feet (9 m) apart. They shall be readily visible to a person standing on the floor.
3. Fully identify all piping installed as work of the project.
4. Mark pipe with letters of height and colors required by OSHA and conforming to ANSI A13.1.
5. Identify every gauge, and control device.
6. Provide valve tags for all valves. Numbers shall correspond to those shown on the Valve Chart. Attach tags to valve shaft.

D. Ceiling identification tags: Provide on the access door or, in suspended ceilings, on the ceiling support adjacent to the device.

1. Valves: Identify with the same number shown on the valve tag.

3.4 CLEANING AND PAINTING

A. Cleaning: Clean piping and equipment. Where items are to be painted, clean and prepare surfaces for painting.

B. Painting: Coordinate painting with requirements of Division 09. Paint the items identified below to be painted. Use paint materials and systems specified in Division 09.

C. Items to be painted:

1. Items identified below to have protective coating.
2. Items furnished with manufacturer's prime coat.
3. Mechanical rooms:

    a. Piping.
    b. Hangers and supports.

D. Items not to be painted: Stainless steel and equipment furnished with manufacturer's finish.

E. Paint piping in mechanical rooms: Paint piping using colors in accordance with ANSI A13.1 and as coordinated with the owner.

1. Galvanized steel: One coat of primer recommended for galvanized surfaces and one coat of glossy alkyd enamel.
2. Ferrous metal: One coat of primer recommended for ferrous metal and one coat of glossy alkyd enamel.

F. Paint systems for exposed piping: Primer compatible with the substrate; one coat or two, if required to cover, to match adjacent surfaces in color and texture.

3.5 OPERATING INSTRUCTIONS (DEMONSTRATION)

A. Furnish the necessary technicians, skilled workers, and helpers to operate all the fire suppression systems and equipment of the entire project for one 8-hour days.

B. Where specified in technical sections, provide longer periods required for specialized equipment.

C. Instruct the Owner or designated personnel in operation, maintenance, lubrication, and adjustment of all systems and equipment.

1. Instructions by manufacturer's technical representative for each type of system shall include the performance of the recommended preventive maintenance procedures for that equipment.

D. The Operating and Maintenance Manual shall be available at the time of the instructions, for use by instructors and Owner personnel.

E. Schedule the general and specialized instruction periods for a time agreed upon by the Owner and Architect.

3.6 PIPING TESTS

A. Hydrostatic testing:

1. Notify Owner in writing at least 24 hours prior to the test.
2. Test before pipes are concealed or insulated.
3. Piping may be tested in sections as the work progresses.
4. Provide fluid, pumps, valves, and gages required for testing.
5. Where water is used as the test fluid, provide ambient temperature water and provide means to avoid freezing. Drain and dispose of test fluid when testing is concluded.
6. Isolate equipment and expansion tanks during test.
7. Isolate or remove any components with a pressure rating below the required test pressure.
8. Brace and support piping during the test, so that no movement, displacement, or damage results from the application of the test pressure.
9. Provide a pressure relief valve, set at a pressure no more than one-third higher than test pressure, to protect against damage caused by expanding liquid or other source of overpressure during test.
10. Replace piping or fittings found defective with new material.

B. Test the piping system for not less than four hours to fulfill the conditions in the Piping Systems Test Schedule at the end of this section.

C. Documentation of tests: Prepare a test report for each portion of piping tested, identified by service, material, location, and pipe size. Include these items:

1. Date of test.
2. Starting and completion times.
3. Initial test pressure.
4. Final test pressure.
5. Problems or leaks detected.
6. Corrective actions taken.
7. Record of successful completion of testing.
8. Name, title, and signature of person conducting test.

D. Piping Systems Test Schedule:

SYSTEM	TEST PRESSURE	ALLOWABLE DROP	MEDIUM
Sprinkler water and fire line	200 psig (1370 kPa)	None	Water

END OF SECTION 210500

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SECTION 211000 - WATER-BASED FIRE SUPPRESSION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following fire suppression systems inside the building:

1. Wet pipe sprinkler systems.

B. Related sections include the following:

1. Piping materials and joining requirements: Section 210500.
2. Sleeves, escutcheon plates, and other items related to piping systems: Section 210502.
3. Requirements for firestopping: Section 210507.

1.2 DEFINITIONS

A. AHJ: Authority having jurisdiction, typically the fire marshal.

B. CPVC: Chlorinated polyvinyl chloride plastic.

C. CR: Chlorosulfonated polyethylene synthetic rubber.

D. PE: Polyethylene plastic.

E. Registered fire protection engineer:

1. Registered professional engineer in Maryland.
2. Bachelor's degree in fire protection engineering and no less than two years of experience working in fire protection; or Bachelor's degree in engineering and no less than 4 years of experience working in fire protection; or other qualification combination satisfactory to the AHJ.

F. Underground service-entrance piping: Water service piping installed below grade in earth.

1.3 SYSTEM DESCRIPTIONS

A. Wet pipe sprinkler system: Automatic sprinklers are attached to piping containing water and that is connected to water supply. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.4 DESIGN REQUIREMENTS

A. Design the system by the hydraulic calculation method. Base data for calculations are shown on the drawings.

B. Locations of service connection, mains and risers, zones, and Hazard Classifications are shown on drawings.

C. Engage a structural engineer licensed in Maryland to verify conditions and prepare calculations, and to certify that the existing building structural system is adequate to accommodate the new sprinkler system.

D. Contractor's attention is called to Memorandum 01-88-206 from the Maryland State Fire Marshal which states; "elevator shafts and elevator mechanical rooms be equipped with an automatic fire suppression system ... within buildings which are .... Sprinklered ... with an automatic sprinkler system at the top and bottom of the elevator shaft and within the elevator machine room." Coordinate locations of sprinklers and piping with elevator equipment and requirements of local elevator inspection authority.

E. Do not include area reductions for quick response sprinklers installed in light or ordinary hazard locations, allowed by NFPA, unless approved by both the insurance carrier and the Owner.

1.5 PERFORMANCE REQUIREMENTS

A. Standard piping system component working pressure: Listed for at least 175 psig (1200 kPa).

1.6 SUBMITTALS

A. Product data: Include copy of UL report verifying each product's UL listing for Fire Protection Service.

1. Piping materials, including dielectric fittings and sprinkler specialty fittings.
2. Pipe hangers and supports.
3. Valves, including listed fire protection valves, unlisted general duty valves, and specialty valves and trim.
4. Each type of sprinkler, escutcheon, and guard. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.

B. Shop drawings: Diagram power, signal, and control wiring.

C. Fire hydrant flow test report.

D. Approved sprinkler piping drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations.

E. Field test reports and certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13 and NFPA 14. Include "Contractor's Material and Test Certificate for Aboveground Piping".

F. Welding certificates.

G. Field quality control test reports.

H. Operation and maintenance data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer qualifications:

1. Installer's responsibilities include designing, fabricating, and installing fire suppression systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.

a. Engineering responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

B. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

C. NFPA Standards: Fire suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, "Installation of Sprinkler Systems."
2. NFPA 230, "Fire Protection of Storage."

D. Pipe shall be certified by the manufacturer to meet referenced standards and shall bear a label directly on the pipe indicating compliance.

1.8 REGULATORY REQUIREMENTS

A. Backflow preventers shall be installed by a licensed plumber. Coordinate fire suppression system piping installation with domestic water piping installation.

1.9 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 ABOVEGROUND PIPE AND FITTINGS

A. Pipe: Metal, rigid types permitted by NFPA 13, UL listed and FM approved, suitable for specified fittings. Galvanized pipe is not acceptable.

B. Fittings: Compatible with pipe, types permitted by NFPA 13, UL listed and FM approved, with the following additional constraints:

1. Acceptable fitting types: flanged, threaded, soldered, brazed, welded, and grooved joint coupling fittings.
2. Unacceptable fitting types: pressure-seal fittings, compression fittings, mechanical bolted tee's, grooved joint mechanical tee's, rubber-gasketed outlet fittings, and any other fittings not overtly included above as acceptable.

C. Hangers and clamps: UL approved, supporting piping from above, black steel conforming to NFPA 13.

2.3 SPRINKLER SPECIALTY FITTINGS

A. Sprinkler specialty fittings shall be UL listed or FMG approved, with 175-psig (1200-kPa) minimum working-pressure rating, and made of materials compatible with piping.

B. Sprinkler drain and alarm test fittings: Cast or ductile iron body; with threaded or locking lug inlet and outlet, test valve, and orifice and sight glass.

C. Sprinkler inspector's test fitting: Cast or ductile iron housing with threaded inlet and drain outlet and sight glass.

D. Drop-nipple fittings: UL 1474, adjustable with threaded inlet and outlet, and seals.

2.4 LISTED FIRE-PROTECTION VALVES

A. Manufacturers:

1. Crane Co.; Crane Valve Group; Crane Valves
2. Crane Co.; Crane Valve Group; Jenkins Valves
3. Hammond Valve
4. McWane Inc.; Kennedy Valve Div.
5. Milwaukee Valve Co.
6. Mueller Company
7. NIBCO
8. Potter-Roemer; Fire Protection Div.
9. Reliable Automatic Sprinkler Co., Inc.
10. Stockham
11. Tyco Fire Protection
12. Victaulic Co. of America

B. Valves shall be UL listed or FM approved, with 175-psig (1200 kPa) minimum pressure rating.

1. Valves where required by NFPA 13 to be supervised shall be capable of being locked open with a guarded-shackle padlock. Equal to Master Lock No. 37.

2.5 SPRINKLERS

A. Sprinklers shall be UL listed or FMG approved, with 175-psig (1200-kPa) minimum pressure rating.

B. Sprinkler types and categories:

1. Provide quick-response type.
2. Provide high-temperature heat-responsive elements where required.
3. Extended coverage sprinklers are not acceptable.

C. Sprinkler types, features, and options as indicated in Part 3.

D. Sprinkler finishes: White, in areas with ceilings, and plain brass in other areas.

E. Special coatings: Lead and corrosion-resistant paint.

F. Sprinkler escutcheons: White for sidewall and ceiling mounting.

G. Where required by the authority having jurisdiction, provide heat deflectors of proper size, painted to match surrounding area.

H. Flexible sprinkler hose fitting assemblies are not acceptable

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire hydrant flow test according to NFPA 13, NFPA 14 and NFPA 291. Use results for system design calculations required in Part 1 "Quality Assurance" Article.

B. Report test results promptly and in writing.

3.2 PIPING APPLICATIONS, GENERAL

A. Shop weld pipe joints where welded piping is indicated.

B. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system's pressure rating may be used in aboveground applications, unless otherwise indicated.

3.3 JOINT CONSTRUCTION

A. Refer to Section 210500, Common Work Results for Fire Suppression, for basic piping joint construction.

B. Threaded joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread pipe with wall thickness less than Schedule 40.

C. Grooved joints: Assemble joints with listed coupling and gasket, lubricant, and bolts.

1. Ductile iron pipe: Radius cut groove ends of piping. Use grooved end fittings and grooved end pipe couplings.
2. Steel pipe: Square cut or roll groove piping as indicated. Use grooved end fittings and rigid, grooved end pipe couplings, unless otherwise indicated.
3. Copper tube: Roll groove tubing. Use grooved end fittings and grooved end tube couplings.
4. Dry pipe systems: Use fittings and gaskets listed for dry-pipe service.

D. Dissimilar-metal piping joints: Construct joints using dielectric fittings compatible with both piping materials.

1. NPS 2 (DN 50) and smaller: Use dielectric unions, couplings, or nipples.
2. NPS 2.5 to NPS 4 (DN 65 to DN 100): Use dielectric flanges.
3. NPS 5 (DN 125) and larger: Use dielectric flange insulation kits.

3.4 ABOVEGROUND PIPING INSTALLATION

A. Install piping above the finished ceiling wherever ceilings occur. Consult Finish Schedules on Architectural drawings. Do not install piping so that it blocks access doors or panels of ductwork, air handling equipment, or the space required for filter removal.

1. Finished ceilings shall not be erected until all fire protection piping has been installed, tested, and inspected.

B. System drains shall be piped to drain into service sinks, drains, or through wall to grade with all exterior fittings of brass. At low points in piping provide ball valves with hose nipples with vacuum breakers.

1. Except as shown otherwise on drawings, drains 1.5 inches and larger shall be piped through wall to grade.

C. Obtain written approval from Architect for necessary openings through steel beams for passage of sprinkler pipes. Make openings as small as possible. Where necessary, reinforce the beams around openings with welded steel plates or angle irons in accordance with Architect's details or instructions. Perform cutting, welding, and reinforcing as specified in Structural Steel Section of Specifications, including requirements for welders' certification and for inspection and testing. Costs for this inspection shall be paid by the Contractor. Provide certification of each inspection as required in "Submittals" in Part 1 above.

D. Pipe hanging and support:

1. Comply with the requirements of NFPA 13.
2. Risers:

a. Support pipe risers through floor slabs with riser clamps.
b. Where pipe sleeves or associated water dams are not capable of accepting the weight of the piping, provide supplemental supports to transfer the weight of the piping to the structure.

3. Remove, add, and modify existing hangers and supports to coordinate with new work and support existing to remain elements.

3.5 VALVE INSTALLATION

A. Install listed fire-protection valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

3.6 SPRINKLER APPLICATIONS

A. Installation in suspended ceilings:

1. Locate sprinklers in the geometrical centers of ceiling tiles. Provide pipe, fittings, and number of sprinklers to accomplish this, with no addition to the contract sum.

B. Concealed, including cover plate: Areas with ceilings.

C. Adjustable pendent: Areas with obstructions such as surface-mounted light fixtures.

D. Upright: Areas without ceilings.

3.7 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Electrical connections: Power wiring is specified in Division 26.

D. Connect alarm devices to fire alarm.

E. Connect wiring according to Section 260519.

F. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.8 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13 and in Section 210500.

3.9 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. Leak test after installation:

   a. Charging medium: water.
   b. Test pressure and duration of test as required by NFPA 13.
   c. Repair leaks and retest until no leaks exist.

2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Energize circuits to electrical equipment and devices.
4. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" chapter.
5. Coordinate with fire alarm tests. Operate as required.
6. Coordinate with fire-pump tests. Operate as required.

B. Report test results promptly and in writing to Architect and authorities having jurisdiction.

C. Grooved pipe installation:

1. Install grooved joints in accordance with the manufacturer’s latest published installation instructions. Grooved ends shall be clean and free from indentations, projections, and roll marks. Gaskets shall be molded and produced by the coupling manufacturer, and shall be verified as suitable for the intended service.
2. A factory-trained field representative (direct employee) of the mechanical joint manufacture shall provide on-site training for contractor's field personnel in the proper use of grooving tools and installation of grooved piping products. The factory-trained representative shall periodically review the product installation and ensure best practices are being followed. Contractor shall remove and replace any improperly installed products. A distributor’s representative is not considered qualified to conduct the training.

3.10 CLEANING AND PROTECTION

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

C. Protect sprinklers from damage until Substantial Completion.

3.11 DEMONSTRATION

A. Engage a factory authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves. Refer to Division 01 and Section 210101.

END OF SECTION 211000

SECTION 220101 - PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General provisions and requirements for all plumbing work.

1.2 RELATED SECTIONS

A. Requirements of this section generally supplement requirements of Division 01.

B. LEED Certification and construction waste management: Division 01.

C. Commissioning requirements: Divisions 01 and 23.

1.3 REFERENCES

A. NFPA 10: Portable Fire Extinguishers.

B. NFPA 241: Safeguarding Construction, Alteration, and Demolition Operations.

1.4 SYSTEM DESCRIPTION

A. The full set of Contract Documents applies to work of Division 22.

B. Visit the site and study all aspects of the project and working conditions, as required by General and Supplementary Conditions, Bidding and Contracting Requirements, Drawings, and Specifications. Verify field dimensions.

C. The work covered in technical sections includes the furnishing of all labor, equipment and materials, and the performance of all operations pertinent to the work described.

D. Except as required otherwise in Division 01, promptly obtain and pay for, including all necessary signatures and paperwork, all permits, fees and inspections required for work of this division by authorities having jurisdiction, including any utility connection or extension charge. No payment will be made until a copy of the permit is forwarded to the Owner.

E. Plumbing work of this project includes, as a brief general description, the following:

1. Revisions to domestic water, sanitary, and vent piping to accommodate new plumbing fixtures.
2. The project will be LEED certified.

F. See Division 01 for requirements related to LEED certification, Owner's occupancy of the premises, limits on use of site, time restrictions on work, limits on utility outages or shutdowns, and phasing (sequencing) and scheduling.

1.5 PRODUCT OPTIONS

A. Except as modified by provisions of Bidding and Contracting Requirements and Division 01, the following options apply to Division 22 specifications.

1. Products specified by reference standards or by description only: Any product meeting those standards or description.
2. Products specified by naming one or more manufacturers, or model name or catalog reference number: Products specified establish a standard of quality, options to be included, and performance.

    a. Where other acceptable manufacturers are named, Contractor may provide products of those named manufacturers only, which meet the specifications.
    b. Where specification permits "equal" products, without naming other acceptable manufacturers, Contractor may use products of any manufacturer, which meet the specifications.

3. Products specified by naming one manufacturer and particular product, with no provision for other options: No options or substitutions allowed.

B. General: Where Contractor is permitted to use a product other than the specified item and model named as the basis of design, Contractor is responsible for all coordination and additional costs as specified in the article "Substitutions," below for substitutions.

1.6 SUBSTITUTIONS

A. Substitutions will be considered only as permitted or required by the Bidding and Contracting Requirements and Division 01. Except as modified by those requirements, the requirements below apply to Division 22 specifications.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed substitution with contract documents.

D. A request constitutes a representation that the Bidder or Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the substitution as for the specified product.
3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.

5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution submittal procedure is specified in Bidding and Contracting Requirements and Division 01.

1.7 MATERIALS AND EQUIPMENT

A. All materials and equipment shall be new and the best of their respective kinds, suitable for the conditions and duties imposed on them by the project, and of representative manufacturer. The description, characteristics and requirements of the materials to be used shall be in accordance with the specifications.

B. All equipment, construction and installation must meet requirements of local, state and federal governing codes.

C. Singular number: In cases where material, a device, or part of the equipment is referred to in the singular number in the specifications, it is intended that such reference shall apply to as many items of material, devices, or parts of the equipment as are required to complete the installation as shown on the drawings or required for proper operation of the system.

D. Terms have the following meanings:

1. Furnish: Supply item
2. Install: Mount and connect item
3. Provide: Furnish and install.

E. All materials and equipment shall be installed and completed in a first class and workmanlike manner and in accordance with the best modern methods, practice and manufacturers' instructions. Any work which shall not present an orderly and neat or workmanlike appearance shall be removed and replaced with satisfactory work when so directed in writing by the Architect.

F. The specifications and drawings are intended to define the minimum requirements, as to quality of materials, construction, finish and overall workmanship.

G. General Conditions describe the correlation and intent of the Contract Documents. In case of discrepancies between the specifications and drawings, the specifications should be followed as to the general methods and principles and the drawings followed as to sizes, capacities and specifics for corresponding parts. If sizes are omitted, the Architect will determine sizes to be utilized.

H. In all cases of doubt, uncertainty, or conflict as to the true meaning of the specifications or drawings, it is the responsibility of the Contractor to notify the Architect of said uncertainty, doubt, or conflict and obtain a decision as to the intent before starting any work which may be affected by this decision.

1.8 COORDINATION

A. Should a situation develop during construction to prevent the proper installation of any equipment or item where shown on the drawings, call the situation to the attention of the Architect and await a written decision.

B. Plan and coordinate all work to proceed in an orderly and continuous manner without undue delay, and in conformance with project schedule. Submit samples, shop drawings, schedules, insurance policies and certificates, and the like in time to avoid delays in actual construction. Coordinate plumbing work so that work of each trade is completed before other construction begins which would obstruct it.

C. Coordinate trades to ensure that proper clearances between work of the various trades allow access to items which require operation and maintenance.

D. Coordinate location and elevation of all piping, ductwork, light fixtures, equipment, and appurtenances in such a manner that the finished installation is as indicated on drawings. In the event difficulties are encountered which prevent this, it is the Contractor's responsibility to bring this to the attention of the Architect prior to initiation of work. Correct improperly coordinated installation at no additional cost.

E. The Contractors' assistants shall include a competent foreman, who shall be on the premises at all times to check, layout, coordinate and superintend the installation of work. The foreman shall establish all grades and lines relative to the work before starting, and be responsible for the accuracy thereof.

1.9 SUBMITTALS

A. Manufacturers' and subcontractors' lists:

1. As specified in Division 01, submit a complete list of proposed manufacturers for all equipment, materials and subcontractors used for the work of this division. Lists shall follow the sequence of the specifications. No considerations will be given for partial or incomplete lists. After review and approval of lists, submit shop drawings and product data.

B. LEED submittals:

1. EQ Credit 2: Low-emitting materials.

a. For interior wet-applied adhesives, sealants, paints, and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method V1.1-2010 and VOC content in g/L.
b. For composite wood installed in building interior: Documentation indicating no added formaldehyde resins or compliance with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) for ultra-low-emitting formaldehyde (ULEF) resins.

C. Shop drawings and product data:

1. Submit in accordance with the requirements of Division 01 or as established at the preconstruction conference, the required number of copies of shop drawings and product data for every item of equipment. Shop drawings or product data will not be considered until manufacturers' lists have been approved. Shop drawings and product data shall be submitted, as required by the General Conditions, with sufficient time for checking, return to Contractor, and resubmission as required before Contractor shall install any item.
2. Each item submitted shall be properly labeled, indicating the specific service for which the equipment or material is to be used, section and paragraph number of specification or drawing number to which it applies, Contractor's name and project name and number. Data submitted shall be specific and shall include product data and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents. Clearly identify each item within the data. Data of a general nature will not be accepted. Each sheet must clearly show the project name and number.
3. The review of a shop drawing or product data shall not be considered as a guarantee of the measurements or building conditions or that the shop drawings or product data have been checked to see that item submitted properly fits the building conditions. This review shall not relieve the Contractor of the responsibility for furnishing material or performing work as required by the contract documents, for correctness of dimensions and quantities, or for proper coordination of details and interfaces among trades.
4. All exclusively electrical items furnished as items associated with plumbing items but not specifically described in the plumbing item submission, shall be submitted as a separate submittal but shall be clearly marked as associated with the plumbing item by identification specification paragraph.
5. Product data sheets shall be 8.5-inch by 11-inch cut sheets for operating and maintenance manual.

D. Submit at least three copies of the results of every test required under any section in this division.

E. Specialist shall submit a list of at least three projects similar to this project in type, size, and quality, which have been in place and operating satisfactorily for at least five years.

1. Include project name, address, name and phone number of owner's representative, and project type and size.

F. After the work is completed, submit all required certificates of approval from approved inspection agencies and authorities having jurisdiction over work of this division. Certificates of approval must be received by the Architect prior to final acceptance of the work.

1.10 SPECIALIST

A. The term "Specialist" as used in the specification shall mean an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field,) which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the specification requires installation by a specialist, the term shall also be deemed to mean the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer's direct supervision.

1.11 CONTRACT CLOSEOUT SUBMITTALS

A. Project record documents:

1. Maintain on site one set of the following record documents; record actual revisions to the work of this division:

   a. Contract drawings.
   b. Specifications
   c. Addenda
   d. Change orders and other modifications to the Contract
   e. Reviewed shop drawings, product data, and samples

2. Maintain record documents separate from documents used for construction.
3. Record information concurrent with construction progress.
4. Specifications: Legibly mark and record in each section a description of actual products installed, including the following:

   a. Manufacturer's name and product model and number
   b. Product options, substitutions, or alternates utilized
   c. Changes made by addenda and modifications

5. Record documents and shop drawings: Legibly mark each item to record actual construction, including:

   a. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   b. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
   c. Field changes of dimension and detail.
   d. Details not on original Contract Drawings.

6. Submit documents as specified in Division 01.

B. Operation and maintenance data:

1. Submit sets prior to final inspection as specified in Division 01. Unless otherwise specified in Division 01, submit no fewer than three sets. In addition to requirements specified in Division 01, submit operating and maintenance manuals for the work of this division as specified below.
2. Lubrication charts: Prepare lubrication charts for each piece of mechanical equipment that requires grease or oil.

   a. Include the following:

      (1) Types of lubricants required
      (2) Locations of lubrication points
      (3) Frequency of lubrication.

   b. Provide one extra set of lubrication charts mounted in plastic covers, besides those required in Operating and Maintenance Manuals.

3. Binders: Three-ring binders with vinyl-covered hard covers. Provide large enough binders, and sufficient quantity, that the required contents can be easily turned, removed, and reinserted.
4. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," and title of project. Print on spine of binder "O & M INSTRUCTIONS." If more than one binder is required, print covers and spines with volume numbers. Include in the front of every binder an index to all binders.
5. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
6. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, typed on white paper.
7. Part 1: Directory, listing names, addresses, and telephone numbers of mechanical engineers; Contractor; mechanical subcontractors; and major mechanical equipment suppliers.
8. Part 2: Operation and maintenance instructions, arranged by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:

    a. Significant design criteria, including pump curves and similar performance charts.
    b. List of plumbing equipment, including operating weight of each.
    c. Parts list for each plumbing fixture, faucet, and pump, including recommended spare parts list.
    d. Operating instructions.
    e. Maintenance instructions for plumbing equipment and systems.
    f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
    g. Valve charts, including locations of flow fittings.
    h. New burner installations: Include firing rate, nozzle size, and fuel pressure.

9. Part 3: Project documents and certificates, including the following:

    a. Shop drawings and product data for plumbing systems.
    b. Water balance reports.
    c. Photocopies of certificates.
    d. Photocopies of warranties and guarantees.
    e. Test reports: Copies of the results of all tests required under all sections of specifications.

10. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with Engineer comments. Revise content of documents as required prior to final submittal.
11. Submit final volumes revised, within ten days after final inspection.

1.12 REGULATORY REQUIREMENTS

A. When these specifications call for materials or construction of a better quality or larger sizes than required by the following codes and standards, the provisions of the specifications shall take precedence.

B. Provide, without extra charge, any additional materials and labor which may be required for compliance with these codes and standards even though the work is not mentioned in these specifications or shown on the contract drawings.

C. Perform the work of this division in strict accordance with the following authorities. The latest revision of these codes accepted by the authority having jurisdiction as of the date of the contract documents shall apply.

1. The plumbing, mechanical, electrical, building, fire, and safety codes of the state and county or city in which the work is being performed.
2. The National Electric Code, NFPA 70 (NEC).
3. The National Fire Protection Association Code. (NFPA).
4. International Energy Conservation, Fire, Fuel Gas, Mechanical, and Plumbing Codes (ICC).

1.13 REFERENCE STANDARDS

A. Perform the work of this division using the standards of the following organizations, as referred to in technical sections, as a minimum requirement for construction and testing. Unless specified otherwise in Bidding and Contract Documents or Division 01, the latest revision current as of the date of the contract documents shall apply. Products shall be certified by manufacturers to meet the requirements of referenced standards.

1. Federal Specifications (FS)
2. Military Specification (MS)
3. Military Standards (Mil. Std.)
4. Air Conditioning, Heating, and Refrigeration Institute (AHRI)
5. Air Movement and Control Association (AMCA)
6. Associated Air Balance Council (AABC)
7. American Association State Highway and Transportation Officials (AASHTO)
8. American National Standards Institute (ANSI)
9. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
10. ASME International (ASME)
11. American Society for Testing and Materials (ASTM)
12. American Society of Sanitary Engineering (ASSE)
13. American Water Works Association (AWWA)
14. International Code Council (ICC)
15. Manufacturer's Standardization Society of the Valve and Fittings Industry Inc. (MSS)
16. National Electrical Code, NFPA 70 (NEC)
17. National Electrical Manufacturer's Association (NEMA)
18. National Fire Protection Association (NFPA)
19. National Fuel Gas Code, NFPA 54
20. National Sanitary Foundation (NSF)
21. National Standard Plumbing Code (NSPC)
22. The Occupational Safety and Health Act (OSHA)
23. Piping and Drainage Institute (PDI)
24. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
25. Underwriters Laboratory Inc. (UL)
26. Maryland Occupational Safety and Health Act (MOSHA)

1.14 TEMPORARY STORAGE

A. Maintain upon premises, where directed, a storage area, and be responsible for all contents within these areas. Provide all security measures necessary for this area.

B. Maintain the area and return it to its original condition at project completion.

1.15 PROTECTION

A. Control dust resulting from construction work to prevent its spread beyond the immediate work area, and to avoid creation of a nuisance.

1. Do not use water to control dust. Use drop cloths or other suitable barriers.
2. In areas where dirt or dust is produced as a result of the work, sweep daily, or more often as required.
3. Provide walk-off mats at entries and replace them at regular intervals.
4. Construct dust partitions, where indicated on the drawings or as required.
5. Protect areas occupied by Owner's personnel or equipment.
6. Seal off all return air registers and other mechanical systems to prevent dust from entering.

B. Each trade and subcontractor is responsible for preventing damage and soiling of work performed by other trades or subcontractors. Each trade and subcontractor is responsible for providing temporary protection of its own work.

1. Protect work from spills, splatters, drippings, adhesives, bitumens, mortars, paints, plasters, and damage from welding or burning.
2. Protect finished work from damage, defacement, staining, or scratching.
3. Protect finishes from cleaning agents, or grinding and finishing equipment.
4. Protect adjacent and finished work from damage, using tape, masking, covers or coatings and protective enclosures.
5. Coordinate installations and temporarily remove items to avoid damage from finishing work.

C. Repair all damage or soiling to the complete satisfaction of the Architect; replace any materials or work damaged to such an extent that they cannot be restored to their original condition, all at no addition to the Contract Sum.

D. Protect work stored in place and supplies stored in the building.

1. Store materials and products, subject to damage from moisture, in dry locations. If necessary, protect in wraps or covers.
2. Store plastics, other materials, and products subject to damage from heat or cold at manufacturer’s recommended temperatures.

E. Use of sidewalk or roadway areas outside of the property lines shall be with permission and approval of the local authorities having jurisdiction.

1.16 FIRE PROTECTION

A. As a minimum, provide hand-carried, portable, UL-rated extinguishers with each work crew working inside the building.

B. Select extinguishers in accordance with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

1.17 PROJECT CONDITIONS

A. Drawings showing utilities in concealed locations are based on the best information available but are not represented as being precisely correct. Work of the contract includes digging, cutting, drilling, using nondestructive methods, and other methods of locating concealed utilities in the field, as well as patching and repairing as specified in "Cutting and Patching" below.

B. If, in the course of the work, workers encounter a material they suspect to present some hazard:

1. Promptly notify the Owner and Architect in writing.
2. Do not perform any work which would disturb the suspected material until written instructions have been received.

1.18 WARRANTY

A. All work and equipment provided as work of this division shall be fully warranted under the general project warranty. In addition, provide added special warranties specified in individual sections.

B. During the correction period, the Contractor shall begin correcting any work found to be not in accordance with the requirements of the Contract Documents within 4-hours of receiving written notice from the Owner. Provide detailed schedule for completion of work within 24-hours of receiving written notice from the Owner and revise schedule based on any Owner comments generated. Except as otherwise required in General Conditions and Division 01, the correction period is one year after the date of substantial completion of the work. Work requiring correction shall promptly be repaired or completely replaced at no addition to the Contract Sum.

1. Service reports for warranty work shall be provided to the Owner.

C. When use of the permanent equipment has been permitted for temporary heating or ventilation of the building, the warranty and correction periods shall nevertheless begin at the time of substantial completion, unless another date of acceptance has been agreed to by the Owner.

D. Special warranties are warranties required by individual specification sections, incidental product warranties, manufacturers' standard warranties, installer or subcontractor service agreements, and other individual warranties in addition to the general project warranty.

E. Provide copies of warranties as required for Operation and Maintenance Manual specified above, and by Division 01.

F. For items of work delayed beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.19 COMMISSIONING

A. This project includes commissioning under the direction of a Commissioning Agent (CxA). Contractor's and subcontractors' responsibilities are described in Divisions 01 and 23.

B. Cooperate with the CxA to accomplish the requirements of the Commissioning Plan during the construction and correction periods.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

B. Cut walls, floors, partitions, roofs, and other appurtenances for the passage or accommodation of pipes, ducts and appurtenances. Close superfluous openings and remove all debris caused by work of this division.

C. No cutting of any structure or finish shall be done until the condition requiring such cutting has been examined and approved by the Architect.

D. New or existing surfaces disturbed as a result of such cutting or otherwise damaged shall be restored to match original work and all materials used for any patching or mending shall conform to the class of materials originally installed.

E. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

3.2 TEMPORARY FACILITIES

A. Temporary water facilities, electricity, telephone, toilet facilities, and temporary heat, shall be provided as specified in Division 01.

3.3 PROGRESS MEETINGS

A. Progress meetings shall be held as specified in Division 01, and also when and if the Contractor or Architect finds them necessary or advantageous to progress of work.

B. Contractor, those subcontractors and those material suppliers concerned with current progress or with the scheduling of future progress, Architect and Owner shall each be represented at these meetings by persons familiar with the details of work and authorized to conclude matters relating to work progress.

3.4 COMMISSIONING

A. Comply with requirements of "Commissioning" in Part 1 above.

END OF SECTION 220101

SECTION 220500 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Requirements applicable to more than one section of Division 22.

B. Basic material and equipment required for the plumbing piping work.

C. Identification of plumbing systems and equipment.

D. Cleaning and painting.

E. Treated wood lumber.

F. Operating instructions.

G. Piping tests.

1.2 RELATED SECTIONS

A. Project and special warranties: Division 01 and Section 220101.

B. Operation and Maintenance Manuals: Division 01 and Section 220101.

C. Painting: Division 09.

D. LEED Certification and construction waste management: Division 01.

E. Commissioning requirements: Division 01 and Division 23.

1.3 REFERENCES

A. American Society of Mechanical Engineers

1. ASME A 13.1: Scheme for the Identification of Piping Systems
2. ASME B 31.9: Building Services Piping

B. American Society of Testing and Materials

1. ASTM B 32: Standard Specification for Solder Metal
2. ASTM B 88: Standard Specification for Seamless Copper Water Tube
3. ASTM B 813: Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube

4. ASTM D 635: Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
5. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials
6. ASTM E 548: Standard Guide for General Criteria Used for Evaluating Laboratory Competence

C. American Welding Society

1. AWS D1.1: Structural Welding - Steel
2. AWS D10.9: Specification for Qualification of Welding Procedures and Welders for Piping and Tubing

D. NSF

1. NSF/ANSI 61: Drinking Water System Components - Health Affects

1.4 DEFINITIONS

A. Project correction period: A period after Substantial Completion of the work during which the Contractor shall correct every part of the work found to be not in accordance with the requirements of the contract documents, promptly after receipt of written notice.

B. Qualified testing agency: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

C. DN: Dimension Nominale, nominal pipe size in millimeters, in accordance with the metric system for construction, Systeme Internationale (SI).

D. NPS: Nominal pipe size in inches, in accordance with standard U.S. designations for manufactured pipe. Pipe sizes do not change when projects are designed and built in metric units; each size has a consistent name (nominal dimension) in each system.

1.5 DESIGN REQUIREMENTS

A. The drawings and system performances have been designed based on use of the particular manufacturer's products specified and scheduled on the drawings.

B. Products of other manufacturers that are listed under the article "Acceptable Manufacturers," or permitted as "equal," are permitted provided:

1. Product shall meet the specifications.

2. Contractor shall make, without addition to the contract sum, all adjustments for deviations so that the final installation is complete and functions as the design basis product is intended.

C. Do not propose products with dimensions or other characteristics different from the design basis product that render their use impractical, or cause functional fit, access, or connection problems.

1.6 SUBMITTALS

A. Shop drawings:

1. Schedule of welding and brazing procedures proposed for each piping system in the project.
2. Shop drawings of backboards for piping specialties.

B. LEED submittals:

1. EQ Credit 2: Low-emitting materials.

a. For interior wet-applied adhesives, sealants, paints, and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method V1.1-2010 and VOC content in g/L.
b. For composite wood installed in building interior: Documentation indicating no added formaldehyde resins or compliance with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) for ultra-low-emitting formaldehyde (ULEF) resins.

C. Certifications: Proof of operator and testing agency personnel qualifications as required for welding and brazing in the article “Quality Assurance” below.

D. Test reports: Field test results for each piping system as specified in Part 3 below.

1.7 QUALITY ASSURANCE

A. Provide materials and perform work in accordance with the plumbing, mechanical, electrical, building, fire, health and safety, and other applicable codes and regulations of the state, county or city in which the work is performed.

B. Product NSF/ANSI 61 certified products where in contact with the domestic water supply.

C. Welding procedures and operator qualifications for structural welding: AWS D1.1, Structural Welding Code Steel, electric arc process.

D. Brazing, and soldering procedures and operator qualifications for building systems piping:

1. ASME B31.9, Building Services Piping.
2. Copper Development Association “Copper Tube Handbook.”
3. Safe Drinking Water Act.

E. UL label:

1. Electrical control panels, equipment, materials and devices provided or installed as work of Division 23 shall be UL listed and shall bear a UL label.
2. Equipment, including custom assemblies, shall be listed and labeled as an assembly.
3. If a UL label is not available, the item shall be tested and labeled by a qualified nationally recognized testing agency, acceptable to authorities having jurisdiction, and in accordance with NFPA 70 (NEC).
4. Provide testing, if required, without addition to the contract sum.

F. The project shall be LEED certified. See requirements specified in Division 01 and individual sections for LEED requirements, waste and air quality control.

G. VOC content: Field-applied adhesives and sealants, limits per South Coast Air Quality Management District (SCAQMD), Rule No. 1168.

H. Products shall contain no urea-formaldehyde content.

1.8 COMMISSIONING

A. This project includes commissioning under the direction of a Commissioning Agent. Contractors' and subcontractors' responsibilities are described in Divisions 01 and Division 23.

PART 2 - PRODUCTS

2.1 GENERAL

A. General piping techniques, testing, identification, painting, and operating instructions specified in this section apply to products specified in other sections of Division 22.

B. Equipment that uses or processes date and time data to perform its function shall be warranted by the manufacturer to properly function and correctly use or process all time-related data for all dates and times which occur during a reasonable life expectancy of the equipment.

2.2 PIPING MATERIALS

A. Soldering materials:

1. Solder: Free of lead, antimony, and zinc and meeting the requirements of ASTM B 32. No solder containing lead is permitted.

a. Tin 95.5 percent, copper 4 percent, and silver 0.5 percent.

(1) Equal to "Silvabrite 100" manufactured by Engelhard Corporation.

b. Tin, copper, bismuth, and silver.

(1) Equal to “Oatey Silver” manufactured by Oatey.

2. Flux:

a. Meeting the requirements of ASTM B 813 and NSF 61 certified.
b. Equal to Oatey H-2095.

B. Threaded pipe joint materials:

1. Pipe jointing compound:

a. Pipe joint compound recommended by the manufacturer for use at the temperature and pressure of the system.
b. For sanitary piping overhead of food storage, preparation, and serving and dining areas: Litharge and glycerin.

2. Pipe joint tape: Polytetrafluoroethylene (PTFE) pipe thread tape, “Teflon.”

2.3 IDENTIFICATION DEVICES AND MATERIALS

A. Stenciling materials:

1. Stencils: Manufactured standard stencils prepared for required applications, conforming to ASME A 13.1 for color and size of legend letters, including arrows showing direction of flow.
2. Paint: Exterior type enamel, colors conforming to ASME A 13.1, or black.

B. Equipment identification tags:

1. Laminated plastic with adhesive back, white core and black outer layers, which, when engraved, will produce white letters and numerals on a black background.
2. Tags installed on curved surfaces shall be aluminum or brass.

C. Valve tags: Brass, 1.5 inch (40 mm) in diameter with black-filled numbers not less than 0.25 inch (6 mm) high, complete with brass attachment chains.

D. Ceiling identification tags: Laminated plastic with adhesive back, engraved black letters on white background, minimum 0.5 inch (15 mm) wide and length as required for 0.375 inch (10 mm) high letters for name of concealed device and number.

2.4 TREATED WOOD LUMBER

A. Wood-preservative-treated lumber: Treated by pressure process, AWPA C2, with chemicals acceptable to authorities having jurisdiction, and marked with treatment quality mark of an inspection agency approved by ALSC Board of Review.

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS AND EQUIPMENT

A. Manufacturers' instructions: Except as modified by drawings or specifications, install products and equipment in accordance with manufacturers' instructions and recommendations applicable to the project conditions.

1. Immediately notify Architect if a difference or discrepancy is found between manufacturers' instructions and the drawings or specifications.

B. The contract drawings are diagrammatic and do not indicate all fittings or offsets in pipe, all access panels, or all specialties required. Provide required fittings, offsets, access panels, and specialties to coordinate the work.

C. No pipe shall be run below the head of a window or door.

D. Equipment and pipes installed in areas without a suspended ceiling shall be as tight to structure as possible, but at least above a height of 6'-8", unless otherwise noted.

E. Items which require access for operation or maintenance shall be easily accessible. Do not cut or form hand holes for operation or maintenance of appliances through walls or ceilings.

F. Provide installations compliant with NFPA 70.

3.2 EQUIPMENT INSTALLATION

A. Prepare for installation:

1. Coordinate work to assure that any required recesses for equipment are correct.
2. Examine areas and conditions where equipment will be installed for rough in locations, compliance with installation requirements and tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
3. Visually check equipment. Replace any damaged components prior to installation.
4. Remove temporary devices used for equipment transport.
5. Assemble equipment that is not assembled in the factory.

B. Install equipment:

1. Set equipment plumb and level.
2. Install such that labels and safety instructions are clearly visible.
3. Drawings show the general arrangement of piping, ductwork, conduit and other elements. Coordinate elements to allow access doors to open fully, allow access to removable access panels or casing panels, maintain clearances in front of control panels and electrical components required by the NFPA 70, and maintain the manufacturer's recommended service clearances.
4. Install components inside of equipment enclosures such that they are serviceable when access panels are removed.

5. Extend grease fittings to accessible locations.
6. Install piping hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment. Support equipment independently from piping.
7. Support:

    a. Floor-mounted equipment:

        (1) Securely fasten in place with connections to wall and floor.
        (2) Provide supplemental structure as required.
        (3) Provide a concrete equipment foundation where indicated. Comply with requirements of Section 220529.

    b. Suspended equipment: Securely hang from structure above. Comply with requirements of Section 220529. Provide 0.5 inch (12.5 mm) minimum diameter threaded rods.
    c. Wall-mounted equipment: Securely fasten to wall with metal fasteners, anchors, brackets, sleeves or other devices recommended by the equipment manufacturer. Provide blocking where required.
    d. Curb-mounted and rail-mounted equipment: Securely fasten to curb and provide flashing to make the installation weather tight. Comply with requirements of Section 220506.
    e. Structural frame-mounted equipment: Securely fasten to structural frame.
    f. Equipment mounted at grade: Securely fasten to structural foundation. See drawings for details of construction of structural foundation.
    g. Coordinate supports so they do not interfere with access to other equipment that requires service.
    h. Provide vibration isolation where required.

8. Snugly fit equipment to architectural finishes in finished spaces unless otherwise indicated.
9. Connect associated piping, power, controls, and other associated systems.
10. Conceal associated piping and electrical connections in finished spaces unless otherwise indicated.
11. In rooms without ceilings or other finishes to conceal piping, and electrical connections, arrange these elements to provide a neat and finished appearance.
12. Install dielectric pipe fittings at connections where dissimilar metals are joined.
13. Coordinate with installation of building automation system controls.
14. Install equipment with a safety listing or certification as required to comply with their listing or certification requirements.

C. Install and wire items furnished with equipment:

1. Install control devices, accessories, and appurtenances furnished loose with equipment.
2. Wire devices furnished with equipment that are not factory-wired.

    a. Comply with requirements in Division 26.
    b. Comply with requirements in NFPA 70.
    c. Comply with the manufacturer’s installation requirements.

D. Prepare equipment for use:

1. Clean equipment and repair any damaged finishes. Remove paint splatters, dirt, and debris. Repair damaged finish to match original finish.

2. Adjust tension on belts.
3. Lubricate equipment.
4. Adjust equipment packaged controls to put the system into operation as intended.
5. Start up and operate equipment in accordance with manufacturer's instructions.
6. Verify smooth rotation and proper direction of rotation of motors.
7. Test controls, unit operation, and safety devices. Replace any failed components and retest.
8. Provide equipment identification.

3.3 PIPE INSTALLATION

A. Install pipe exposed to view parallel to building lines and as close to walls, columns, and ceilings as may be practical, maintaining proper clearances for access at all parts requiring servicing.

B. Install pipe a sufficient distance from other work to permit a clearance of not less than 0.5 inch (15 mm) between its finished covering and adjacent work.

C. Remove burrs resulting from cutting pipe or from any other operation.

D. Provide for expansion and contraction of piping and connections so that no breakage or excessive strain will occur. Provide anchors and guides of approved design where shown on drawings and where necessary to allow for proper expansion and contraction. At the time of installation, expansion loops shall be cold sprung to one-half of the calculated expansion.

E. Pipe connection flexibility:

1. Connect domestic hot water risers and branch connections to mains with at least five pipe fittings, including tee in main.
2. Connect domestic hot water risers and branch connections to equipment and fixtures with at least four pipe fittings, including tee in riser.
3. Connect mains and branch connections to equipment and fixtures with at least four pipe fittings, including tee in main.
4. Connections shall be arranged so that movement in piping due to expansion and contraction will not transmit excessive force to equipment or fixtures.

F. Install unions or flanges in the piping at each item of equipment, solenoid valve, central thermostatic mixing valve, and appliance, to provide easy removal of the equipment, valve, or appliance.

G. Pitch water piping so that air in the system can be properly vented. Provide shutoff valves where necessary to isolate parts of system for repairs without draining the entire system.

H. Interface with other products:

1. Where pipe is provided through walls, provide finished, permanent, waterproof installation complete with inserts, sleeves, supports or hangers, seals, and other appurtenances as required. Do not pierce, cut, or notch any footing or other structural member.
2. Waterproofing and dampproofing of the building shall be unharmed by the installation of the work. Where pipe has to pierce waterproofing or dampproofing, including outside walls, the penetration shall be made watertight. Waterproofing damaged or destroyed shall be repaired or replaced with new waterproofing.

I. Thoroughly clean pipe and fittings before they are installed, and keep them clean until the acceptance of the completed work. Cap or plug the ends of the lines to prevent earth and other debris from entering during construction.

J. Threaded connections:

1. Cut threads full and clean.
2. Apply specified pipe joint compound or tape on male threads only.
3. Where piping is installed in crawl spaces and tunnels, cover exposed threads with rust-inhibitive paint. Apply after joints have been assembled and tested.

K. Copper tubing installation:

1. Cut pipe with a tubing cutter or fine-tooth saw. Cuts made with a saw shall be true and square, and the end shall be filed smooth with a fine-tooth file. Remove all marks and burrs with sandpaper.
2. Solder joints for copper tubing: Clean ends of tubing and inside of fitting ends thoroughly with emery cloth before applying flux.
3. Provide dielectric fittings between copper and steel piping to prevent electrolysis.
4. Follow the techniques for soldering and brazing pipe, fittings, and valves as recommended by the manufacturer.

3.4 IDENTIFICATION

A. General: Do not apply identification until insulation and finish painting work is complete.

B. Equipment:

1. Stencil equipment with minimum two-inch (50-mm) -high letters or provide identification tags. Clearly identify function, equipment served, and area served.
2. Firmly fasten each identification tag to its appropriate piece of equipment with drive screws, sheet metal screws, or rivets. Do not interfere with operation of, or damage the item being marked.

C. Piping:

1. Mark by stenciling.
2. Mark to identify service with arrows showing direction of flow. Apply markings near building walls where pipes enter or leave an accessible space and in intermediate locations so that markings are no more than 30 feet (9 m) apart. They shall be readily visible to a person standing on the floor.
3. Fully identify all piping installed as work of the project.
4. Mark pipe with letters of height and with colors as required by OSHA and conforming to ASME A 13.1.
5. Identify every thermometer, gauge, and control device.
6. Provide valve tags for all valves except shutoff valves on individual fixtures or equipment where their function is obvious, or where the fixture or equipment is immediately adjacent. Numbers shall correspond to those shown on the Valve Chart. Attach tags to valve shaft.

D. Ceiling identification tags: Provide on the access door or, in suspended ceilings, on the ceiling support adjacent to the unit.

1. Valves: Identify with the same number shown on the valve tag.

3.5 CLEANING AND PAINTING

A. Cleaning: Clean all piping and equipment. Where items are to be painted, clean ready for painting.

B. Painting: Coordinate painting with requirements of Division 09. Paint the items identified below to be painted. Use paint materials and systems specified in Division 09.

C. Items to be painted:

1. Piping exposed in finished spaces, insulated and uninsulated.

D. Items not to be painted: Copper, stainless steel, and equipment furnished with manufacturer's finish.

E. Paint systems for exposed piping: Primer compatible with the substrate, whether steel, galvanized steel, insulation jacket, or other material; one coat or two, if required to cover, to match adjacent surfaces in color and texture.

3.6 TREATED WOOD LUMBER

A. Provide wood-preservative-treated lumber where wood members are required as detailed on the drawings and in the following applications:

1. Cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, or waterproofing.
2. Sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
3. Framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.

3.7 OPERATING INSTRUCTIONS (DEMONSTRATION)

A. Furnish the necessary technicians, skilled workers, and helpers to operate all the plumbing systems and equipment of the entire project for one 8-hour day.

B. Where specified in technical sections, provide longer periods required for specialized equipment.

C. Instruct the Owner or designated personnel in operation, maintenance, lubrication, and adjustment of all systems and equipment.

1. Instructions by manufacturer's technical representative for each type of equipment shall include the performance of the recommended preventive maintenance procedures for that equipment.

D. The Operating and Maintenance Manual shall be available at the time of the instructions, for use by instructors and Owner personnel.

E. Schedule the general and specialized instruction periods for a time agreed upon by the Owner and Architect.

3.8 PIPING TESTS

A. Hydrostatic testing:

1. Notify Owner in writing at least 24 hours prior to the test.
2. Test before pipes are concealed or insulated.
3. Piping may be tested in sections as the work progresses.
4. Provide fluid, pumps, valves, and gages required for testing.
5. Where water is used as the test fluid, provide ambient temperature water and provide means to avoid freezing. Drain and dispose of test fluid when testing is concluded.
6. Isolate equipment and expansion tanks during test.
7. Isolate or remove any components with a pressure rating below the required test pressure.
8. Brace and support piping during the test, so that no movement, displacement, or damage results from the application of the test pressure.
9. Provide a pressure relief valve, set at a pressure no more than one-third higher than test pressure, to protect against damage caused by expanding liquid or other source of overpressure during test.
10. Replace piping or fittings found defective with new material.
11. Sanitary and storm drainage piping tests:

    a. Before connection of the plumbing fixtures, and before connection to the sewer, cap or plug all new sanitary and storm drainage piping systems of the building.
    b. Test following the methods of testing required by the plumbing code, and no less than the duration and pressures required in the Schedule of Piping Systems Tests.
    c. Where pipes are in trenches, leave the trenches open until the completion of the test.

12. Air conditioning condensate piping tests:

    a. Before connection of condensate producing HVAC equipment, cap or plug all new air conditioning condensate drain piping systems of the building.
    b. Test following the methods of testing required by the plumbing code, and no less than the duration and pressures required in the Schedule of Piping Systems Tests.
    c. Where pipes are in trenches, leave the trenches open until the completion of the test.

13. Documentation of tests: Prepare a test report for each portion of piping tested, identified by service, material, location, and pipe size. Include these items:

    a. Date of test.
    b. Starting and completion times.
    c. Initial test pressure.

d. Final test pressure.
e. Problems or leaks detected.
f. Corrective actions taken.
g. Record of successful completion of testing.
h. Name, title, and signature of person conducting test.

14. Piping Systems Test Schedule:

System	Test Pressure psig (kPa)	Duration	Allowable Drop	Medium
Domestic water piping (cold, hot, tempered, & recirculated)	125 (860)	4 Hours	None	Water
Sanitary waste piping	4.3 (30)**	4 Hours	None	Water

** Where piping is above food service area, test pressure shall be 11 psig (76 kPa).

END OF SECTION 220500

SECTION 220504 - PLUMBING DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Demolition.

B. Disposal.

C. Protection

1.2 RELATED SECTIONS

A. Demolition: Division 02.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION

A. Extent and location of demolition is indicated on the drawings.

B. Comply with demolition and disposal requirements of Division 02.

C. Perform demolition operations expeditiously and in accordance with accepted practice and applicable building code provisions. Perform demolition operations neatly and with the least possible disturbance to the building.

D. If, in the course of the work, workers encounter a material they suspect to be hazardous:

1. Promptly notify the Owner and Architect in writing.
2. Do not perform any work which would disturb the suspected material until written instructions have been received.

E. Provide temporary barriers, danger signals, and appurtenances for protection of personnel and equipment during demolition operations.

F. Drain and refill portions of existing piping systems necessary for the work.

1. Provide isolation valves, if necessary, to keep systems operational in occupied areas.
2. Schedule and coordinate draining with the Owner in accordance with Division 01 requirements for system shutdowns.

G. Demolish, remove, demount, and disconnect inactive and obsolete piping, fittings, specialties, equipment, ductwork, controls, fixtures, insulation, and associated appurtenances.

1. Piping and ducts embedded in floors, walls, and ceilings may be abandoned in place if they do not interfere with new installations. Cut back to at least one inch (25 mm) below the finished surface.
2. Remove materials above accessible ceilings.
3. Drain and cap items to remain behind finished surfaces.
4. Patch and repair surface materials as required in Division 01 and Section 220101.

H. Remove supports, hangers, anchors, and fasteners associated with piping and equipment being removed.

3.2 DISPOSAL

A. Dispose of equipment and materials removed, and other waste material, as work progresses.

B. Do not allow demolition debris to accumulate on site. Remove products of demolition from the building daily as a minimum.

3.3 PROTECTION

A. Protect existing materials that will remain. Locate, identify, and protect mechanical and electrical services passing through demolition area and serving other areas outside the demolition limits. Maintain services to areas outside demolition limits. When services must be interrupted, install temporary services for affected areas.

B. Provide and maintain dust and noise barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Keep standby patching materials on hand to patch and maintain protection as required. Remove protection and barriers after demolition operations are complete.

C. Ensure weathertightness at all times. Prevent the entry of dust or water.

END OF SECTION 220504

SECTION 220523 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Shutoff valves.

B. Check valves.

C. Balancing valves.

D. Drain valves.

1.2 RELATED SECTIONS

A. Piping installation and testing: Section 220500.

B. Piping systems:

1. Domestic water piping: Section 221116.
2. Sanitary waste and vent piping: Section 221316.
3. Storm drainage piping: Section 221413.

C. Automatic water temperature control valve for domestic hot water: Section 221119.

D. Backflow preventers.

E. Access doors: Section Division 08.

1.3 REFERENCES

A. ASME B16.10: Face-to-Face and End-to-End Dimensions of Valves.

B. ASME B16.34: Valves - Flanged, Threaded, and Welding End.

1.4 SUBMITTALS

A. Product data: For each type of valve. Include body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions.

B. Certification that products comply with NSF/ANSI 61.

C. Maintenance data: For inclusion in operation and maintenance manual specified in Division 01 and Section 220101. Include manufacturer's instructions for adjusting, servicing, disassembling, and repairing.

D. Valve charts: Furnish valve charts typed on 8.5 by 11-inch (216 by 279-mm) bond paper, showing locations of all manual and automatic control valves, and flow meters. Include:

1. Number
2. Location
3. Service
4. Function
5. Area served

E. Valve numbering system shall be approved by the Owner prior to final submittal. Place one copy of approved chart in a plastic envelope and mount on wall where directed. Provide another copy for each of the Operating and Maintenance Manuals.

1.5 QUALITY ASSURANCE

A. Lead free requirements:

1. Potable water system components intended to dispense water for human consumption, including pipe and joining materials, shall comply with NSF/ANSI 61 and with requirements for “lead-free” plumbing as defined by state laws and U.S. Safe Drinking Act.
2. Acceptance product marking: NSF®-61.

B. Ferrous valves shall conform to ASME B16.10 and B16.34 for dimension and design criteria.

C. Copper alloy valves (brass and bronze) shall have no more than 15 percent zinc in the alloy.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Shutoff valves:

1. Full-port ball valves: Subject to compliance with requirements, provide the specified NIBCO valve, or comparable product by one of the following:

a. Apollo Valves
b. Milwaukee Valve Co.
c. NIBCO
d. Stockham Valve & Fittings
e. Victaulic Company of America
f. Walworth Co.
g. Watts Regulator Co.

2. High-performance butterfly valves: Subject to compliance with requirements, provide the specified NIBCO valve, or comparable product by one of the following:

    a. Centerline - Mark Controls Corporation
    b. DeZurik
    c. Milwaukee Valve Co.
    d. NIBCO
    e. Victaulic Company of America
    f. Walworth Inc.

B. Check valves:

1. Check valves: Subject to compliance with requirements, provide the specified NIBCO valve, or comparable product by one of the following:

    a. Combination Pump and Valve Co.
    b. Mueller Steam Specialty
    c. NIBCO
    d. Victaulic Company of America

2. Full-port check valves: Subject to compliance with requirements, provide the specified Zoeller valve, or comparable product by one of the following:

    a. Liberty Pumps
    b. Zoeller

C. Balancing valves: Subject to compliance with requirements, provide the specified Bell & Gossett valve, or comparable product by one of the following:

1. Watts Regulator Co.
2. Armstrong

D. Drain valves: Subject to compliance with requirements, provide the specified NIBCO valves, or comparable products by one of the following:

1. Apollo Valves
2. Milwaukee Valve Co.
3. NIBCO
4. Stockham Valve & Fittings
5. Victaulic Company of America
6. Walworth Co.
7. Watts Regulator Co.

2.2 SHUTOFF VALVES

A. Ball valves:

1. Valves NPS 0.25 (DN 8) through NPS 2 (DN 50):

a. 600 psi CWP, two-piece silicon bronze alloy body, full port, blowout-proof stem, PTFE seats, stainless steel ball and stem, extension handle for use in insulated piping, threaded or soldered ends.
b. Basis of design: NIBCO T-685-66-LF or S-685-66-LF.

B. High performance Butterfly valves, NPS 2.5 (DN 65) and larger: Bubble-tight shutoff in both directions at 200 psi (1379 kPa), and maintains bubble-tight rating when flange on one side is removed (dead-end service); Class 150 suitable for use with ASME B16.5 Class 125 and 150 flanges; ASTM A 536 ductile-iron lug body, stainless-steel stem; field-replaceable EPDM sleeve and stem seals, capable of withstanding 225 degrees F (107 degrees C); equal to NIBCO LD-2000.

1. Disk type: Aluminum bronze Stainless steel.
2. Seat type: RTFE.
3. Operator:

a. NPS 6 (DN 150) and smaller: Ten-position leverlock handle.

4. Provide extension handle where required in insulated piping.

2.3 CHECK VALVES

A. Center-guided, spring-loaded silent-action type check valves:

1. Valves NPS 0.5 (DN 15) through NPS 2 (DN 50):

a. 250 psi CWP, silicone bronze body, PTFE disk, stainless steel stem and spring, threaded or soldered ends.
b. Basis of design: NIBCO T-480-Y-LF or S-480-Y-LF.

2. Valves NPS 2.5 (DN 65) through NPS 10 (DN 250):

a. 200 psi CWP, cast iron body, bronze renewable seat and disk, stainless steel stem and spring, flanged ends.
b. Basis of design: NIBCO F-910-B-LF.

B. Full port check valves:

1. Valves NPS 1.25 (DN 32) through NPS 3 (DN 75)

a. Rated for operation at 50 psi at 130 degrees F (54 degrees C)
b. Epoxy-coated cast iron body
c. Vertical or horizontal installation
d. Full port design, no restrictions
e. Neoprene polyester reinforced flapper with smooth edge, cast iron and noncorrosive metal backing plates, and stainless steel fastener
f. Stainless steel bolts

(1) Basis of design: Zoeller Unicheck.

2.4 BALANCING VALVES

A. Balancing valves:

1. NPS 3 (DN 80) and smaller: Calibrated balancing valve.

a. Materials: Low-lead brass body (<0.25 percent lead content), stainless steel ball with carbon filled TFE seat rings.
b. Pressure and temperature ports. Differential pressure readout ports across valve seat.
c. Ratings (NPT): Entire assembly 400 psi, 250 degrees F (2758 kPa, 121 degrees C).
d. Flow element: Variable orifice flow meter.
e. Adjustable pre-set balancing points with memory stop and isolation valve.
f. Drain port: 1/4-inch NPT.
g. Bi-directional design.
h. Bellows type meter gauge kit with case, provide one for use on the entire project.
i. Basis of design: Bell & Gossett Circuit Setter Plus.

2.5 DRAIN VALVES

A. Drain valves:

1. Provide with supplemental ASSE 1011 backflow preventer.
2. Full-port, two-piece ball valve, bronze body, bronze ball, replaceable PTFE seats and seals, vinyl-covered steel handle, threaded or soldered inlet, threaded cap with brass chain. Provide extension handles where used in insulated piping. Remove handle where valve is accessible to the public.
3. Pressure rating: 600-psig (4137-kPa).
4. NPS 0.75 (DN 20) inlet.
5. NPS 0.75 (DN 20) ASME B1.20.7 garden-hose thread outlet.
6. Basis of design: NIBCO T-585-80-LF-HC or T-585-80-LF-HC.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install valves to be readily accessible for operation and maintenance, and with ample clearance for turning handles or operators.

B. For valves in inaccessible locations, provide access doors as specified in a related section.

C. Identify valves as specified in Section 220500, Common Work Results for Plumbing.

1. Provide tags for all valves except stop valves on individual fixtures or equipment where their function is obvious, or where the fixture or equipment is immediately adjacent. Numbers shall correspond to those shown on the Valve Chart. Attach tags to valve shaft.
2. Provide ceiling identification tags where valves are above an accessible suspended ceiling. Number shall correspond to tag number.

3.2 INSTALLING SHUTOFF VALVES

A. Install shutoff valves for water piping where indicated:

1. Sizes NPS 2 (DN 50) and smaller: Ball valves.
2. Sizes NPS 2.5 (DN 65) and larger: High performance butterfly valves.

3.3 INSTALLING CHECK VALVES

A. Provide center-guided, spring-loaded silent-action type check valves in domestic water lines.

B. Provide full-port check valves in pumped sanitary, or pumped storm water lines.

3.4 INSTALLING BALANCING VALVES

A. Install balancing valves where indicated.

B. Locate valve to provide a minimum of 5 pipe diameters of straight inlet and 2 pipe diameters of straight outlet.

3.5 INSTALLING DRAIN VALVES

A. Provide drain valve at every low point of a water system, and where indicated.

END OF SECTION 220523

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pipe hangers and supports.

B. Trapeze pipe hangers.

C. Metal framing systems.

D. Insulation protection.

E. Fasteners.

1.2 RELATED SECTIONS

A. Plumbing Piping Insulation: Section 220719.

1.3 REFERENCES

A. American Society of Mechanical Engineers

1. ASME B31.9: Building Services Piping.

B. ASTM International

1. ASTM A 36: Standard Specification for Carbon Structural Steel
2. ASTM A 53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
3. ASTM A 307: Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
4. ASTM A 563: Standard Specification for Carbon and Alloy Steel Nuts
5. ASTM A 1064: Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
6. ASTM C 533: Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation
7. ASTM C 552: Standard Specification for Cellular Glass Thermal Insulation
8. ASTM F 594: Standard Specification for Stainless Steel Nuts
9. ASTM F 3125: Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated

C. American Welding Society

1. AWS-D.1.1: Structural Welding – Steel

D. Metal Framing Manufacturer's Association

1. MFMA-4: Metal Framing Standards Publication
2. MFMA-103: Guidelines for the Use of Metal Framing

E. Manufacturer's Standardization Society

1. MSS SP-58: Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.

1.4 DEFINITIONS

A. Hot Systems: Maximum operating (service) temperatures 120 degrees F (49 degrees C) and above.

B. Ambient Systems: Maximum operating temperatures 60 to 119 degrees F (16 to 48 degrees C).

C. Cold Systems: Maximum operating temperatures 59 degrees F (15 degrees C) and below.

1.5 SUBMITTALS

A. Product data:

1. Provide manufacturer's literature showing compliance with specifications for each type of hanger, framing system, support, fastener and accessory materials.
2. Provide a schedule of piping types and sizes and associated pipe hanger types.
3. Provide a schedule of building attachment types and associated attachment hardware.
4. Provide a schedule of pipe types and sizes and proposed hanger spacing and support rod diameters.
5. Provide manufacturer's recommended pipe hanger spacing criteria for stainless steel piping.
6. For supports used as components of fire protections systems, include certification of listing and label as required in "Quality Assurance" below.

B. Welding certificates.

1.6 QUALITY ASSURANCE

A. Qualifications of welders: As specified in Section 220500, Common Work Results for Plumbing.

B. Hangers and supports used as components of fire protection systems shall:

1. Comply with NFPA 13.
2. Be listed and labeled by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Pipe hangers:

1. Anvil International
2. Carpenter and Paterson, Inc.
3. Cooper Industries
4. National Pipe Hanger Corporation
5. PHD Manufacturing, Inc.
6. PHP Systems/Design

B. Metal framing systems:

1. Anvil International
2. Cooper Industries
3. Hydra-Zorb
4. PHD Manufacturing, Inc.
5. PHP Systems/Design
6. Unistrut

C. Pipe covering protection shields:

1. Anvil International
2. Carpenter and Patterson, Inc.
3. Cooper Industries
4. National Pipe Hanger Corporation
5. PHD Manufacturing, Inc.
6. Pipe Shields, Inc.
7. Rilco Manufacturing Co., Inc.

2.2 PIPE HANGERS AND SUPPORTS

A. General: Comply with requirements of MSS SP-58.

B. Hangers and clamps:

1. Typical interior applications: Galvanized steel or factory painted.
2. Exterior and corrosive applications: Stainless steel.
3. For use with uninsulated copper pipe: Copper plated.

C. Trapeze pipe hanger: MSS SP-58, Type 59, shop-fabricated or field-fabricated pipe support assembly made from structural carbon-steel shapes with pipe saddles and U-bolts to secure piping on top of hanger.

D. Supplemental materials:

1. Threaded rod: Continuously threaded.

a. Zinc-plated or galvanized carbon steel for indoor applications.
b. Stainless steel for outdoor and corrosive applications.

2. Nuts and washers: Provide the same material used for threaded rods (ASTM A 563 for steel, ASTM F 594 for stainless steel).
3. Structural carbon-steel shapes: ASTM A 36.
4. Steel pipe: ASTM A 53, Grade B, Type E (electric resistance welded), Schedule 40, black and galvanized steel.

E. Metal framing systems:

1. Description: Shop- or field-fabricated, pipe-support assembly made of channels, nuts, bolts, structural connections, accessories, fittings, and other manufactured components.
2. Standard: Comply with MFMA-4 for factory-fabricated components for field assembly.
3. Channels: Continuous slotted galvanized steel channel with inturned lips, width selected for applicable load criteria.
4. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
5. Metal framing system pipe clamps:

a. Galvanized steel clamp pipe support with elastic stop nut, and hex head machine screw, and manufactured to connect to metal framing system channels.
b. For insulated piping: Clamp shall have friction tape on inside of clamp surface, manufactured to connect to pipe clamp insulating insert over pipe.
c. For uninsulated piping: Clamp shall have an integral molded thermoplastic elastomer clamping insert on inside of clamp surface, manufactured to connect to uninsulated pipe.

F. Insulation protection:

1. Pipe covering protection shield:

a. Shield: Galvanized steel, meeting the requirements of MSS SP-58 Type 40. Provide with alignment ridges when used in conjunction with pipe hanger.
b. Structural insulation insert: Structural insulation insert to form the insulation for the lower half of, or the entire pipe circumference Provide ASTM C 533, Type I calcium silicate with 100-psig (688-kPa) minimum compressive strength; or ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength. Insert thickness shall match adjacent piping insulation thickness.

2. Combination insulating insert and insulation protection shield:

a. Insulating insert material for cold and ambient system piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength and vapor barrier. Insert thickness shall match adjacent piping insulation thickness.
b. Insulating insert material for hot system piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig (688-kPa) minimum compressive strength; or ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength. Insert thickness shall match adjacent piping insulation thickness.
c. Insulation protection shield: Galvanized steel.
d. Insulating insert and insulation protection shield shall cover entire circumference of pipe.

e. Insulating insert length: Extend 2 inches minimum (50 mm) beyond insulation protection shield.

3. Pipe covering protection saddle:

a. Saddle: Steel, meeting requirements of MSS SP-58 Type 39
b. Insulation insert: Insulating material located in the space between saddle and pipe.

4. Pipe clamp insulating insert:

a. Insulating insert material: Closed-cell, sponge or expanded rubber, ASTM C 534, Type I for tubing material, with integral supports constructed from non-compressive closed cell material, single piece construction with self-adhesive closure strips. Insert thickness shall match adjacent piping insulation thickness. If insulation thickness is not available, provide maximum available thickness and seal insulation vapor barrier at thickness transition.
b. Insulation protection jacket: Aluminum or stainless steel, bonded to insulation insert.
c. Insulating insert and jacket shall cover entire circumference of pipe.
d. Basis of design: Armacell “Armafix” insulating inserts.

2.3 FASTENERS

A. Mechanical expansion anchors:

1. Self-drilling type expansion shields or machine bolt drop-in anchors for drilled holes. Fasteners to floor slabs shall be vibration and shock resistant. Load applied to fasteners shall not exceed 25 percent of manufacturer’s stated load capacity in 3500 psi (24,000 kPa) concrete. Provide zinc-coated anchors for indoor applications and stainless-steel anchors for outdoor applications.
2. Basis of design: ITT Phillips Anchors “Red Head.”

B. Fasteners to drywall or cavity wall construction:

1. Toggle bolts with hollow wall drive anchors or nylon anchors as required.
2. Basis of design: ITT Phillips Anchors “Red Head” toggle bolts.

C. Bolts, nuts, and washers: ASTM A 307, or ASTM F 3125 where high strength is required.

PART 3 - EXECUTION

3.1 GENERAL

A. Provide hangers and supports in accordance with schedules at the end of this section, as modified by specifications for each location and type.

B. Comply with MSS SP-58. Provide hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

C. Provide hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

D. Where required, provide structural steel shapes or metal framing system channels and hardware to transfer load from a hanger location to multiple locations in the structure to get support from an appropriate location or to increase the strength of the connection to the structure.

E. Support horizontal piping from above with hangers and threaded rod where possible, unless otherwise indicated.

F. Secure vertical piping at stack bases.

G. Riser support:

1. Support pipe risers through floor slabs with riser clamps.
2. Where pipe sleeves or associated water dams are not capable of accepting the weight of the piping, provide supplemental supports to transfer the weight of the piping to the structure.
3. Provide additional supports as needed not to exceed scheduled maximum vertical support spacing.

H. Provide hanger sizes to allow for continuous insulation for insulated piping systems.

I. Fabricate wall-mounted and floor-mounted supports using metal framing systems or structural steel where required.

J. Support groups of small piping along a structural wall using a metal framing system secured to the wall.

K. Trim threaded rods with a maximum excess length of 1 inch (25 mm). Provide protective rubber red end caps on the ends of threaded rods exposed and within 8 feet (2.4 meters) of the floor, roof, or grade below.

L. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

M. Install lateral bracing with pipe hangers and supports to prevent swaying.

N. Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

O. Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

P. Trapeze pipe hangers: Provide where required for grouping of parallel runs of horizontal piping.

1. Weld steel according to AWS D-1.1.
2. Hang with threaded rods. Size threaded rods in accordance with MSS SP-58.
3. Design trapeze pipe hangers and supports based on supported load plus a 50 percent minimum safety factor.
4. Hanger spacing shall not exceed the requirements for the smallest pipe in the rack.

5. Hanger spacing shall not exceed 6 feet (1.8 m) where hung from wood.

Q. Metal framing systems: Provide where required for grouping of parallel runs of piping, and support together on field-assembled strut systems. Comply with MFMA-103 for metal framing system selections and applications.

R. Where piping penetrates metal studs within metal stud partitions, provide polymer inserts manufactured for the purpose to isolate piping and insulation from the metal stud material.

S. Remove, add, and modify existing hangers and supports to coordinate with new work and support existing to remain elements.

3.2 BUILDING ATTACHMENTS

A. Attaching to structural walls:

1. Provide a minimum of two 0.375 inch (9.5 mm) minimum screw-type fasteners for attaching brackets and a minimum of three 0.5 inch (13 mm) minimum bolt-type fasteners for attaching structural supports.

B. Attaching to structural steel beams, channels, or angles:

1. Secure threaded rods to MSS SP-58 Type 20 adjustable beam clamps that are clamped to the bottom flange of steel beams for any pipe size.
2. Secure threaded rods to MSS SP-58 Type 23 beam clamps for beams with maximum flange thickness of 0.75 inch (19 mm) and for single pipes NPS 2 (DN 50) and smaller.

C. Attaching to concrete slabs and composite slabs:

1. Obtain approval from the structural engineer and confirm allowable loads prior to supporting pipe from concrete slabs or composite slabs. Where approved, provide mechanical expansion anchors and steel bolts or rods.

D. Attaching to steel decks: Not permitted.

3.3 INSTALLING STORM WATER PIPING

A. Provide hanger to support horizontal storm drainage piping within 12 inches of the first fitting downstream of connections to roof drains and overflow roof drains.

3.4 INSTALLING CAST-IRON PIPING

A. Support piping within 18 inches (460 mm) of each horizontal joint in addition to satisfaction of maximum hanger spacing. Where there are multiple joints in a 4 foot (1.2 m) section, supports may be provided at every other joint.

B. Support piping at changes in direction.

C. Where pipe is supported by hangers more than 18 inches (460 mm) long, provide lateral support at a maximum interval of 40 feet (12.2 m) with sway bracing.

D. Secure closet bends, traps, and similar items against movement in any direction.

3.5 PIPING HANGER AND SUPPORT SCHEDULES

A. Hanger and support types (insulated cold and ambient applications): Applications include, but are not limited to, domestic cold water and insulated sanitary and storm water systems.

HANGERS & SUPPORTS FOR INSULATED COLD AND AMBIENT APPLICATIONS		
MSS SP-58 Classification	Description	Piping Applications
Hung from Above		
Types 1 & 40	Clevis hanger & pipe covering protection shield.	NPS 0.5 (DN 15) through NPS 2 (DN 50)
Types 1 & 40 (with structural insulation insert)	Clevis hanger & pipe covering protection shield, with structural insulation insert.	NPS 2.5 (DN 65) and larger
Type 59 (with combination insulating insert and insulation protection shield)	Trapeze pipe hanger with pipe saddles & U-bolts (with combination insulating insert and insulation protection shield).	NPS 0.5 (DN 15) through NPS 4 (DN 100)
N/A	Metal framing system with metal framing system pipe clamps and pipe clamp insulating inserts.	NPS 0.5 (DN 15) through NPS 4 (DN 100)
Supported from Below		
Type 37 (with combination insulating insert and insulation protection shield)	Adjustable pipe stanchion saddle with U-bolt and floor flange anchored to floor (with combination insulating insert and insulation protection shield).	All sizes where supported from floor or a concrete support pier.
N/A	Metal framing system with metal framing system pipe clamps and pipe clamp insulating inserts.	NPS 0.5 (DN 15) through NPS 8 (DN 200)
Risers		
Type 8	Riser clamp.	All sizes

B. Hanger and support types (insulated hot applications): Applications include, but are not limited to domestic hot water and domestic hot water return systems.

HANGERS & SUPPORTS FOR INSULATED HOT APPLICATIONS		
MSS SP-58 Classification	Description	Piping Applications
Hung from Above		
Types 1 & 40	Clevis hanger & pipe covering protection shield.	NPS 0.5 (DN 15) through NPS 2 (DN 50)
Types 1 & 40 (with structural insulation insert)	Clevis hanger & pipe covering protection shield, with structural insulation insert.	NPS 2.5 (DN 65) to NPS 6 (DN 150)
Type 59 (with combination insulating insert and insulation protection shield)	Trapeze pipe hanger with pipe saddles & U-bolts (with combination insulating insert and insulation protection shield).	NPS 0.5 (DN 15) through NPS 4 (DN 100)
N/A	Metal framing system with metal framing system pipe clamps and pipe clamp insulating inserts.	NPS 0.5 (DN 15) through NPS 4 (DN 100)
Supported from Below		
Type 37 (with combination insulating insert and insulation protection shield)	Adjustable pipe stanchion saddle with U-bolt and floor flange anchored to floor (with combination insulating insert and insulation protection shield).	All sizes where supported from the floor or a concrete support pier. Use only where no significant horizontal pipe movement is anticipated.
Types 41 & 39	Adjustable roller support & pipe covering protection saddle (cast-iron roll and sockets, steel roll rod, supported from below with threaded rods).	All sizes where supported from racks, fixed structural supports, or brackets where vertical adjustment is required.
Types 44 & 39	Roller chair & pipe covering protection saddle (Cast-iron roll, steel roll rod, steel chair, bolts, and hex nuts).	All sizes where supported from racks, fixed structural supports, or brackets where vertical adjustment is not required.
N/A	Metal framing system with metal framing system pipe clamps and pipe clamp insulating inserts.	NPS 0.5 (DN 15) through NPS 6 (DN 150)
Risers		
Type 8	Riser clamp.	All sizes

C. Hanger and support types (uninsulated applications): Applications include, but are not limited to uninsulated storm water, sanitary, vent, compressed air, and laboratory gas systems.

HANGERS & SUPPORTS FOR UNINSULATED APPLICATIONS		
MSS SP-58 Classification	Description	Piping Applications
Hung from Above		
Type 1	Clevis hanger	All sizes
Type 10	Adjustable swivel ring	NPS 0.5 (DN 15) through NPS 4 (DN 100)
Type 59	Trapeze pipe hanger with pipe saddles & U-bolts.	NPS 0.5 (DN 15) through NPS 4 (DN 100)
N/A	Metal framing system with metal framing system pipe clamps for uninsulated piping.	NPS 0.5 (DN 15) through NPS 4 (DN 100)
Supported from Below		
Type 37	Adjustable pipe stanchion saddle with U-bolt, with floor flange and base anchored to floor.	All sizes where supported from the floor or a concrete support pier.
N/A	Metal framing system with metal framing system pipe clamps and pipe clamp insulating inserts.	NPS 0.5 (DN 15) through NPS 8 (DN 200)
Risers		
Type 8	Riser clamp.	All sizes

D. Minimum threaded rod sizes: Provide at least the following minimum rod diameters for single rods supporting a single pipe hanger.

Pipe Size	Minimum Rod Diameter
NPS 2 (DN 50) and below	0.375 inches (10 mm)
NPS 2.5 and NPS 3 (DN 65 and DN 75)	0.5 inches (15 mm)
NPS 4 and NPS 5 (DN 100 and DN 125)	0.625 inches (16 mm)
NPS 6 and NPS 8 (DN150 and DN 200)	0.75 inches (20 mm)
NPS 10 to NPS 12 (DN 250 to DN 300)	0.875 inches (22 mm)
NPS 14 to NPS 18 (DN 350 to DN 450)	1.0 inch (25 mm)
NPS 20 (DN 500) and above	1.25 inch (35 mm)

E. Maximum hanger and support spacing for pressurized piping:

1. Provide additional hangers or supports for concentrated loads such as flanges, valves, expansion compensators, fittings, and other specialties.
2. Horizontal spacing schedule:

<table>
<tr><th>Pipe Size</th><th>Copper Piping</th><th>Ductile Iron Piping</th></tr>
<tr><td>NPS 0.75 (DN 20) and below</td><td>5 feet (1.5 m)</td><td rowspan="3">7 feet (2.1 m)</td></tr>
<tr><td>NPS 1 (DN 25)</td><td>6 feet (1.8 m)</td></tr>
<tr><td>NPS 1.25 (DN 32)</td><td>7 feet (2.1 m)</td></tr>
<tr><td>NPS 1.5 (DN 40)</td><td rowspan="2">8 feet (2.4 m)</td><td>9 feet (2.7 m)</td></tr>
<tr><td>NPS 2 (DN 50)</td><td>10 feet (3 m)</td></tr>
<tr><td>NPS 2.5 (DN 65)</td><td>9 feet (2.7 m)</td><td>11 feet (3.4 m)</td></tr>
<tr><td>NPS 3 (DN 75)</td><td>10 feet (3 m)</td><td>12 feet (3.7 m)</td></tr>
<tr><td>NPS 4 (DN 100)</td><td rowspan="4">12 feet (3.7 m)</td><td>14 feet (4.3 m)</td></tr>
<tr><td>NPS 5 (DN 125)</td><td>16 feet (4.9 m)</td></tr>
<tr><td>NPS 6 (DN 150)</td><td>17 feet (5.2 m)</td></tr>
<tr><td>NPS 8 (DN 200)</td><td>19 feet (5.8 m)</td></tr>
</table>

3. Vertical spacing schedule:

Copper Piping	Ductile Iron Piping
10 feet (3 m)	15 feet (4.5 m)

F. Maximum hanger and support spacing for gravity piping:

1. Provide additional hangers or supports for concentrated loads such as fittings, and other specialties.
2. Horizontal spacing schedule:

<table>
<tr><th>Pipe Size</th><th>Copper DWV Tubing</th><th>Cast-iron (Hub & Spigot)</th><th>Cast-iron (No-hub)</th><th>High-silicon Cast-iron</th></tr>
<tr><td>1.5 inches (40 mm)</td><td rowspan="2">8 feet (2.4 m)</td><td>N/A</td><td rowspan="11">5 feet (1.5 m)</td><td rowspan="4">5 feet (1.5 m)</td></tr>
<tr><td>2 inches (50 mm)</td><td rowspan="9">5 feet (1.5 m)</td></tr>
<tr><td>3 inches (75 mm)</td><td rowspan="6">10 feet (3 m)</td></tr>
<tr><td>4 inches (100 mm)</td></tr>
<tr><td>5 inches (125 mm)</td><td rowspan="7">N/A</td></tr>
<tr><td>6 inches (150 mm)</td></tr>
<tr><td>8 inches (200 mm)</td></tr>
<tr><td>10 inches (250 mm)</td><td rowspan="3">N/A</td></tr>
<tr><td>12 inches (300 mm)</td></tr>
<tr><td>15 inches (350 mm)</td></tr>
<tr><td colspan="5">Cast-iron horizontal support spacing may be increased up to but not in excess of 10 feet (3 m) where 10 foot (3 m) or greater lengths of pipe are used.</td></tr>
</table>

3. Vertical spacing schedule:

Copper DWV Tubing	Cast-iron (Hub & Spigot)	Cast-iron (No-hub)	High-silicon Cast-iron
10 feet (3 m)	15 feet (4.5 m)	15 feet (4.5 m)	14 feet (4.3 m)

END OF SECTION 220529

SECTION 220700 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Definitions and general requirements applicable to the insulation systems specified in “Related Sections.”

1.2 RELATED SECTIONS

A. Plumbing piping insulation: Section 220719.

1.3 REFERENCES

A. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials

B. NFPA 255: Standard Method of Test of Surface Burning Characteristics of Building Materials

C. UL 723: Standard for Test for Surface Burning Characteristics of Building Materials

1.4 DEFINITIONS

A. Concealed insulation shall include work:

1. Above ceilings.
2. Where furred in and in pipe chases.

B. Exposed insulation shall include work:

1. In all rooms and areas.
2. In mechanical equipment rooms, penthouses, or other similar utility spaces.
3. In storage rooms.

C. Unconditioned areas: Areas outside of the insulated envelope.

D. Finished spaces: Areas of the building accessible to the public and to building occupants other than service personnel.

1.5 QUALITY ASSURANCE

A. Perform work in strict accordance with the building, fire and safety codes of the state, county or city in which the work is performed.

B. Insulation, including fittings and butt strips, jackets, facings, and accessories such as adhesives, mastics, cements, tapes and cloth, shall have a fire and smoke hazard rating and label as tested by ASTM E84, NFPA 255, and UL 723, not exceeding Flame Spread 25, Fuel Contributed 50, Smoke Developed 50.

C. All insulation and accessories shall be free of asbestos.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver insulation and accessory products in manufacturers' wrapping or cartons, identified on the exterior and bearing labels showing conformance to flame and smoke rating requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Refer to sections listed in “Related Sections.”

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Plumbing piping insulation for the interior piping systems listed in the minimum insulation thickness schedule at the end of this section.

B. Plumbing piping insulation for the exterior piping systems.

C. Work of this section includes:

1. Insulation for new piping installed under this contract.
2. Patching existing insulation where removed to make connections to existing piping.
3. Patching existing insulation damaged during demolition and construction.

1.2 RELATED SECTIONS

A. LEED certification: Division 01.

B. Firestopping: Division 07.

C. Painting: Division 09.

D. Definitions and general insulation requirements: Section 220700.

E. Pipe hangers and protection shields: Section 220529.

F. Lavatory piping insulation: Section 224200.

1.3 REFERENCES

A. American Society of Testing and Materials

1. Standards for mineral fiber insulation materials

a. ASTM C 449: Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement
b. ASTM C 547: Mineral Fiber Pipe Insulation.
c. ASTM C 553: Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
d. ASTM C 1136: Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

2. Standards for flexible elastomeric insulation materials

    a. ASTM C 534: Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

3. Standards for all insulation materials

    a. ASTM C 450: Prefabrication and Field Fabrication of Thermal Insulating Fitting Covers for NPS Piping, Vessel Lagging, and Dished Head Segments.
    b. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials

4. Standards for field applied jackets and accessories

    a. ASTM C 1729: Standard Specification for Aluminum Jacketing for Insulation
    b. ASTM D 1784: Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
    c. ASTM B 209: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate

1.4 SUBMITTALS

A. LEED submittals:

1. MR Credit 2: BPDO – Environmental Product Declarations:

    a. For insulation, if available: Industry-wide EPD or product-specified EPD.

2. MR Credit 4: BPDO – Material Ingredients:

    a. For insulation, if available: Material Ingredients Report.

3. MR Credit 3: BPDO – Sourcing of Raw Materials:

    a. For recycled content insulation: Documentation indicating percentages by weight of pre-consumer and post-consumer recycled content. Include material cost value.

4. EQ Credit 2: Low-Emitting Materials:

    a. For interior wet-applied adhesives and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method V1.1-2010 and VOC content in g/L. Include volume of material applied per product.

B. Material list: Each type of insulation and accessory, with manufacturer's name and material name and number. Identify locations for use, thickness of material, type of jacket, vapor barrier, and method of application.

C. Product data: Sufficient to show that the product meets the specified requirements for materials, composition, and performance.

D. Submit a single manufacturer for each product. Submittals that include multiple manufacturers for a single product are not acceptable.

E. Installer qualifications.

1.5 QUALITY CONTROL SUBMITTALS

A. Manufacturer's instructions: Recommended accessory materials and products; installation instructions.

1.6 QUALITY ASSURANCE

A. Comply with requirements for LEED certification specified in Division 01.

B. Installers shall be mechanics skilled in this trade, employed with a firm that has a minimum of five years of experience installing mechanical insulation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The listed manufacturers and particular products are intended to set a standard for materials, composition, and performance. Products of other manufacturers may be proposed as permitted by the provisions of Division 01 and the article "Product Options" in Section 220101.

B. Mineral fiber insulation:

1. CertainTeed Corporation.
2. Johns Manville
3. Knauf Insulation
4. Manson Insulation
5. Owens-Corning

C. Flexible elastomeric insulation:

1. Aeroflex USA
2. Armacell LLC
3. K-Flex USA
4. Rubatex

D. Coatings, adhesives, and fabrics:

1. Childers
2. Foster
3. Manville Building Materials Group
4. Rock Wool Manufacturing Company
5. Trimac

2.2 MINERAL FIBER INSULATION MATERIALS

A. Mineral fiber preformed pipe insulation: Glass fibers bonded with a thermosetting resin, ASTM C 547 Type I, with factory-applied ASJ-SSL jacket. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

B. ASJ-SSL jacket:

1. All service jacket with self-sealing lap.
2. White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip.
3. Complying with ASTM C 1136, Type I.

C. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, pressure sensitive, complying with ASTM C 1136; 3 inch (75 mm) width. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

D. Mineral fiber blanket insulation: Glass fibers bonded with a thermosetting resin, ASTM C 553, Type IV, without facing. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

E. Mineral fiber preformed fitting and valve covers: Glass fibers bonded with a thermosetting resin, made from the same material and density as adjacent pipe insulation, meeting ASTM C 450 requirements for dimensions used in forming insulation to cover valves, elbows, tees, flanges, strainers, and unions. Provide with preformed PVC field-applied jacket. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

F. Mineral fiber insulation adhesive:

1. Solvent free, low VOC, water-based adhesive designed for bonding mineral fiber insulation to steel or aluminum surfaces, and compatible with service temperatures. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
2. Basis of design: Foster 85-60 “Quick-Tack”.

G. Mineral fiber insulation vapor barrier mastic:

1. Vapor barrier coating for use over ASJ jackets to give a vapor barrier seal at joints, laps and punctures. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
2. Basis of design: Foster 30-65 “Vapor-Fas”.

H. Insulating cement: Mineral fiber cement with a hydraulic-setting binder, conforming to ASTM C 449. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

2.3 FLEXIBLE ELASTOMERIC INSULATION MATERIALS

A. Flexible elastomeric preformed pipe insulation: Closed-cell, sponge- or expanded-rubber, ASTM C 534, Type I for tubular materials. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

B. Flexible elastomeric preformed fitting and valve covers: Closed-cell, sponge- or expanded-rubber, made from the same material and density as adjacent pipe insulation, meeting ASTM C 450 requirements for dimensions used in forming insulation to cover valves, elbows, tees, flanges, strainers, and unions. Provide with preformed PVC field-applied jacket. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

C. Flexible elastomeric insulation adhesive:

1. Water resistant contact cement designed especially suited for bonding two impermeable surfaces and recommended for rubber foam, steel, or aluminum surfaces, and compatible with service temperatures. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
2. Basis of design: Foster 85-75 “Drion”.

D. Flexible Elastomeric Tape:

1. Black, closed cell, self-adhering, elastomeric thermal insulation tape for insulating pipes and fittings, 0.125 inch (3 mm) thick, 2 inches (50 mm) wide.
2. ASTM C 534 Grade 1.
3. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

E. Flexible elastomeric insulation vapor barrier coating:

1. Water-based latex enamel coating for use over flexible elastomeric insulation, providing a moisture-resistant protective finish suitable for both indoor and outdoor applications. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
2. Basis of design: Armacell “WB Armaflex” latex enamel.

2.4 FIELD-APPLIED JACKETS

A. Polyvinyl chloride (PVC) jacket:

1. Jacket material: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; 20 mils (0.5 mm) thick; roll stock ready for shop or field cutting and forming. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
2. Color: White
3. Adhesive: As recommended by jacket material manufacturer. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
4. Fitting covers: Manufacturer’s factory-fabricated fitting covers made from the same material, finish, and thickness as the jacket, suitable to the size of fittings and thickness of insulation. Provide factory fabricated fitting covers for elbows, tees, flanges, unions, reducers, end caps, valves, and other fittings. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

5. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket and fitting covers with acrylic adhesive; suitable for indoor and outdoor applications, 2 inch (50 mm) width, 6 mil (0.15 mm) thickness. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

2.5 FIELD-APPLIED FABRIC-REINFORCING MESH

A. Fabric-reinforcing mesh:

1. Woven Glass-Fiber Fabric: Approximately 2 ounces per square yard (68 grams per square meter) for covering pipe and pipe fittings.

2.6 FIELD-APPLIED GLASS CLOTH

A. Glass cloth: Woven Glass-Fiber Fabric: MIL-C-20079H. Type I, plain weave, 8 ounces per square yard (270 grams per square meter).

B. Glass cloth tape: Type II, Class 3, 4.5 ounces per square yard (150 grams per square meter).

C. Lagging finish coating:

1. Washable, abrasion-resistant, indoor insulation coating for glass lagging cloth. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
2. Basis of design: Foster 30-36 “Sealfas”.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Provide interior piping insulation in accordance with the Minimum Insulation Thickness Schedule for Interior Applications at the end of this section, as modified by specifications for each location and type.

B. Provide field applied jackets in accordance with the Field-Applied Jacket Schedule at the end of this section, as modified by specifications for each location and type.

C. Provide mineral fiber insulation unless otherwise indicated.

D. Apply insulation in a neat and workmanlike manner and in accordance with manufacturer’s printed instructions.

E. Maintain a continuous vapor barrier on systems that convey fluid at below-ambient temperatures, including the following applications:

1. Domestic cold water piping
2. Storm water piping
3. Roof drain bodies

4. Floor drain bodies receiving air-conditioning condensate
5. Air-conditioning condensate piping

F. Where a continuous vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

G. Installation at pipe hangers:

1. Insulation shall be continuous through hangers for all piping systems.
2. Install pipe covering protection shields with thickness of structural insulation inserts equal, under load, to that of adjoining insulation.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
5. Shields and structural insulation inserts are specified in Section 220529, Hangers and Supports for Plumbing Piping and Equipment.

H. Where insulated piping systems pass through sleeves or openings in partitions and floors, the insulation shall be continuous through the sleeves and openings. See Firestopping specifications for coordinating insulation and firestopping.

I. Do not insulate chrome-plated piping connections to plumbing fixtures, except wheelchair-accessible lavatories shall be insulated with special insulation and finish assemblies specified in Section 224200.

J. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

K. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

L. Install insulation with longitudinal seams at top and bottom of horizontal runs.

M. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

N. Install insulation with least number of joints practical.

O. Finish installation with systems at operating conditions. Repair separations and cracking caused by thermal movement.

3.2 INSTALLING MINERAL FIBER INSULATION

A. Install insulation with factory-applied jackets as follows:

1. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive.

2. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap.
3. Cover circumferential joints and longitudinal seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
4. Where a continuous vapor barrier is indicated, apply vapor-barrier mastic on longitudinal seams and circumferential joints and at ends adjacent to pipe flanges and fittings.
5. Repair damaged insulation jackets by applying same jacket material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere and seal patches.

B. Installation on fittings, valves, strainers, flanges, and unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate using mineral fiber preformed fitting and valve covers whenever possible. Install preformed fittings with adhesive.
3. Where mineral fiber preformed fitting and valve covers are not available, insulate using mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining pieces and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation. Coat with mastic. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
4. Valves: Insulate up to and including the bonnets, stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
5. Strainers: Insulate so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover.
6. Flanges and unions: Install preformed pipe insulation to outer diameter of flange or union. Make width of insulation section same as overall width of union or flange and bolts, plus twice the thickness of pipe insulation. Fill voids between inner circumference of flange or union insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
7. Install fitted PVC cover. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

C. Installation of floor drain bodies that receive air-conditioning condensate and roof drain bodies:

1. Provide mineral fiber blanket insulation, 1 inch thick minimum, adhered to drain body.
2. Coat with mastic.
3. Finish with two coats of lagging finish coating with glass cloth and tape embedded between coats.

3.3 INSTALLING FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and circumferential joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Installation on fittings and flanges:

1. Install insulation over fittings and flanges with continuous thermal and vapor-retarder integrity unless otherwise indicated.

2. Insulate using flexible elastomeric preformed fitting covers whenever possible. Install preformed fittings with adhesive. Tape and seal with vapor barrier coating.
3. Where flexible elastomeric preformed fitting covers are not available, insulate using mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining pieces and bonded with adhesive. Tape and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated. Seal with vapor barrier coating.
4. Flanges: Install pre-formed pipe insulation to outer diameter of pipe flange. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation. Secure insulation to flanges and tape and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated. Seal with vapor barrier coating.
5. Install fitted PVC cover. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.

3.4 SCHEDULES

A. Minimum insulation thickness schedule for interior applications:

MINIMUM INSULATION THICKNESS SCHEDULE FOR INTERIOR APPLICATIONS (3)		
Application	Fluid Temperature Range	All Pipe Sizes
Domestic Hot Water & Domestic Hot Water Return Piping (2)	105F to 140F (40C to 60C)	1.5-inch (38 mm)
Domestic Cold or Tempered Water Piping (1)	--	1-inch (25 mm)
(1) - Contractor's Option within partitions only: 0.5-inch (13mm) flexible elastomeric insulation. (2) - Contractor's Option within partitions only: 1-inch (25 mm) flexible elastomeric insulation for piping NPS 1.25 (DN 32) and smaller.		

END OF SECTION 220719

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SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Domestic cold water piping.

B. Domestic hot water piping.

C. Recirculated hot water piping.

D. Tempered water piping.

1.2 RELATED SECTIONS

A. Piping installation and testing: Section 220500.

1.3 REFERENCES

A. American Society of Mechanical Engineers

1. ASME B 16.18: Cast Copper Alloy Solder Joint Pressure Fittings
2. ASME B 16.22: Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
3. ASME B16.24: Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves: Classes 150, 300, 600, 900, 1500, and 2500

B. American Society of Mechanical Engineers/American National Standards Institute

1. ASME/ANSI B16.1: Cast iron pipe flanges and flanged fittings
2. ASME/ANSI B16.5: Pipe flanges and flanged fittings

C. American Society of Testing and Materials

1. ASTM A 182: Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service
2. ASTM A 240: Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
3. ASTM A 312: Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes
4. ASTM A 403: Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings
5. ASTM A 536: Standard Specification for Ductile Iron Castings
6. ASTM B 75: Standard Specification for Seamless Copper Tube
7. ASTM B 88: Standard Specification for Seamless Copper Water Tube
8. ASTM B 584: Standard Specification for Copper Alloy Sand Castings for General Applications

9. ASTM F 1545: Standard Specification for Plastic-Lined Ferrous Metal Pipe, Fittings, and Flanges

D. American Water Works Association

1. AWWA C-104: American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
2. AWWA C-110: American National Standard for Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids
3. AWWA C-111: American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
4. AWWA C-151: American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water

E. National Sanitation Foundation/American National Standards Institute

1. NSF/ANSI 61: Drinking Water System Components – Health Effects

1.4 DEFINITIONS

A. Domestic water system: Potable water system for general human use, including hot and cold water supply and return.

1.5 SUBMITTALS

A. Product data: Each type of pipe and fitting included in the project.

B. Certification that products comply with NSF/ANSI 61.

C. Certifications: Disinfection test report

D. Submit a single manufacturer for each product. Submittals that include multiple manufacturers for a single product are not acceptable.

1.6 QUALITY ASSURANCE

A. Lead free requirements:

1. Potable water system components intended to dispense water for human consumption, including pipe and joining materials, shall comply with NSF/ANSI 61 and with requirements for “lead-free” plumbing as defined by state laws and U.S. Safe Drinking Act.
2. Acceptance product marking: NSF®-61.

B. Pipe shall be certified by the manufacturer to meet referenced standards and shall bear a label directly on the pipe, indicating compliance.

PART 2 - PRODUCTS

2.1 ACCEPTABLE SUPPLIERS

A. Disinfection of domestic water system:

1. ARC Water Treatment Company, Inc.
2. Ecolab
3. Water Chemical Services, Inc.
4. Olin Water Services

2.2 ABOVE GROUND PIPE

A. Copper: ASTM B 88, Type L hard drawn.

B. Ductile iron: AWWA C-151, Class 54, with AWWA C-104 cement lining.

C. Stainless steel: ASTM A 312, Type 304L, Schedule 10S.

2.3 ABOVE GROUND FITTINGS

A. General requirements for fittings:

1. Elbows in piping NPS 4 (DN 100) and larger shall be long radius type.

B. Cast or wrought fittings for copper pipe:

1. General: Solder joint, cast brass, ASME B16.18; or wrought copper, ASME B16.22.
2. Flanges: Bronze, solder type, ASME B16.24, Class 150.

C. Dielectric nipples:

1. Standard: IAPMO PS 66.
2. Electroplated steel nipple complying with ASTM F 1545.
3. Pressure Rating and Temperature: 300 psig (2,070 kPa) at 225 degrees F (107 degrees C).
4. End Connections: Male threaded or grooved.
5. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 GENERAL

A. Install domestic water piping as shown on the drawings and in accordance with the provisions of Section 220500, Common Work Results for Plumbing.

B. Install piping in accordance with the Schedule of Pipe Systems, Sizes, and Materials at the end of this section.

C. Provide drain valves at low points of domestic water system for drainage.

3.2 INSTALLING DIELECTRIC ISOLATION

A. Provide dielectric nipples at connections between existing ferrous piping and copper piping.

3.3 TESTING OF DOMESTIC WATER SYSTEM

A. When domestic water piping is completed, and before strainer baskets are installed, pressure test at the pressure shown in Piping Test Table in Section 220500.

3.4 CLEANING OF DOMESTIC WATER SYSTEM

A. Flushing of building systems:

1. Flush domestic cold water, domestic hot water, recirculated hot water, and tempered water piping before using. Unless prescribed otherwise by the county or state health department, the method of flushing shall be as follows:
2. Do not allow flushing water for piping to travel through plumbing equipment. Isolate equipment by closing isolation valves and opening bypass valves or by leaving piping disconnected from equipment.
3. Flush new piping segments as the work progresses.
4. Provide temporary domestic water and drain piping as needed. Remove when flushing is complete.
5. Drain water from the segment low point to a safe location and replace water at the same rate.
6. Continue until drain water is free from sediment, scale, rust and other foreign substances.
7. Flush every new branch of piping, for a minimum of 15 minutes after running clean.
8. Install strainer baskets.
9. Disinfect piping as described below.

B. Disinfection of building systems:

1. Disinfect domestic cold water, domestic hot water, recirculated hot water, and tempered water piping before using. Unless prescribed otherwise by the county or state health department, the method of flushing shall be as follows:
2. Provide temporary domestic water and drain piping as needed. Remove when disinfection is complete.
3. Through a NPS 0.75 (DN 20) hose connection in the main downstream of the backflow preventer, pump in sodium hypochlorite to produce a free available chlorine residual of not less than 200 ppm. Provide plumbing connections and power for pumping chlorine into the system.
4. Fill all piping systems with chlorinated water.
5. Proceed downstream from the point of chlorine application, opening each water source for each faucet and outlet until chlorine is detected at a concentration of 200 ppm. Close each water source for each faucet and outlet when chlorine is evident at the required concentration.

6. Energize domestic water recirculation systems or provide another means of filling domestic hot water return piping with chlorinated water at a concentration of 200 ppm.
7. Retain this water in the system for at least three hours, but no more than 3.5 hours.
8. At the end of the retention period, verify that no less than 100 ppm of chlorine are present at the most remote end of the system.
9. Open all faucets and outlets and flush all piping until the chlorine residual in the water is less than 1 ppm.
10. Obtain a representative water sample from the system for analysis by a recognized bacteriological testing laboratory.
11. If the sample tested for coliform organisms is negative, the testing organization shall submit a letter and laboratory report to the Contractor, certifying successful completion of the disinfection. Submit the letter and report.
12. If any samples tested indicate the presence of coliform organisms, repeat the entire disinfection procedure.

3.5 SCHEDULE OF PIPE SYSTEMS, SIZES AND MATERIALS

A. Pipe schedules apply to domestic cold water, domestic hot water, domestic hot water return, and domestic temper water piping.

B. Above ground piping:

	Copper Type L cast or wrought fittings
NPS 2.5 (DN 65) and smaller	X
NPS 3 (DN 80) and NPS 4 (DN 100)	X
NPS 5 (DN 125) and larger	X

END OF SECTION 221116

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SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Thermostatic water temperature controllers.

1.2 RELATED SECTIONS

A. Piping: Domestic water piping: Section 221116.

B. Insulation: Section 220719.

1.3 REFERENCES

A. American National Standards Institute:

1. ANSI B1.20.1: Pipe Threads, General Purpose, Inch.
2. ANSI B 16.22: Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
3. ANSI Z21.22: Relief Valves for Hot Water Supply Systems.

B. American Society of Mechanical Engineers:

1. ASME A112.1.2: Air Gaps in Plumbing Systems (For Plumbing Fixtures and
2. Water-Connected Receptors).
3. ASME B16.18: Cast Copper Alloy Solder Joint Pressure Fittings.
4. ASME B16.22: Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.

C. American Society of Sanitary Engineering:

1. ASSE 1001: Performance Requirements for Atmospheric Type Vacuum Breakers.
2. ASSE 1010: Performance Requirements for Water Hammer Arresters.
3. ASSE 1013: Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies.
4. ASSE 1015: Performance Requirements for Double Check Backflow Prevention Assemblies.
5. ASSE 1018: Performance Requirements for Trap Seal Primer Valves - Potable Water Supplied.
6. ASSE 1044: Performance Requirements for Trap Seal Primer – Drainage Types and Electric Design Types.

D. American Society for Testing and Materials:

1. ASTM B88: Standard Specification for Seamless Copper Water Tube.
2. ASTM B584: Standard Specification for Copper Alloy Sand Castings for General Applications.

E. PDI-WH 201: Water Hammer Arresters.

F. NSF/ANSI 61: Drinking Water System Components – Health Effects.

1.4 SUBMITTALS

A. Product data: Each specialty device or equipment, with installation instructions.

B. Certification that products comply with NSF/ANSI 61.

1.5 QUALITY ASSURANCE

A. Lead free requirements:

1. Potable water system components intended to dispense water for human consumption, including pipe and joining materials, shall comply with NSF/ANSI 61 and with requirements for “lead-free” plumbing as defined by state laws and U.S. Safe Drinking Act.
2. Acceptance product marking: NSF®-61.

B. Minimum working pressure: 125 psi (860 kPa) unless otherwise indicated.

PART 2 - PRODUCTS

2.1 THERMOSTATIC WATER TEMPERATURE CONTROLLERS

A. Acceptable manufacturers:

1. Bradley Corporation
2. Powers Regulator Company
3. Lawler Manufacturing Company, Inc.
4. Leonard Valve Company
5. Symmons Industries, Inc.

B. General:

1. Provide units of sizes, capacities, and piping arrangements as indicated on the drawings.
2. Construction: Copper or bronze body with corrosion-resistant interior components.
3. Minimum pressure rating: 125 psi (860 kPa).
4. Paraffin-based thermal actuation technology to sense and adjust outlet temperature with vandal-resistant locking mechanism to secure temperature setting.
5. Maximum water pressure drop at design flow rate: 10 psi (70 kPa).
6. Set units for the discharge temperatures specified below unless otherwise indicated on the drawings.

C. Master thermostatic water tempering valves:

1. ASSE 1017 listed.
2. Union and check stop at each inlet.
3. Discharge temperature adjustment range: 90 - 160 degrees F. Set at 120 degrees F.
4. Rigid bulb indicating thermometer at supply outlet; 3-inch dial graduated 30 degrees to 130 degrees F, stainless-steel, hermetically-sealed with external calibration screw.
5. Minimum controllable flow rate without recirculation: 3.0 gpm (11.4 l/m).
6. Rough bronze finish.
7. Cabinet: Wall-mounted , steel with manufacturer's standard enamel finish.
8. Basis of design: Powers Regulator Company "Hydroguard" LFSH 1430.

D. Lavatory thermostatic tempering valves.

1. ASSE 1070 listed.
2. Integral checks and screen strainers at inlets and union end connections.
3. Discharge temperature adjustment range: 80 - 120 degrees F. Set at 110 degrees F.
4. Capacity of valve: 12.0 gpm (45.4 l/m) at 45 psi (310 kPa) differential.
5. Perform to a minimum flow of 0.5 gpm (1.9 l/m).
6. Basis of design: Powers Regulator Company "Hydroguard" Series LFLM 495.

PART 3 - EXECUTION

3.1 INSTALLING WATER TEMPERATURE CONTROLLERS

A. Install and connect controllers as shown on the drawings and in compliance with the manufacturer's recommendations.

B. Adjust controllers to specified supply temperatures or as indicated on the drawings.

END OF SECTION 221119

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SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Sanitary piping

1.2 RELATED SECTIONS

A. Piping installation and testing: Section 220500.

B. Sanitary waste piping specialties: Section 221319.

1.3 REFERENCES

A. Cast iron piping standards

1. ASTM A 74: Standard Specification for Cast Iron Soil Pipe and Fittings
2. ASTM C 564: Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
3. ASTM C1540: Standard Specification for Heavy-Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings
4. CISPI 301: Standard Specification for hubless cast iron soil pipe and fittings for sanitary and storm drain, waste, and vent piping applications

B. Copper (DWV) piping standards

1. ANSI/ASME B16.29: Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fitting: DWV
2. ASME/ANSI B16.23: Cast Copper Alloy Solder Joint Drainage Fittings: DWV
3. ASTM B 306: Standard Specification for Copper Drainage Tube (DWV)

1.4 SUBMITTALS

A. Product data: Each specified material and product.

B. Submit a single manufacturer for each product. Submittals that include multiple manufacturers for a single product are not acceptable.

1.5 QUALITY ASSURANCE

A. Cast iron pipe and fittings shall be marked with the collective trademarks of the Cast Iron Soil Pipe Institute (CISPI) and listed by NSF International.

B. Prior to any new piping installation, verify the inverts of piping to which new work is to be attached. Demonstrate to the satisfaction of the construction manager and/or Owner, that the connections to existing sanitary pipes meet the intent of the contract.

C. Pipe shall be certified by the manufacturer to meet referenced standards and shall bear a label, directly on the pipe, indicating compliance.

D. Clean, rod, and flush existing sanitary piping as necessary to maintain gravity flow.

PART 2 - PRODUCTS

2.1 PIPING AND FITTINGS

A. Install each type of pipe and fittings in locations required or permitted in Part 3, including the Pipe Installation Schedule at the end of the section.

B. Cast-iron no-hub pipe and fittings:

1. Pipe and fittings: Cast Iron Soil Pipe Institute Standard 301.
2. Joints: Use one of the no-hub coupling options below

a. Option 1 (for use in any location):

(1) ASTM C 564 neoprene gaskets and two-piece cast-iron housing clamps and stainless-steel bolts and nuts.
(2) Basis of design: Products of MG Piping Products Company.

b. Option 2 (for use in any location):

(1) Corrugated 304 stainless-steel shields with four or six clamps and holding bolts conforming to ASTM C 1540 and rubber gasket sealing sleeves conforming to ASTM C 564
(2) Basis of design: Husky “Series 4000” coupling or Mission "Heavy Weight Series CHW" coupling.

3. Pipe and fitting restraints:

a. Provide for piping NPS 5 (DN 125) and larger
b. Factory fabricated pipe and fitting restraint assemblies rated to prevent pipe separation under fluid thrust forces up to 50 feet of head in conformance with CISPI 301.
c. Basis of design: Holdrite No. 117 No-Hub Pipe and Fitting Restraint.

C. Copper tube (DWV) pipe and fittings:

1. Pipe: copper tubing Type DWV, ASTM B 306
2. Fittings: Wrought copper drainage fittings and soldered joints conforming to ASME/ANSI B16.29 or cast-brass fittings conforming to ASME/ANSI B16.23.

PART 3 - EXECUTION

3.1 PREPARATION

A. Connect piping as shown on the drawings. Check elevations of connection points before installing new work.

3.2 INSTALLATION, GENERAL

A. Use suitable tools and appliances for the safe and convenient handling and laying of pipe. Examine each section of pipe for defects. Do not lay any piece that is known to be defective. If any defective piece should be discovered after having been laid, remove and replace it at no change to the contract price.

B. Install piping in accordance with the Pipe Installation Schedule at the end of this section, as indicated on the drawings, and in accordance with Section 22 0500, Common Work Results for Plumbing. Materials and work shall conform to local plumbing codes and health department regulations.

C. Thoroughly clean all pipe and fittings before installing them, and keep them clean until the acceptance of the completed work. Cap or plug ends of lines to prevent debris from entering during construction.

3.3 INSTALLING CAST-IRON PIPING

A. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings." Install restraint assemblies at pipe couplings and fittings for piping NPS 5 (DN 125) and larger.

3.4 INSTALLING COPPER PIPING

A. Install aboveground copper tubing according to Copper Development Association, Inc. (CDA) "Copper Tube Handbook."

3.5 INSTALLING SANITARY AND VENT PIPING

A. Make changes in direction of sanitary piping with approved sanitary fittings, Y branches, 1/8 or 1/16 bends.

B. In soil, waste, and vent stacks where branches occur that are smaller than stacks, provide properly sized reducing fittings.

C. Provide sanitary piping at a 2 percent minimum downward slope in the direction of flow unless otherwise indicated.

D. Provide vent piping at a 1 percent minimum downward slope toward vertical fixture vent or toward vent stack.

E. Provide sanitary vent termination height above the finished roof level at the minimum required per the applicable plumbing code, or as directed by the building inspector.

F. Provide sanitary vent terminations a minimum of 10 feet (3 meters) away from outside air intakes, or further where indicated on drawings.

3.6 CONNECTING TO EXISTING PIPING

A. Clean the inside of existing piping at connections to new piping using a water blasting device.

B. Blasting device: Flexible high pressure hose with self-propelling nozzle which blasts to front, sides, and rear (propulsion).

C. Operation: Blasting device is operated with water at 15,000 psi (10^7 kPa). The piping system being cleaned is not pressurized.

D. Clean from the connection point to at least 5 feet (1.5 m) outside the exterior building wall.

3.7 SCHEDULES

A. Sanitary pipe installation schedule.

SANITARY PIPE INSTALLATION SCHEDULE Contractor has option where more than one x appears on a line		
MATERIAL TYPE		
Application	Cast-iron no-hub	Copper tube (DWV)
Sanitary, concealed within walls, partitions, or ceiling space	X	X
Sanitary, interior exposed	X	X
All information in this schedule is subject to local plumbing code and health department requirements.		

END OF SECTION 221316

SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Drains and cleanouts.

B. Flashing material.

1.2 RELATED SECTIONS

A. Piping: Section 221316.

B. Curbs and flashings: Section 220506.

1.3 SUBMITTALS

A. Product data: Each specialty device or equipment, with installation instructions.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. General: Model numbers are provided in the articles below to set a standard for materials, quality of construction, options and details, and performance. Provide named products, or equal products by the acceptable manufacturers listed.

B. Drains and cleanouts:

1. Josam Company
2. Jay R. Smith Manufacturing Company
3. MIFAB, Inc.
4. Wade
5. Watts Drainage
6. Zurn Plumbing Products

2.2 FLOOR DRAINS

A. Those installed in slabs on grade and above crawl space do not require flashing clamp devices. All others shall have flashing clamp devices.

1. Equal to the Zurn catalog numbers noted on drawings.

B. Floor drain P traps shall have primer plugs.

2.3 FLEXIBLE FLASHING

A. Polyvinyl chloride sheet, flexible, waterproof, unreinforced, 40 mil minimum thickness, intended for use as a drain flashing.

2.4 CLEANOUTS

A. Cleanouts: Those installed in slab on grade and in slab above crawl spaces do not require membrane flashing device. All others shall have flashing devices.
B. In sanitary lines:

1. Exposed piping:

    a. Coated cast-iron cleanout tee with bronze cleanout plug.
    b. Basis of design: Zurn Z-1445.

2. Concealed piping:

    a. Coated cast-iron cleanout tee with bronze cleanout plug and polished bronze cover.
    b. Basis of design: Zurn ZB-1446.

3. Concealed piping where more than 8 inches (205 mm) back from finished wall line: Install a sanitary 90 degrees long turn Y fitting with bronze cleanout plug extended out to finish 1 inch (25 mm) behind finished wall.

    a. Provide with 9 by 9 inch cover plate (access panel) with vandalproof screws.

        (1) Basis of design: Zurn Z-1460.

C. In underfloor sanitary lines: (See Floor Finish Schedule) All units complete with adjustable floor cleanout, coated cast-iron body, and bronze threaded plug.

1. In storage areas with plain or painted concrete floors: Polished bronze light-duty top.

    a. Basis of design: Zurn ZB-1400.

2. In exposed areas with plain or painted concrete floors: Polished nickel bronze light-duty top.

    a. Basis of design: Zurn ZN-1400.

3. In resilient tile floors: Polished nickel bronze light-duty square top recessed for 1/8-inch tile.

    a. Basis of design: Zurn ZN-1400-TX.

4. In ceramic tile floors: Polished nickel bronze light-duty square top.

a. Basis of design: Zurn ZN-1400-T.

5. In carpeted floors: Carpet marker.

a. Basis of design: Zurn Z-1400-CM.

6. In terrazzo floors: Corrosion resistant ductile-iron top with severe and heavy-duty coating.

a. Basis of design: Zurn Z-1400-DC.

PART 3 - EXECUTION

3.1 INSTALLING FLOOR DRAINS

A. Where floor drains are over occupied areas, flash them with flashing specified in this section, single piece for each drain, 30 by 30 inches (762 by 762 mm) with opening cut in center to suit clamping device of drain. Adhere flashing to substrate with adhesive and secure to clamping device of drain. Ascertain that weep holes from drainage pan are open.

B. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated. See architectural plans for additional information about slopes of floors.

C. Floor drains shall be provided with cast-iron P traps with primer connections, including those discharging directly into storm drains.

D. Floor drains shall be provided with trap primers.

1. Refer to Section 221119, Domestic Water Piping Specialties, for trap primers.

E. Floor drains shall be covered until placed in service to prevent the entrance of any foreign matter.

3.2 INSTALLING CLEANOUTS

A. Install cleanouts at base of each vertical, soil, waste, and vent stack, in the vertical piping.

B. Cleanouts shall be the same size as the pipe into which they are installed, except no cleanout shall be larger than NPS 4 (DN 100).

C. Install cleanouts in horizontal piping where indicated on drawings. Where cleanouts occur directly below a floor, the cleanout shall terminate with top flush with floor. Provide for the floor finish to be installed on the cleanout cover, and separated from surrounding material. Install carpet markers after carpet installation is completed. Install ceramic tile and terrazzo per manufacturer’s instructions.

D. Where cleanouts are over occupied areas, flash them with flashing specified in this section, by the same method specified for floor drains.

END OF SECTION 221319

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SECTION 221426.13 – PLAZA DECK (TERRACE) DRAINS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies requirements for the following Scope of Work:

1. Provide drain bowls, strainers, clamping rings, underdeck clamps, and pipe joint connections at all terrace drain locations.
2. Clear roof drain systems from roof level to the point where the leaders exit the building to achieve a free-flowing system.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

1.3 PROJECT CONDITIONS

A. Sections of the existing interior finish ceiling systems will require removal. These areas should be reviewed with Owner prior to removal. Work areas shall be clearly defined and closed-off from building occupants. Areas of ceiling removal shall be as small as possible to effectively install the work. Any adjacent ceilings damaged during installation shall be repaired or replaced by the Contractor at no cost to the Owner.

B. Existing roof drain outlet diameters vary. Contractor shall confirm conditions prior to ordering materials.

C. The plumbing work shall be coordinated with roof work in such a manner that drain bowl assemblies are installed concurrently with the roofing and that no interior portions of the building are left exposed to the elements at the end of a day's work. Install replacement drain bowl assemblies before new roofing is in place.

D. The Contractor shall provide all rooftop protection for new and existing roofs.

E. All plumbing work shall be performed by a licensed plumber in accordance with the International Plumbing Code (IPC**).**

F. The Contractor shall investigate the ceiling conditions. PVC piping shall not be used if the ceiling is used as a return air plenum.

PART 2 - PRODUCTS

2.1 DRAIN COMPONENTS

A. Plaza Deck (Terrace) Drains: Coated cast iron with bottom outlets, large-sump style, with wide roof flanges and square pedestrian grate, such as “Series 23500-AE” manufactured by Josam Company, or approved equal. Outlet diameters shall match the existing leader pipe diameters.

B. Clamping rings: Non-puncturing type, with integral gravel stops, either coated cast iron or stainless steel, sized to match the drain bowls. Bolts, nuts, and washers required for securement of clamping rings to drain bowls shall be stainless steel.

C. Underdeck clamps: Coated cast iron, provided by the drain bowl manufacturer for application beneath roof decks.

2.2 ACCESSORIES

A. Leader pipe: Schedule 40 PVC pipe. Pipe and connections shall be sized to tie into existing leader piping.

B. Drain bowl to leader pipe connections: 4 band, no hub, neoprene connections.

C. Steel plate for drain bowl locations shall be minimum 24 gauge hot dipped galvanized plate as provided by the drain bowl manufacturer. Plate shall be a minimum size of 16-inches by 16-inches with central hole of suitable size to receive new drain bowl.

D. Insulation for drain bowls and leader piping: Fibrous glass batt type with premolded PVC jackets. Insulation shall be minimum 1-inch thick.

PART 3 - EXECUTION

3.1 PREPARATION

A. The Owner shall be notified at least 72 hours prior to all underdeck work. All materials, equipment and daily clean-up shall be the responsibility of the Contractor.

B. All flashing-in of the roof drains and membrane repairs as a result of the plumbing work shall be the responsibility of and provided for by the Contractor.

C. The Contractor is cautioned to investigate all existing conditions and materials of construction. All replacement items must be completely compatible with and match the existing system.

D. Comply with Division 1 GENERAL REQUIREMENTS for preparation, protection and clean-up of interior and exterior work areas.

3.2 CEILING REMOVAL

A. Do not remove any ceiling areas without the prior approval of the Owner and Owner's Representative. The limits of ceiling removal to facilitate installation of the new plumbing work shall be clearly defined. All precautions shall be taken to protect the building interior and occupants during ceiling removal and replacement.

B. Do not damage or cut any of the ceiling support system without the Owner's and Owner's Representative's approval. Should the support system be damaged or removed to facilitate plumbing work installation, it shall be replaced with a new support system equal to the existing, at no additional cost to the Owner.

C. All floor and adjacent areas, both interior and exterior, damaged or stained by the installation of the plumbing work shall be cleaned of all dust, debris and any other materials to the Owner's satisfaction.

3.3 DRAIN BOWL ASSEMBLY INSTALLATION

A. Install new roof drains such that the bowl flange with clamping ring and integral gravel stop are level (see Detail Drawings for assembly position).

B. Provide manufacturer supplied, prefabricated, galvanized steel plate over opening. Mechanically attach plate to steel deck with specified fasteners, 2 per side.

C. Make drain to leader connections watertight and of proper strength using no hub connections.

D. Install drain bowl insulation and PVC jackets. Join sections with tape or other methods indicated by the manufacturer. Extend insulation to the first elbow or 2-feet.

E. Drain components shall be completed and flashed in the same day's operation.

F. Check all drain joints with a water test once the roofing and flashing are completed.

3.4 CLEANING OF DRAINAGE SYSTEM

A. Once the new roof system has been installed, clear all roof drain leader piping and underground leaders of debris and clogs such that the system is free-flowing.

B. The Contractor shall clear the existing leader pipe with rooter-type equipment from the roof deck level to the point where the drain pipes exit the building.

3.5 WATER TESTS

A. Perform water tests on roof drain assemblies, including leader piping, and on gutter assemblies and scuppers. Using 3/4-inch garden hose, run water into the drainage components for thirty

minutes. Inspect all drainage components for leakage and repair as required. Inform Owner of test findings.

END OF SECTION 221426.13

SECTION 224200.05a - PLUMBING FIXTURES – SINKS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Sinks and trim, faucets, other fittings, and related components.

1.2 RELATED SECTIONS

A. Piping:

1. Domestic water piping: Section 221116.
2. Sanitary waste and vent piping: Section 221316.

B. LEED Certification: Division 01.

1.3 SUBMITTALS

A. Product data: For each sink specified, including fixture, trim, fittings, accessories, appurtenances, supports, construction details, dimensions of components, and finishes.

B. Certification that products comply with NSF/ANSI 61.

C. Shop drawings: A schedule of proposed fixtures and trim, in the order listed in the specification.

D. LEED submittals for indoor water use reduction documentation:

1. For faucets and aerators documentation indicating flow rate in GPM.
2. Include documentation indicating WaterSense label.

1.4 QUALITY ASSURANCE

A. UL label: As specified in Section 220500, Common Work Results for Plumbing.

B. Lead free requirements:

1. Potable water system components, including pipe and joining materials, shall comply with NSF/ANSI 61 and with requirements for “lead-free” plumbing as defined by state laws and U.S. Safe Drinking Act.
2. Acceptance product marking: NSF®-61.

C. Fixtures shall be of the best commercial grade of their respective kinds, free from flaws, cracks, craze or other imperfections, complete with fittings and connections. Residential grade fixtures shall not be acceptable. Fixtures manufactured by acceptable manufacturers are acceptable provided they meet specified requirements and are similar to the basis of design.

D. Comply with requirements for LEED certification specified in Division 01.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Basis-of-design products: Subject to compliance with requirements, provide specified or scheduled products, or comparable product by one of the following.

1. Fixtures:

a. Acorn Engineering Co.
b. American Standard
c. Bradley Corporation
d. Commercial Enameling Co.
e. Eljer
f. Elkay Manufacturing Co.
g. Just Co.
h. Kohler Co.
i. Zurn Plumbing Products

2. Faucets:

a. Chicago Faucet Co.
b. Speakman Co.
c. T & S Brass and Bronze Works, Inc.

3. Supplies, traps, and miscellaneous trim:

a. Acorn Engineering Co.
b. Brass-Craft Manufacturing Co.
c. Chicago Faucet Co.
d. Elkay Manufacturing Co.
e. Engineered Brass Co.
f. McGuire Manufacturing Co.
g. T & S Brass and Bronze Works, Inc.

2.2 KITCHENETTE SINKS

A. F-5 sink, kitchenette:

1. Fixture:

a. Material: Type 302 stainless steel, 18-gauge, sound deadening coating on underside.
b. Sink type: Double-compartment, seamless radius-coved corners, 8-inch (203-mm) faucet centers.

(1) 4-hole ledge for faucet with spray.

c. Dimensions: 25 inches x 21 inches (635 mm x 533 mm).
d. Mounting: In countertop specified in Division 12.
e. Basis of design: Elkay LRAD2521.

2. Faucet with thumb spray:

a. Chrome-plated cast brass, combination hot and cold water faucet, deck-mounted, 8-inch (203-mm) swing spout, non-aerating spray outlet, thumb spray supply outlet, 8-inch (203-mm) faucet centers, 2-inch (51 mm) single-wing handles, quarter turn cartridge valves.
b. Provide self-closing thumb-control spray with 4 feet of nylon hose.
c. Water connections: 0.375-inch compression.
d. Water consumption: 1.5 GPM.
e. Basis of design: Chicago 1102-ABCP with E2805JKABCP spray outlet and thumb spray.

3. Supply nipples:

a. Two brass nipples, triple-plated polished chrome of length and size as required.
b. Basis of design: Brass-Craft.

4. Supply stops and risers:

a. Chrome-plated angle ball valve, 0.5-inch NPT inlet, 0.375-inch OD female compression outlet, loose key handle, and slip wall flange.
b. Chrome-plated copper 12" bullnose flexible supply riser, loose key handle
c. Basis of design: Chicago STB-21-11-AB or STB-21-12-AB for length required.

5. Drain:

a. Crumb cup strainer with 1.5-inch x 4-inch tailpiece.
b. Basis of design: Elkay LK-35-B.

6. P trap and waste nipple:

a. Chrome-plated brass body, 1.5-inch x 1.5-inch IPS outlet, swivel type, with cleanout.
b. Chrome-plated cast brass 1.5-inch IPS waste nipple with cast brass chrome-plated set screw escutcheon.
c. Basis of design: McGuire 8089 with McGuire waste nipple.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Furnish, provide rough-in for, and set sinks to extent and number indicated on drawings. Sinks shall be left in first class condition, properly adjusted, cleaned and ready for operation.

B. Provide all parts, fittings, escutcheons, and appurtenances regularly required for each fixture.

C. Protect and cover fixtures so they cannot be used until final work acceptance.

END OF SECTION 224200.05a

SECTION 224200.06 - PLUMBING FIXTURES - DRINKING FOUNTAINS AND WATER COOLERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Drinking fountains and water coolers, trim, fittings, and related components.

1.2 RELATED SECTIONS

A. Piping:

1. Domestic water piping: Section 221116.
2. Sanitary waste and vent piping: Section 221316.

1.3 SUBMITTALS

A. Product data: For each drinking fountain and water cooler specified, including fixture, trim, fittings, accessories, appurtenances, supports, construction details, dimensions of components, and finishes.

B. Certification that products comply with NSF/ANSI 61.

C. Shop drawings: A schedule of proposed fixtures and trim, in the order listed in the specification.

1.4 QUALITY ASSURANCE

A. UL label: As specified in Section 220500, Common Work Results for Plumbing.

B. Lead free requirements:

1. Potable water system components, including pipe and joining materials, shall comply with NSF/ANSI 61 and with requirements for “lead-free” plumbing as defined by state laws and U.S. Safe Drinking Act.
2. Acceptance product marking: NSF®-61.

C. Fixtures shall be of the best commercial grade of their respective kinds, free from flaws, cracks, craze or other imperfections, complete with fittings and connections. Residential grade fixtures shall not be acceptable. Fixtures manufactured by acceptable manufacturers are acceptable provided they meet specified requirements and are similar to the basis of design.

D. Fixtures and trim where required to be accessible to disabled people, identified in this section as “for disabled,” shall comply with requirements of the Americans with Disabilities Act (ADA) Regulations, as applicable to each type of fixture or its use.

1. Trim must meet requirements for force of operation at water pressures up to 80 psi.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Basis-of-design products: Subject to compliance with requirements, provide specified or scheduled products, or comparable product by one of the following.

1. Water coolers and fountains:

a. Elkay Manufacturing Company
b. Halsey Taylor
c. Haws Corp.
d. Oasis Water Coolers

2. Supplies, traps, and miscellaneous trim:

a. Acorn Engineering Co.
b. Bradley Corporation
c. Brass-Craft Manufacturing Co.
d. Chicago Faucet Co.
e. Elkay Manufacturing Co.
f. Engineered Brass Co.
g. Guy Gray; IPS Corporation
h. Haws Corp.
i. McGuire Manufacturing Co.
j. T & S Brass and Bronze Works, Inc.

3. Fixture supports and carriers:

a. Josam Mfg. Co.
b. J.R. Smith
c. Zurn Plumbing Products

2.2 BARRIER FREE SURFACE-MOUNTED SINGLE BUBBLER WATER COOLERS

A. Common requirements:

1. Fixture:

a. Water cooler type: Barrier free refrigerated-type water cooler.
b. Refrigeration circuit: R-134a, compressor with air-cooled condenser. Plug connection suitable for operation on 120-V, single-phase, 60-Hz current.
c. Capacity: To cool 8 gallons (30 L) per hour with inlet water 80 degrees F and room temperature 90 degrees F.

d. Lead: Waterways shall contain no lead. This requirement exceeds the requirement for the standard designation of "lead free."
e. Mounting: Surface-mounted on wall via galvanized steel bracket provided with unit.
f. Construction:

(1) Stainless steel satin finish basin top.
(2) Galvanized steel frame.

g. Activation:

(1) Mechanical front button bubbler activation.

h. Exterior panels:

(1) Stainless steel.

i. Bubbler:

(1) Flexible hooded bubbler with non-squirt feature.

j. Water connection: 0.375-inch (DN 10) with built-in 100 micron strainer.
k. Waste connection: 1.25-inch (DN 32) tailpiece.
l. P trap:

(1) 1.25-inch x 1.5-inch (DN 32 x DN 40) IPS outlet, cast-brass, ground joint, swivel type, with cleanout and complete with NPS 1-1/2 (DN 40) brass nipple with cast set screw escutcheon.
(2) Basis of design: McGuire 8090 with 2127 nipple.

m. Filter:

(1) Provide manufacturer's standard filter.

2. Carrier:

a. Plate carrier with legs anchored to floor.
b. Basis of design: Zurn Z1225.

B. F-6B water cooler for disabled with bottle filler:

1. Provide with bottle filling station with brushed stainless-steel cabinet and electronic hands-free activation
2. Mounting Height: For the basis of design, bubbler shall be 36 inches (914 mm) above finished floor.
3. Basis of design: Elkay LVRC8WSK.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Furnish, provide rough-in for, and set fixtures to extent and number indicated on drawings. The fixtures shall be left in first class condition, properly adjusted, cleaned and ready for satisfactory operation.

B. Provide all parts, fittings, escutcheons, and appurtenances regularly required for each fixture.

C. Securely attach wall hung fixtures to wall using specified supports.

D. Protect and cover fixtures so they cannot be used until final work acceptance.

E. Water coolers: Provide water connection with shut-off valve concealed behind fixture access panel and transition to fixture connection size. Provide P-trap and connect to fixture tailpiece, concealed behind fixture access pane, and connect to sanitary system.

F. Provide mounting heights for fixtures “for disabled” that coordinate with the manufacturer’s requirements for the fixture provided allowing for adequate leg room as well as a compliant bubbler height.

END OF SECTION 224200.06

SECTION 230101 - HVAC GENERAL PROVISIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General provisions and requirements for all HVAC work.

1.2 RELATED SECTIONS

A. Requirements of this section generally supplement requirements of Division 01.

B. LEED Certification and construction waste management: Division 01.

C. Commissioning requirements: Divisions 01 and 23.

1.3 REFERENCES

A. NFPA 10: Portable Fire Extinguishers.

B. NFPA 241: Safeguarding Construction, Alteration, and Demolition Operations.

1.4 SYSTEM DESCRIPTION

A. The full set of Contract Documents applies to work of Division 23.

B. Visit the site and study all aspects of the project and working conditions, as required by General and Supplementary Conditions, Bidding and Contracting Requirements, Drawings, and Specifications. Verify field dimensions.

C. The work covered in technical sections includes the furnishing of all labor, equipment and materials, and the performance of all operations pertinent to the work described.

D. Except as required otherwise in Division 01, promptly obtain and pay for, including all necessary signatures and paperwork, all permits, fees and inspections required for work of this division by authorities having jurisdiction, including any utility connection or extension charge. No payment will be made until a copy of the permit is forwarded to the Owner.

E. HVAC work of this project includes, as a brief general description, the following:

1. Variable air volume terminal units
2. Ductwork and heating water piping
3. The project includes commissioning under the direction of a Commissioning Agent (CxA).
4. The project will be LEED certified.

F. See Division 01 for requirements related to LEED certification, Owner's occupancy of the premises, limits on use of site, time restrictions on work, limits on utility outages or shutdowns, and phasing (sequencing) and scheduling.

1.5 PRODUCT OPTIONS

A. Except as modified by provisions of Bidding and Contracting Requirements and Division 01, the following options apply to Division 23 specifications.

1. Products specified by reference standards or by description only: Any product meeting those standards or description.
2. Products specified by naming one or more manufacturers, or model name or catalog reference number: Products specified establish a standard of quality, options to be included, and performance.

a. Where other acceptable manufacturers are named, Contractor may provide products of those named manufacturers only, which meet the specifications.
b. Where specification permits "equal" products, without naming other acceptable manufacturers, Contractor may use products of any manufacturer, which meet the specifications.

3. Products specified by naming one manufacturer and particular product, with no provision for other options: No options or substitutions allowed.

B. Where Contractor is permitted to use a product other than the specified item and model named as the basis of design, Contractor is responsible for all coordination and additional costs as specified in the article "Substitutions," below for substitutions.

1.6 SUBSTITUTIONS

A. Substitutions will be considered only as permitted or required by the Bidding and Contracting Requirements and Division 01. Except as modified by those requirements, the requirements below apply to Division 23 specifications.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed substitution with contract documents.

D. A request constitutes a representation that the Bidder or Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the substitution as for the specified product.
3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.

5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution submittal procedure is specified in Bidding and Contracting Requirements and Division 01.

1.7 MATERIALS AND EQUIPMENT

A. All materials and equipment shall be new and the best of their respective kinds, suitable for the conditions and duties imposed on them by the project, and of representative manufacture. The description, characteristics and requirements of the materials to be used shall be in accordance with the specifications.

B. All equipment, construction and installation must meet requirements of local, state and federal governing codes.

C. Singular number: In cases where material, a device, or part of the equipment is referred to in the singular number in the specifications, it is intended that such reference shall apply to as many items of material, devices, or parts of the equipment as are required to complete the installation as shown on the drawings or required for proper operation of the system.

D. Terms have the following meanings:

1. Furnish: Supply item
2. Install: Mount and connect item
3. Provide: Furnish and install.

E. All materials and equipment shall be installed and completed in a first class and workmanlike manner and in accordance with the best modern methods, practice and manufacturers' instructions. Any work which shall not present an orderly and neat or workmanlike appearance shall be removed and replaced with satisfactory work when so directed in writing by the Architect.

F. The specifications and drawings are intended to define the minimum requirements, as to quality of materials, construction, finish and overall workmanship.

G. General Conditions describe the correlation and intent of the Contract Documents. In case of discrepancies between the specifications and drawings, the specifications should be followed as to the general methods and principles and the drawings followed as to sizes, capacities and specifics for corresponding parts. If sizes are omitted, the Architect will determine sizes to be utilized.

H. In all cases of doubt, uncertainty, or conflict as to the true meaning of the specifications or drawings, it is the responsibility of the Contractor to notify the Architect of said uncertainty, doubt, or conflict and obtain a decision as to the intent before starting any work which may be affected by this decision.

1.8 COORDINATION

A. Should a situation develop during construction to prevent the proper installation of any equipment or item where shown on the drawings, call the situation to the attention of the Architect and await a written decision.

B. Plan and coordinate all work to proceed in an orderly and continuous manner without undue delay, and in conformance with project schedule. Submit samples, shop drawings, schedules, insurance policies and certificates, and the like in time to avoid delays in actual construction. Coordinate HVAC work so that work of each trade is completed before other construction begins which would obstruct it.

C. Coordinate trades to ensure that proper clearances between work of the various trades allow access to items which require operation and maintenance.

D. Coordinate location and elevation of all piping, ductwork, light fixtures, equipment, and appurtenances in such a manner that the finished installation is as indicated on drawings. In the event difficulties are encountered which prevent this, it is the Contractor's responsibility to bring this to the attention of the Architect prior to initiation of work. Correct improperly coordinated installation at no additional cost.

E. The Contractors' assistants shall include a competent foreman, who shall be on the premises at all times to check, lay out, coordinate and superintend the installation of work. The foreman shall establish all grades and lines relative to the work before starting, and be responsible for the accuracy thereof.

1.9 SUBMITTALS

A. Manufacturers' and subcontractors' lists:

1. As specified in Division 01, submit a complete list of proposed manufacturers for all equipment, materials and subcontractors used for the work of this division. Lists shall follow the sequence of the specifications. No considerations will be given for partial or incomplete lists. After review of lists, submit shop drawings and product data.

B. LEED submittals:

1. EQ Credit 2: Low-emitting materials.

    a. For interior wet-applied adhesives, sealants, paints, and coatings: Documentation indicating compliance with California Department of Public Health (CDPH) Standard Method V1.1-2010 and VOC content in g/L.
    b. For composite wood installed in building interior: Documentation indicating no added formaldehyde resins or compliance with California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) for ultra-low-emitting formaldehyde (ULEF) resins.

C. Shop drawings and product data:

1. Submit in accordance with the requirements of Division 01 or as established at the preconstruction conference, the required number of copies of shop drawings and product data for every item of equipment. Shop drawings or product data will not be considered until manufacturers' lists have been approved. Shop drawings and product data shall be submitted, as required by the General Conditions, with sufficient time for checking, return to Contractor, and resubmission as required before Contractor shall install any item.
2. Each item submitted shall be properly labeled, indicating the specific service for which the equipment or material is to be used, section and paragraph number of specification or drawing number to which it applies, Contractor's name and project name and number. Data submitted shall be specific and shall include product data and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents. Clearly identify each item within the data. Data of a general nature will not be accepted. Each sheet must clearly show the project name and number.

    a. For roof-mounted equipment, submit manufacturer's certified drawings and other coordination drawings as required so that openings can be framed through the roof in accordance with structural requirements.

3. The review of a shop drawing or product data shall not be considered as a guarantee of the measurements or building conditions or that the shop drawings or product data have been checked to see that item submitted properly fits the building conditions. This review shall not relieve the Contractor of the responsibility for furnishing material or performing work as required by the contract documents, for correctness of dimensions and quantities, or for proper coordination of details and interfaces among trades.
4. All exclusively electrical items furnished as items associated with mechanical items but not specifically described in the mechanical item submission, shall be submitted as a separate submittal but shall be clearly marked as associated with the mechanical item by identification specification paragraph.
5. Product data sheets shall be 8.5-inches by 11-inches cut sheets for operating and maintenance manual.

D. Submit at least three copies of the results of every test required under any section in this division.

E. Specialist shall submit a list of at least three projects similar to this project in type, size, and quality, which have been in place and operating satisfactorily for at least five years.

1. Include project name, address, name and phone number of owner's representative, and project type and size.

F. After the work is completed, submit all required certificates of approval from approved inspection agencies and authorities having jurisdiction over work of this division. Certificates of approval must be received by the Architect prior to final acceptance of the work.

1.10 SPECIALIST

A. The term “Specialist” as used in the specification shall mean an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field,) which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the specification requires installation by a specialist, the term shall also be deemed to mean the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer’s direct supervision.

1.11 CONTRACT CLOSEOUT SUBMITTALS

A. Project record documents:

1. Maintain on site one set of the following record documents; record actual revisions to the work of this division:

   a. Contract drawings.
   b. Specifications.
   c. Addenda.
   d. Change orders and other modifications to the Contract.
   e. Reviewed shop drawings, product data, and samples.

2. Maintain record documents separate from documents used for construction.
3. Record information concurrent with construction progress.
4. Specifications: Legibly mark and record in each section a description of actual products installed, including the following:

   a. Manufacturer’s name and product model and number.
   b. Product options, substitutions, or alternates utilized.
   c. Changes made by addenda and modifications.

5. Record documents and shop drawings: Legibly mark each item to record actual construction, including:

   a. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
   b. Field changes of dimension and detail.
   c. Details not on original Contract Drawings.

6. Submit documents as specified in Division 01.

B. Operation and maintenance data:

1. Submit sets prior to final inspection as specified in Division 01. Unless otherwise specified in Division 01, submit no fewer than three sets. In addition to requirements specified in Division 01, submit operating and maintenance manuals for the work of this division as specified below.

2. Lubrication charts: Prepare lubrication charts for each piece of mechanical equipment that requires grease or oil.

    a. Include the following:

        (1) Types of lubricants required.
        (2) Locations of lubrication points.
        (3) Frequency of lubrication.

    b. Provide one extra set of lubrication charts mounted in plastic covers, besides those required in Operating and Maintenance Manuals.

3. Binders: Three-ring binders with vinyl-covered hard covers. Provide large enough binders, and sufficient quantity, that the required contents can be easily turned, removed, and reinserted.
4. Prepare binder covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," and title of project. Print on spine of binder "O & M INSTRUCTIONS." If more than one binder is required, print covers and spines with volume numbers. Include in the front of every binder an index to all binders.
5. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
6. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, typed on white paper.
7. Part 1: Directory, listing names, addresses, and telephone numbers of mechanical engineers; Contractor; mechanical subcontractors; and major mechanical equipment suppliers.
8. Part 2: Operation and maintenance instructions, arranged by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:

    a. Significant design criteria, including pump and fan curves and similar performance charts.
    b. List of equipment, including operating weight of each piece.
    c. Parts list for each component, including recommended spare parts list.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
    g. Valve charts, including locations of flow fittings.

9. Part 3: Project documents and certificates, including the following:

    a. Shop drawings and product data.
    b. Air and water balance reports.
    c. Photocopies of certificates.
    d. Photocopies of warranties and guarantees.
    e. Test reports: Copies of the results of all tests required under all sections of specifications.

10. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with Engineer comments. Revise content of documents as required prior to final submittal.
11. Submit final volumes revised, within ten days after final inspection.

1.12 REGULATORY REQUIREMENTS

A. When these specifications call for materials or construction of a better quality or larger sizes than required by the following codes and standards, the provisions of the specifications shall take precedence.

B. Provide, without extra charge, any additional materials and labor which may be required for compliance with these codes and standards even though the work is not mentioned in these specifications or shown on the contract drawings.

C. Perform the work of this division in strict accordance with the following authorities. The latest revision of these codes accepted by the authority having jurisdiction as of the date of the contract documents shall apply.

1. The plumbing, mechanical, electrical, building, fire, and safety codes of the state and county or city in which the work is being performed.
2. The National Electric Code, NFPA 70 (NEC).
3. The National Fire Protection Association Code. (NFPA).
4. International Energy Conservation, Fire, Fuel Gas, Mechanical, and Plumbing Codes (ICC).

1.13 REFERENCE STANDARDS

A. Perform the work of this division using the standards of the following organizations, as referred to in technical sections, as a minimum requirement for construction and testing. Unless specified otherwise in Bidding and Contract Documents or Division 01, the latest revision current as of the date of the contract documents shall apply. Products shall be certified by manufacturers to meet the requirements of referenced standards.

1. Federal Specifications (FS)
2. Military Specification (MS)
3. Military Standards (Mil. Std.)
4. Air Conditioning, Heating, and Refrigeration Institute (AHRI)
5. Air Movement and Control Association (AMCA)
6. Associated Air Balance Council (AABC)
7. American Association State Highway and Transportation Officials (AASHTO)
8. American National Standards Institute (ANSI)
9. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
10. ASME International (ASME)
11. American Society for Testing and Materials (ASTM)
12. American Society of Sanitary Engineering (ASSE)
13. American Water Works Association (AWWA)
14. International Code Council (ICC)
15. Manufacturer’s Standardization Society of the Valve and Fittings Industry Inc. (MSS)
16. National Electrical Code, NFPA 70 (NEC)
17. National Electrical Manufacturer’s Association (NEMA)
18. National Fire Protection Association (NFPA)
19. National Fuel Gas Code, NFPA 54
20. National Sanitary Foundation (NSF)

21. National Standard Plumbing Code (NSPC)
22. The Occupational Safety and Health Act (OSHA)
23. Piping and Drainage Institute (PDI)
24. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
25. Underwriters Laboratory Inc. (UL)
26. Maryland Occupational Safety and Health Act (MOSHA)

1.14 TEMPORARY STORAGE

A. Maintain upon premises, where directed, a storage area, and be responsible for all contents within these areas. Provide all security measures necessary for this area.

B. Maintain the area and return it to its original condition at project completion.

1.15 PROTECTION

A. Control dust resulting from construction work to prevent its spread beyond the immediate work area, and to avoid creation of a nuisance.

1. Do not use water to control dust. Use drop cloths or other suitable barriers.
2. In areas where dirt or dust is produced as a result of the work, sweep daily, or more often as required.
3. Provide walk-off mats at entries and replace them at regular intervals.
4. Construct dust partitions, where indicated on the drawings or as required.
5. Protect areas occupied by Owner’s personnel or equipment.
6. Seal off all return air registers and other mechanical systems to prevent dust from entering.

B. Each trade and subcontractor is responsible for preventing damage and soiling of work performed by other trades or subcontractors. Each trade and subcontractor is responsible for providing temporary protection of its own work.

1. Protect work from spills, splatters, drippings, adhesives, bitumens, mortars, paints, plasters, and damage from welding or burning.
2. Protect finished work from damage, defacement, staining, or scratching.
3. Protect finishes from cleaning agents, or grinding and finishing equipment.
4. Protect adjacent and finished work from damage, using tape, masking, covers or coatings and protective enclosures.
5. Coordinate installations and temporarily remove items to avoid damage from finishing work.

C. Repair all damage or soiling to the complete satisfaction of the Architect; replace any materials or work damaged to such an extent that they cannot be restored to their original condition, all at no addition to the Contract Sum.

D. Protect work stored in place and supplies stored in the building.

1. Store materials and products, subject to damage from moisture, in dry locations. If necessary, protect in wraps or covers.
2. Store plastics, other materials, and products subject to damage from heat or cold at manufacturer’s recommended temperatures.

E. Use of sidewalk or roadway areas outside of the property lines shall be with permission and approval of the local authorities having jurisdiction.

1.16 FIRE PROTECTION

A. As a minimum, provide hand-carried, portable, UL-rated extinguishers with each work crew working inside the building.

B. Select extinguishers in accordance with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

1.17 PROJECT CONDITIONS

A. Drawings showing utilities in concealed locations are based on the best information available but are not represented as being precisely correct. Work of the contract includes digging, cutting, drilling, using nondestructive methods, and other methods of locating concealed utilities in the field, as well as patching and repairing as specified in "Cutting and Patching" below.

B. If, in the course of the work, workers encounter a material they suspect to present some hazard:

1. Promptly notify the Architect in writing.
2. Do not perform any work which would disturb the suspected material until written instructions have been received.

1.18 WARRANTY

A. All work and equipment provided as work of this division shall be fully warranted under the general project warranty. In addition, provide added special warranties specified in individual sections.

B. During the correction period, the Contractor shall begin correcting any work found to be not in accordance with the requirements of the Contract Documents within 4-hours of receiving written notice from the Owner. Provide detailed schedule for completion of work within 24-hours of receiving written notice from the Owner and revise schedule based on any Owner comments generated. Except as otherwise required in General Conditions and Division 01, the correction period is one year after the date of substantial completion of the work. Work requiring correction shall promptly be repaired or completely replaced at no addition to the Contract Sum.

1. Service reports for warranty work shall be provided to the Owner

C. When use of the permanent equipment has been permitted for temporary heating or ventilation of the building, the warranty and correction periods shall nevertheless begin at the time of substantial completion, unless another date of acceptance has been agreed to by the Owner.

D. Special warranties are warranties required by individual specification sections, incidental product warranties, manufacturers' standard warranties, installer or subcontractor service agreements, and other individual warranties in addition to the general project warranty.

E. Provide copies of warranties as required for Operation and Maintenance Manual specified above, and by Division 01.

F. For items of work delayed beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

1.19 COMMISSIONING

A. This project includes commissioning under the direction of a Commissioning Agent (CxA). Contractors' and subcontractors' responsibilities are described in Divisions 01 and 23.

B. Cooperate with the CxA to accomplish the requirements of the Commissioning Plan during the construction and correction periods.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

B. Cut walls, floors, partitions, roofs, and other appurtenances for the passage or accommodation of pipes, ducts and appurtenances. Close superfluous openings and remove all debris caused by work of this division.

C. No cutting of any structure or finish shall be done until the condition requiring such cutting has been examined and approved by the Architect.

D. New or existing surfaces disturbed as a result of such cutting or otherwise damaged shall be restored to match original work and all materials used for any patching or mending shall conform to the class of materials originally installed.

E. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

3.2 TEMPORARY FACILITIES

A. Temporary water facilities, electricity, telephone, toilet facilities, and temporary heat, shall be provided as specified in Division 01.

3.3 PROGRESS MEETINGS

A. Progress meetings shall be held as specified in Division 01, and also when and if the Contractor or Architect finds them necessary or advantageous to progress of work.

B. Contractor, those subcontractors and those material suppliers concerned with current progress or with the scheduling of future progress, Architect and Owner shall each be represented at these meetings by persons familiar with the details of work and authorized to conclude matters relating to work progress.

3.4 COMMISSIONING

A. Comply with requirements of “Commissioning” in Part 1 above.

END OF SECTION 230101

SECTION 230500 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Requirements applicable to more than one section of Division 23.

B. Piping installation materials.

C. Identification devices and materials.

D. Treated wood lumber.

E. Equipment installation.

F. Cleaning and painting.

G. Operating instructions.

H. Piping tests.

1.2 RELATED SECTIONS

A. Project and special warranties: Division 01 and Section 230101.

B. Operation and Maintenance Manuals: Division 01 and Section 230101.

C. LEED Certification and construction waste management: Division 01.

D. Commissioning requirements: Division 01 and Division 23.

E. Painting: Division 09.

F. Hangers and Supports for HVAC Piping and Equipment: Section 230529.

1.3 REFERENCES

A. American Society of Mechanical Engineers

1. ASME Boiler and Pressure Vessel Code (BPVC).
2. ASME A 13.1: Scheme for the Identification of Piping Systems.
3. ASME B1.20.1: Pipe Threads, General Purpose, Inch.
4. ASME B 31.1: Power Piping.
5. ASME B 31.9: Building Services Piping.

B. American Society of Testing and Materials

1. ASTM A 234: Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service
2. ASTM B 32: Standard Specification for Solder Metal
3. ASTM B 88: Standard Specification for Seamless Copper Water Tube
4. ASTM B 813: Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube
5. ASTM D 635: Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
6. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials
7. ASTM E 548: Standard Guide for General Criteria Used for Evaluating Laboratory Competence

C. American Welding Society

1. AWS D1.1: Structural Welding - Steel
2. AWS A5.8: Specification for Filler Metals for Brazing and Braze Welding.
3. AWS D10.9: Specification for Qualification of Welding Procedures and Welders for Piping and Tubing
4. AWS D10.12: Guide for Welding Mild Steel Pipe.
5. AWS QC1: Specification for AWS Certification of Welding Inspectors

D. NFPA 70: National Electric Code

1.4 DEFINITIONS

A. Project correction period: A period after Substantial Completion of the work during which the Contractor shall correct every part of the work found to be not in accordance with the requirements of the contract documents, promptly after receipt of written notice.

B. Qualified testing agency: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

C. DN: Dimension Nominale, nominal pipe size in millimeters, in accordance with the metric system for construction, Systeme Internationale (SI).

D. NPS: Nominal pipe size in inches, in accordance with standard U.S. designations for manufactured pipe. Pipe sizes do not change when projects are designed and built in metric units; each size has a consistent name (nominal dimension) in each system.

1.5 DESIGN REQUIREMENTS

A. The drawings and system performances have been designed based on the use of the particular manufacturer's products specified and scheduled on the drawings.

B. Products of other manufacturers that are listed under the article "Acceptable Manufacturers," or permitted as "equal," are permitted provided:

1. Product shall meet the specifications.
2. Contractor shall make, without addition to the contract sum, all adjustments for deviations so that the final installation is complete and functions as the design basis product is intended.

C. Do not propose products with dimensions or other characteristics different from the design basis product that render their use impractical, or cause functional fit, access, or connection problems.

1.6 SUBMITTALS

A. Shop drawings:

1. Schedule of welding and brazing procedures proposed for each piping system in the project.

B. Certifications: Proof of operator and testing agency personnel qualifications as required for welding and brazing in the article "Quality Assurance" below.

C. Test reports: Field test results for each piping system as specified in Part 3 below.

D. Valve charts:

1. Furnish valve charts typed on 8.5 by 11-inch (216 by 279-mm) bond paper, showing locations of all manual and automatic control valves, and flow meters. Include:

a. Number
b. Location
c. Service
d. Function
e. Area served

2. Valve numbering system shall be approved by the Owner prior to final submittal. Place one copy of approved chart in a plastic envelope and mount on wall where directed. Provide another copy for each of the Operating and Maintenance Manuals.

1.7 QUALITY ASSURANCE

A. Provide materials and perform work in accordance with the plumbing, mechanical, electrical, building, fire, health and safety, and other applicable codes and regulations of the state, county or city in which the work is performed.

B. Welding procedures and operator qualifications for structural welding: AWS D1.1, Structural Welding Code Steel, electric arc process.

C. Welding, brazing, and soldering procedures and operator qualifications for building systems piping:

1. AWS D10.9, Qualification of Welding Procedures and Welders for Piping and Tubing.
2. ASME B31.9, Building Services Piping.
3. Copper Development Association "Copper Tube Handbook."

D. Qualifications of independent testing laboratory personnel:

1. Welding inspectors: AWS QC1, Certification of Welding Inspectors.

E. UL label:

1. Electrical control panels, equipment, materials and devices provided or installed as work of Division 23 shall be UL listed and shall bear a UL label.
2. Equipment, including custom assemblies, shall be listed and labeled as an assembly.
3. If a UL label is not available, the item shall be tested and labeled by a qualified nationally recognized testing agency, acceptable to authorities having jurisdiction, and in accordance with NFPA 70 (NEC).
4. Provide testing, if required, without addition to the contract sum.

F. The project shall be LEED certified. See requirements specified in Division 01 and individual sections for LEED requirements, waste and air quality control.

G. VOC content: Field-applied adhesives and sealants, limits per South Coast Air Quality Management District (SCAQMD), Rule No. 1168.

H. Products shall contain no urea-formaldehyde content.

1.8 COMMISSIONING

A. This project includes commissioning under the direction of a Commissioning Agent. Contractors' and subcontractors' responsibilities are described in Division 01.

PART 2 - PRODUCTS

2.1 GENERAL

A. Piping techniques, testing, identification, painting, and operating instructions specified in this section apply to products specified in other sections of Division 23.

B. Equipment that uses or processes date and time data to perform its function shall be warranted by the manufacturer to properly function and correctly use or process all time-related data for all dates and times which occur during a reasonable life expectancy of the equipment.

2.2 PIPING INSTALLATION MATERIALS

A. Weldolets and thredolets: Fittings designed for installing branches on piping, with either welded or threaded connection to branch; conforming to ASTM A 234.

B. Soldering materials:

1. Solder: Free of lead, antimony, and zinc and meeting the requirements of ASTM B 32. No solder containing lead is permitted.

a. Tin 95.5 percent, copper 4 percent, and silver 0.5 percent.

(1) Equal to “Silvabrite 100” manufactured by Engelhard Corporation.

b. Tin, copper, bismuth, and silver.

(1) Equal to "Oatey Silver" manufactured by Oatey.

2. Flux:

a. Meeting the requirements of ASTM B 813 and NSF 61 certified.
b. Equal to Oatey H-20^{95}.

C. Brazing filler metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel. Alloy shall have a melting point greater than 1000 degrees F (540 degrees C).

D. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

E. Threaded pipe joint materials:

1. Pipe joint compound:

a. Pipe joint compound recommended by the manufacturer for use at the temperature and pressure of the system.

2. Pipe joint tape: Polytetrafluoroethylene (PTFE) pipe thread tape, "Teflon."

2.3 IDENTIFICATION DEVICES AND MATERIALS

A. Stenciling materials:

1. Stencils: Manufactured standard stencils prepared for required applications, conforming to ASME A 13.1 for color and size of legend letters, including arrows showing direction of flow.
2. Paint: Exterior type enamel, colors conforming to ASME A 13.1, or black.

B. Equipment identification tags:

1. Laminated plastic with adhesive back, white core and black outer layers, which, when engraved, will produce white letters and numerals on a black background.
2. Tags installed on curved surfaces shall be aluminum or brass.

C. Valve tags: Brass, 1.5 inch (40 mm) in diameter with black-filled numbers not less than 0.25 inch (6 mm) high, complete with brass attachment chains.

D. Ceiling identification tags: Laminated plastic with adhesive back, engraved black letters on white background, minimum 0.5 inch (15 mm) wide and length as required for 0.375 inch (10 mm) high letters for name of concealed device and number.

2.4 BACKBOARDS FOR PIPING SPECIALTIES

A. Backboards: Marine plywood: BS-1080, Veneer Grade A/B, moisture-resistant, spruce-pine-fir multiple ply, 5-ply minimum, pressure-treated construction, 0.563-inch (14-mm) thick minimum

B. Supports: Fiber reinforced plastic (FRP) composite structural shapes: ASTM D 635 and E 84, Pultruded FRP structural shapes, non-corrosive, flame retardant, thermosetting polyester resin, composite factory-fabricated shapes for assorted assemblies and field erection.

1. Ultimate tensile strength: 30,000 psi (207 MPa).
2. Modulus of elasticity: 2.8×10^6 psi (19,300 MPa).
3. Specific gravity: 1.6 to 1.75.
4. Density: 0.062 to 0.070 pounds/cubic inch (1.72 to 1.94 grams/cubic centimeter).
5. Flame spread: ASTM E 84 Class A, 25 maximum.
6. Color: Yellow.
7. Shapes and sizes as required to support the load, and in accordance with minimum sizes indicated on the drawings
8. Acceptable manufacturers:

a. Bedford Reinforce Plastics Company
b. Composites USA, Inc.
c. Liberty Pultrusions, Inc.
d. Strongwell Corporation
e. Structural Fiberglass, Inc.

C. Fasteners: Corrosion-resistant and suitable for secure anchorage into wall behind backboards.

2.5 TREATED WOOD LUMBER

A. Wood-preservative-treated lumber: Treated by pressure process, AWPA C2, with chemicals acceptable to authorities having jurisdiction, and marked with treatment quality mark of an inspection agency approved by ALSC Board of Review.

PART 3 - EXECUTION

3.1 GENERAL

A. Manufacturers' instructions: Except as modified by drawings or specifications, install products and equipment in accordance with manufacturers' instructions and recommendations applicable to the project conditions.

1. Immediately notify Architect if a difference or discrepancy is found between manufacturers' instructions and the drawings or specifications.

B. The contract drawings are diagrammatic and do not indicate all fittings or offsets in pipe and ductwork, all access panels, or all specialties required. Provide required fittings, offsets, access panels, and specialties to coordinate the work.

C. No pipe or duct shall be run below the head of a window or door.

D. Equipment, ducts, and pipes installed in areas without a suspended ceiling shall be as tight to structure as possible, but at least above a height of 6'-8", unless otherwise noted.

E. Items which require access for operation or maintenance shall be easily accessible. Do not cut or form hand holes for operation or maintenance of appliances through walls or ceilings.

F. Provide equipment and installations compliant with NFPA 70.

3.2 EQUIPMENT INSTALLATION

A. Prepare for installation:

1. Coordinate work to assure that any required recesses for equipment are correct.
2. Examine areas and conditions where equipment will be installed for rough in locations, compliance with installation requirements and tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.
3. Visually check equipment. Replace any damaged components prior to installation.
4. Remove temporary devices used for equipment transport.
5. Assemble equipment that is not assembled in the factory.

B. Install equipment:

1. Follow the manufacturer’s rigging requirements for unloading and moving the equipment.
2. Set equipment plumb and level.
3. Install such that labels and safety instructions are clearly visible.
4. Drawings show the general arrangement of piping, ductwork, conduit and other elements. Coordinate elements to allow access doors to open fully, allow access to removable access panels or casing panels, maintain clearances in front of control panels and electrical components required by the NFPA 70, and maintain the manufacturer’s recommended service clearances.

5. Install components inside of equipment enclosures such that they are serviceable when access panels are removed.
6. Extend grease fittings to accessible locations.
7. Install duct and piping hangers and supports so that duct and piping live and dead loads and stresses from movement will not be transmitted to connected equipment. Support equipment independently from piping and ductwork.
8. Provide connection flanges for ductwork to equipment in a manner that maintains the equipment's structural integrity.
9. Support:

    a. Floor-mounted equipment:

        (1) Securely fasten in place with connections to wall and floor.
        (2) Provide supplemental structure as required.
        (3) Provide a concrete equipment foundation where indicated. Comply with requirements of Section 230529.

    b. Suspended equipment: Securely hang from structure above. Comply with requirements of Section 230529. Provide 0.5 inch (12.5 mm) minimum diameter threaded rods.
    c. Wall-mounted equipment: Securely fasten to wall with metal fasteners, anchors, brackets, sleeves or other devices recommended by the equipment manufacturer. Provide blocking where required.
    d. Structural frame-mounted equipment: Securely fasten to structural frame.
    e. Equipment mounted at grade: Securely fasten to structural foundation. See drawings for details of construction of structural foundation.
    f. Coordinate supports so they do not interfere with access to other equipment that requires service.
    g. Provide vibration isolation where required.

10. Snugly fit equipment to architectural finishes in finished spaces unless otherwise indicated.
11. Ensure that equipment, coils, and drain pans properly drain. Test drain pans.
12. Connect associated ducts, piping, power, controls, and other associated systems.
13. Conceal associated ducts, piping and electrical connections in finished spaces unless otherwise indicated.
14. In rooms without ceilings or other finishes to conceal ducts, piping, and electrical connections, arrange these elements to provide a neat and finished appearance.
15. Install dielectric pipe fittings at water coil connections where dissimilar metals are joined.
16. Coordinate with installation of building automation system controls.
17. Install equipment with a safety listing or certification as required to comply with their listing or certification requirements.

C. Install and wire items furnished with equipment:

1. Install control devices, accessories, and appurtenances furnished loose with equipment.
2. Wire devices furnished with equipment that are not factory-wired.

    a. Perform the work as required in Section 230901.
    b. Comply with requirements in Section 230902.
    c. Comply with requirements in Division 26.
    d. Comply with requirements in NFPA 70.
    e. Comply with the manufacturer's installation requirements.

D. Prepare equipment for use:

1. Clean equipment and repair any damaged finishes. Remove paint splatters, dirt, and debris. Repair damaged finish to match original finish.
2. Adjust tension on belts.
3. Adjust discharge air devices.
4. Lubricate equipment.
5. Adjust equipment packaged controls to put the system into operation as intended.
6. Start up and operate equipment in accordance with manufacturer's instructions.
7. Verify smooth rotation and proper direction of rotation of motors.
8. Test controls, unit operation, and safety devices. Replace any failed components and retest.
9. Provide equipment identification.

3.3 PIPE INSTALLATION

A. Install piping in concealed locations, unless otherwise indicated or unless the piping is located in equipment rooms and service areas.

B. Install pipe exposed to view parallel to building lines and as close to walls, columns, and ceilings as may be practical, maintaining proper clearances for access at all parts requiring servicing. Diagonal runs are prohibited unless specifically indicated otherwise.

C. Install pipe a sufficient distance from other work to permit a clearance of not less than 0.5 inch (15 mm) between its finished covering and adjacent work.

D. Install piping free of sags and bends.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping and valves in locations to permit valve servicing.

G. Remove burrs resulting from cutting pipe or from any other operation.

H. Thoroughly clean pipe and fittings before they are installed, and keep them clean until the acceptance of the completed work. Cap or plug the ends of the lines to prevent earth and other debris from entering during construction.

I. Provide for expansion and contraction of piping and connections so that no breakage or excessive strain will occur. Provide anchors and guides of approved design where shown on drawings and where necessary to allow for proper expansion and contraction. At the time of installation, expansion loops shall be cold sprung to one-half of the calculated expansion.

J. Pipe connection flexibility:

1. Connect risers and branch connections to mains with at least five pipe fittings, including tee in main.
2. Connect risers and branch connections to equipment with at least four pipe fittings, including tee in riser.

3. Connect mains and branch connections to equipment with at least four pipe fittings, including tee in main.
4. Connections shall be arranged so that movement in piping due to expansion and contraction will not transmit excessive force to equipment.

K. Install unions or flanges in the piping at each item of equipment, control valve, and appliance, to provide easy removal of the equipment, valve, or appliance, and to provide for easy removal of coils.

L. Pitch hydronic piping so that air in the system can be properly vented. Provide shutoff valves where necessary to isolate parts of system for repairs without draining the entire system.

M. Interface with other products:

1. Where pipe is provided through walls, provide finished, permanent, waterproof installation complete with inserts, sleeves, supports or hangers, seals, and other appurtenances as required. Do not pierce, cut, or notch any footing or other structural member.
2. Waterproofing and dampproofing of the building shall be unharmed by the installation of the work. Where pipe has to pierce waterproofing or dampproofing, including outside walls, the penetration shall be made watertight. Waterproofing damaged or destroyed shall be repaired or replaced with new waterproofing.

N. Flanges shall be welded neck or slip-on pattern of class to suit the valves or equipment connections. Flanges shall have machine bolts with hex nuts and washers.

O. Threaded connections:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
2. Cut threads full and clean.
3. Apply specified pipe joint compound or tape on male threads only.
4. Where piping is installed in crawl spaces and tunnels, cover exposed threads with rust-inhibitive paint. Apply after joints have been assembled and tested.

P. Welded Joints:

1. Construct joints according to AWS D10.12, using qualified processes and welding operators.
2. Bevel plain ends of steel pipe.

Q. Copper tubing installation:

1. Cut pipe with a tubing cutter or fine-tooth saw. Cuts made with a saw shall be true and square, and the end shall be filed smooth with a fine-tooth file. Remove all marks and burrs with sandpaper.
2. Solder joints for copper tubing: Clean ends of tubing and inside of fitting ends thoroughly with emery cloth before applying flux.
3. Provide dielectric fittings between copper and steel piping to prevent electrolysis.
4. Follow the techniques for soldering and brazing pipe, fittings, and valves as recommended by the manufacturer.
5. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

3.4 IDENTIFICATION

A. General: Do not apply identification until insulation and finish painting work is complete.

B. Equipment:

1. Stencil equipment with minimum two-inch (50-mm) -high letters or provide identification tags. Clearly indicate equipment designation and area served.
2. Firmly fasten each identification tag to its appropriate piece of equipment with drive screws, sheet metal screws, or rivets. Do not interfere with operation of, or damage the item being marked.

C. Piping:

1. Mark by stenciling.
2. Mark to identify service with arrows showing direction of flow. Apply markings near building walls where pipes enter or leave an accessible space and in intermediate locations so that markings are no more than 30 feet (9 m) apart. They shall be readily visible to a person standing on the floor.
3. Fully identify all piping installed as work of the project.
4. Mark pipe with letters of height and with colors as required by OSHA and conforming to ASME A 13.1.
5. Identify every thermometer, gauge, and control device.

D. Valves:

1. Provide valve tags for all valves except shutoff valves on individual pieces of equipment where the equipment is immediately adjacent and their function is obvious. Numbers shall correspond to those shown on the Valve Chart. Attach tags to valve shaft.
2. Provide ceiling identification tags where valves are above a ceiling. Number shall correspond to tag number.

E. Ductwork: Stencil ductwork after insulation is applied, if required, with minimum two-inch (50-mm)-high letters, clearly identifying service (supply, return, exhaust) and showing direction of flow with arrows. Mark ducts near building walls where they enter or leave a space, and at intervals of not more than 30 feet (9 m). Identification shall be visible to a person standing on the floor.

F. Ceiling identification tags: Provide on access doors or, in suspended ceilings, on the ceiling support grid near the item identified.

1. Valves: Identify with the same number shown on the valve tag.
2. Terminal units above ceilings: Identify with unit description and number.

3.5 CLEANING AND PAINTING

A. Cleaning: Clean all piping and equipment. Where items are to be painted, clean ready for painting.

B. Painting: Coordinate painting with requirements of Division 09. Paint the items identified below to be painted. Use paint materials and systems specified in Division 09.

C. Items to be painted:

1. Items identified below to have protective coating.
2. Items furnished with manufacturer's prime coat.
3. Mechanical rooms (including but not limited to boiler, chiller, and air-handling unit rooms):

   a. Insulation and uninsulated steel: Piping, pumps, tanks, and vessels.
   b. Hangers and supports.

4. Piping and ductwork exposed in finished spaces, insulated and uninsulated.
5. Inside ducts behind registers, grilles, and diffusers.

D. Items not to be painted: Copper, stainless steel, and equipment furnished with manufacturer's finish.

E. Paint systems in mechanical rooms: Paint piping with conforming to ASME A 13.1.

1. Galvanized steel: One coat of primer recommended for galvanized surfaces and one coat of glossy alkyd enamel.
2. Ferrous metal: One coat of primer recommended for ferrous metal and one coat of glossy alkyd enamel.
3. Items protected with rust-inhibitive primer: Finish coat of compatible glossy enamel.

F. Paint systems for exposed piping and ductwork: Primer compatible with the substrate, whether steel, galvanized steel, insulation jacket, or other material; one coat or two, if required to cover, of paint to match adjacent surfaces in color and texture.

G. Painting inside ducts behind registers, grilles, and diffusers: Matte black, compatible with substrate and suitable for the temperatures at which the duct will operate, extending from the duct opening to a depth such that no unpainted surface will be visible to a person standing on the floor or adjacent balconies.

3.6 BACKBOARDS FOR PIPING SPECIALTIES

A. Provide wall-mounted backboards, sizes and locations as indicated on the drawings, for mounting piping specialties. Assembly shall consist of plywood board, FRP supports, and fasteners.

3.7 TREATED WOOD LUMBER

A. Provide wood-preservative-treated lumber where wood members are required as detailed on the drawings and in the following applications:

1. Cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, or waterproofing.
2. Sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.

3. Framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.

3.8 OPERATING INSTRUCTIONS (DEMONSTRATION)

A. Furnish factory-trained/equipment vendor-employed or factory-trained/factory-employed service technicians with the skills and labor to start-up and operate all mechanical systems and equipment. Provide the following services.

1. Start up and operate all systems and equipment for one 8-hour day.
2. Training:

   a. Provide at least 40 hours of training time, consisting of ten periods of four consecutive hours, during a period of not less than 90 days.
   b. Maintenance training:

      (1) Train the Owner's designated personnel in the manufacturer's recommended preventive maintenance procedures for each unique type of equipment that requires periodic maintenance.
      (2) Training shall include, but not be limited to filter changes, belt changes, lubrication, and adjustment.
      (3) Engage the Owner's designated personnel in hands-on training activities that demonstrate required maintenance and service.

   c. Operation training:

      (1) Train the Owner's personnel in the operation of equipment and systems.
      (2) Training shall include, but not be limited to demonstration of packaged controls, modes of operation, and observation of equipment operating parameters and self-diagnostic capabilities.
      (3) Provide troubleshooting opportunities during each training session.

   d. Make the Operating and Maintenance Manual available at the time of the instructions, for use by instructors and Owner personnel.
   e. Record training:

      (1) Furnish a qualified videographer to record training and demonstration activities.
      (2) Record each training and demonstration activity separately.
      (3) Record instruction, demonstrations, diagrams, and visual aids as necessary.
      (4) Record each session in 720p DVD video and audio format at a minimum.
      (5) Provide audio pickup sufficient for future use as a teaching and demonstration tool. Use microphones where necessary. Repeat all training where audio is unintelligible.
      (6) Audibly describe training and demonstration activities during recordings. Indicate floor, room number, and vantage point as part of the narration.
      (7) Provide two sets of DVDs within seven days of each training activity.

3. Direct digital building automation system control training shall be in addition to the equipment training required within this section. Refer to specification section 230923 for direct digital building automation system control operating training requirements.
4. Schedule start-up and operation as well as training at times agreed upon by the Owner and the Architect.

    a. Submit training itinerary to the Owner and Construction Manager a minimum of two-weeks prior to the anticipated date of performing the first scheduled activity.
    b. Provide a proposed schedule similar in format to the sample included below to coordinate the training effort.
    c. Revise the schedule based on comments received from the Owner and resubmit a final copy for record.

Item	Demonstrating Organization	Date	Start Time	End Time
Start-up and Operation Day				
Equipment Type #1 Training				
Equipment Type #2 Training				
Equipment Type #3 Training				
Etc.				

3.9 PIPING TESTS

A. Hydrostatic testing:

1. Notify Owner in writing at least 24 hours prior to the test.
2. Test before pipes are concealed or insulated.
3. Piping may be tested in sections as the work progresses.
4. Provide fluid, pumps, valves, and gages required for testing.
5. Where water is used as the test fluid, provide ambient temperature water and provide means to avoid freezing. Drain and dispose of test fluid when testing is concluded.
6. Isolate equipment and expansion tanks during test.
7. Isolate or remove any components with a pressure rating below the required test pressure.
8. Brace and support piping during the test, so that no movement, displacement, or damage results from the application of the test pressure.
9. Provide a pressure relief valve, set at a pressure no more than one-third higher than test pressure, to protect against damage caused by expanding liquid or other source of overpressure during test.
10. Replace piping or fittings found defective with new material.
11. Documentation of tests: Prepare a test report for each portion of piping tested, identified by service, material, location, and pipe size. Include these items

    a. Date of test.
    b. Starting and completion times.
    c. Initial test pressure.
    d. Final test pressure.
    e. Problems or leaks detected.
    f. Corrective actions taken.
    g. Record of successful completion of testing.

h. Name, title, and signature of person conducting test.

12. Piping Systems Test Schedule:

System	Test Pressure psig (kPa)	Duration	Allowable Drop	Medium
Heating water piping	125 (860)	4 Hours	None	Water
Chilled water piping	125 (860)	4 Hours	None	Water

* If pressure drops, locate leaks with soap and water solution

END OF SECTION 230500

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SECTION 230502 - SLEEVES AND PLATES FOR HVAC PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Sleeves.

B. Sealing materials.

C. Escutcheon plates.

D. Mechanical penetration seals.

1.2 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Sleeves.
2. Sealing materials.
3. Escutcheon plates.
4. Mechanical penetration seals.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Sleeves without water stops:

1. Steel sleeves: Schedule 40 black steel pipe, ASTM A 53.
2. Copper sleeves: Type L, ASTM B 88 hard drawn.
3. Plastic sleeves: Schedule 40 PVC, ASTM D 1785.

B. Sleeves with water stops:

1. Cast-iron sleeves with water stops: Extra heavy, equal to product of U.S. Pipe Co. with water stop and ends as shown on the drawings.

2.2 SEALING MATERIALS

A. Waterproof sealant:

1. Bare and insulated pipes carrying fluids 150 degrees F (65 degrees C) and below:

a. High-performance, moisture cured, 1-component, polyurethane-based, non-sag, elastomeric sealant. Use a primer for applications required by the manufacturer.
b. Basis of design: Sika Corporation “Sikaflex - la.”

2. Bare and insulated piping carrying fluids 151 degrees F (66 degrees C) and above:

a. One-part RTV silicone, neutral-cured, architectural grade sealant. Use a primer for applications required by the manufacturer.
b. Basis of design: Dow Corning Corporation “790 Silicone.”

B. Grout: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout, 5000 psi (34.5 MPa), 28-day compressive strength.

2.3 ESCUTCHEON PLATES

A. Floor, wall, and ceiling escutcheon plates for existing piping:

1. Stamped or cast brass with set screw, split and tabbed.
2. Finish: Chrome.

B. Floor, wall, and ceiling escutcheon plates for new piping:

1. Stamped or cast brass with set screw.
2. Finish: Chrome.

2.4 MECHANICAL PENETRATION SEALS

A. Mechanical penetration seals:

1. Seals shall be modular mechanical type, consisting of interlocking synthetic links shaped to continuously fill the annular space between the pipe and wall opening. Bolt and nut fasteners for the seals shall be stainless steel for units used in penetrations below grade.
2. Basis of design: PSI “Link-Seal Modular Seals” or Calpico Sealing Link “LINX”.

PART 3 - EXECUTION

3.1 INSTALLING SLEEVES

A. Provide sleeves for bare piping, or piping with insulation continuous through sleeve, passing through walls, partitions, beams, or slabs. Sleeves for insulated piping shall be large enough to pass piping and insulation.

B. Sleeve materials:

1. Penetrations in non-fire-rated interior construction:

a. Provide steel sleeves for penetrations of steel, cast iron, and insulated piping.
b. Provide copper sleeves for penetrations of uninsulated copper tubing and piping.
c. Provide plastic or steel sleeves for penetrations of plastic piping.
d. Plastic piping and sleeves are not permitted in ceiling spaces used as HVAC system plenums, or in shafts used for building HVAC air distribution.
e. Plastic sleeves are not permitted for penetrations of masonry construction.
f. A core drill may be provided in cast concrete walls in lieu of a sleeve.

2. Penetrations in fire-rated construction:

a. Provide sleeves that are acceptable components of through-penetration firestop assemblies specified in Division 07.
b. Where acceptable for floor penetration listing, provide sleeve projections above floor slabs in compliance with requirements of this section.
c. Where pre-manufactured cast in place or drop in fire rated sleeves are used in floors, provide the manufacturer's water dam accessories to achieve compliance.

3. Penetrations in exterior walls and foundations, masonry or concrete:

a. Provide cast iron sleeves with water stops in new cast concrete walls.
b. A core drill may be provided in cast concrete walls in lieu of a sleeve.
c. Provide steel sleeves in masonry walls.

4. Penetrations of steel beams:

a. Where steel pipe penetrates a steel beam that is not part of a fire- or smoke-rated assembly, no sleeve is required.
b. Do not cut, drill, or burn structural steel for installation of piping without specific instructions from the Architect.

C. Sleeve projection:

1. Sleeves through walls and partitions: Flush with finished surfaces.
2. Sleeves through floors:

a. Typical floors: Extend 0.375 inch (10 mm) above finished floor.
b. Kitchens and food service areas: Extend 0.375 inches (10 mm) above finished floor.
c. Mechanical or equipment room floors: Extend one inch (25 mm) above finished floor.
d. Finish neat and level.
e. Provide anchor clips to prevent sleeves from being loosened and knocked down.

3.2 INSTALLING SEALING MATERIALS

A. Penetrations in non-fire-rated interior construction:

1. Seal exterior of sleeve to wall or floor being penetrated:

a. Provide grout where sleeves penetrate concrete or masonry.
b. Provide waterproof sealant or wall construction materials where sleeves penetrate gypsum board walls.

2. Sealant between sleeve interior and pipe or pipe insulation:

    a. Typical applications: Seal spaces between sleeves and pipe, or between sleeves and pipe insulation, with mineral wool.
    b. Kitchens and food service areas: Seal space between sleeves and pipe, or between sleeves and pipe insulation, with waterproof sealant and finish even with sleeve.

B. Penetrations in fire-rated construction: Seal as required by the through-penetration firestop assembly specified in Division 07.

3.3 INSTALLING ESCUTCHEON PLATES

A. Provide plates of size and depth required to conceal sleeves where exposed piping passes through interior walls, partitions, floors, and ceilings. Secure plates in place with set screws.

3.4 INSTALLING MECHANICAL PENETRATION SEALS

A. Penetrations in exterior masonry or concrete walls and foundations:

1. Above grade: Mechanical penetration seal, at outside face of wall.
2. Below grade:

    a. Mechanical penetration seal, at outside face of wall.

END OF SECTION 230502

SECTION 230504 - HVAC DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Demolition.

B. Disposal.

C. Protection

1.2 RELATED SECTIONS

A. Demolition: Division 02.

1.3 REFERENCES

A. ANSI/ASHRAE Standard 147: Reducing the Release of Halogenated Refrigerants from Refrigerating and Air-Conditioning Equipment and Systems.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 DEMOLITION

A. Extent and location of demolition is indicated on the drawings.

B. Comply with demolition and disposal requirements of Division 02.

C. Perform demolition operations expeditiously and in accordance with accepted practice and applicable building code provisions. Perform demolition operations neatly and with the least possible disturbance to the building.

D. If, in the course of the work, workers encounter a material they suspect to be hazardous:

1. Promptly notify the Owner and Architect in writing.
2. Do not perform any work which would disturb the suspected material until written instructions have been received.

E. Provide temporary barriers, danger signals, and appurtenances for protection of personnel and equipment during demolition operations.

F. Drain and refill portions of existing piping systems necessary for the work.

1. Provide isolation valves, if necessary, to keep systems operational in occupied areas.
2. Schedule and coordinate draining with the Owner in accordance with Division 01 requirements for system shutdowns.

G. Demolish, remove, demount, and disconnect inactive and obsolete piping, fittings, specialties, equipment, ductwork, controls, fixtures, insulation, and associated appurtenances.

1. Piping and ducts embedded in floors, walls, and ceilings may be abandoned in place if they do not interfere with new installations. Cut back to at least one inch (25 mm) below the finished surface.
2. Remove materials above accessible ceilings.
3. Drain and cap items to remain behind finished surfaces.
4. Patch and repair surface materials as required in Division 01 and Section 230101.

H. Remove supports, hangers, anchors, and fasteners associated with piping and equipment being removed.

3.2 DISPOSAL

A. Dispose of equipment and materials removed, and other waste material, as work progresses.

B. Do not allow demolition debris to accumulate on site. Remove products of demolition from the building daily as a minimum.

3.3 PROTECTION

A. Protect existing materials that will remain. Locate, identify, and protect mechanical and electrical services passing through demolition area and serving other areas outside the demolition limits. Maintain services to areas outside demolition limits. When services must be interrupted, install temporary services for affected areas.

B. Provide and maintain dust and noise barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Keep standby patching materials on hand to patch and maintain protection as required. Remove protection and barriers after demolition operations are complete.

C. Ensure weathertightness at all times. Prevent the entry of dust or water.

END OF SECTION 230504

SECTION 230508 - HYDRONIC PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flexible connections.

B. Y-type strainers.

C. Air vents.

1.2 RELATED SECTIONS

A. Hydronic piping: Section 232113.

B. Access doors: Division 08.

1.3 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Flexible connections.
2. Y-type strainers.
3. Air vents.

B. Operation and maintenance data: Include operating and maintenance data for each hydronic piping specialty in the project Operation and Maintenance Manual as specified in Division 01 with supplemental requirements as specified in Section 230101.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Flexible connections:

1. Flex-hose Company
2. Keflex (Flex-Weld Inc.)
3. Mason Industries, Inc.
4. Metraflex

B. Y-type strainers:

1. Keckley
2. Mueller Steam Specialty
3. Spirax Sarco Inc.
4. Tate Andale, Inc. “Guardian”
5. Watts Industries, Inc.

C. Automatic air vents:

1. Bell and Gossett, a xylem brand
2. Hoffman Specialty Div. of ITT Industries
3. Spirax Sarco Inc.
4. Spirotherm, Inc.
5. Taco Inc.

D. Manual air vents:

1. Bell and Gossett, a xylem brand
2. Taco, Inc.

2.2 FLEXIBLE CONNECTIONS

A. Flexible connections NPS 2 (DN 50) and smaller:

1. Copper pipe:

a. Body: Corrugated bronze bellows waterway with woven flexible bronze outer shield.
b. Connections: Female sweat.
c. Performance: Capable of 0.5-inch (13-mm) minimum permanent offset.
d. Pressure rating: 150 psig (1035 kPa).
e. Maximum Operating Temperature: 250 degrees F (121 degrees C).
f. Basis of design: Metraflex Company model BBS.

2. Steel pipe:

a. Body: Corrugated stainless steel bellows waterway with woven flexible stainless steel outer shield.
b. Connections: Female threaded.
c. Performance: Capable of 0.5-inch (13-mm) minimum permanent offset.
d. Pressure rating: 150 psig (1035 kPa).
e. Maximum Operating Temperature: 250 degrees F (121 degrees C).
f. Basis of design: Metraflex Company model SST.

B. Flexible connections NPS 2.5 through 12 (DN 65 through 300):

1. Body: Corrugated Type 321 stainless-steel corrugated bellows waterway with woven flexible stainless-steel braid outer shield.
2. Connections: Flanged.
3. Performance: Capable of 0.75-inch (20-mm) minimum permanent offset.

4. Pressure rating: 150 psig (1035 kPa).
5. Maximum Operating Temperature: 250 degrees F (121 degrees C).
6. Basis of design: Metraflex Company model MLP.

2.3 WATER SPECIALTIES

A. Y-type strainers:

1. Steel pipe, threaded:

   a. Body, threaded cap, and plug: ASTM A126 Class B cast iron.
   b. Screen: Type 304 stainless steel with 0.045-inch (1.2-mm) maximum perforations.
   c. Pressure rating: 250 psi (1720 kPa) saturated steam, 300 psi minimum (2070 kPa) cold working pressure.
   d. Basis of design: Spirax Sarco IT.

2. Steel pipe, flanged:

   a. Body, bonnet, and plug: ASTM A126 Class B cast iron.
   b. Gasket: Graphite.
   c. Screen: Type 304 stainless steel with 0.045-inch (1.2-mm) maximum perforations.
   d. Pressure rating: 125 psi (862 kPa) saturated steam, 200 psi (1380 kPa) cold working pressure.
   e. Basis of design: Spirax Sarco CI.

3. Copper pipe:

   a. Body, cap, and plug: ASTM B 62 bronze.
   b. Connections: Threaded.
   c. Gasket: Graphite for sizes above NPT 2 (DN 50).
   d. Screen: Type 304 stainless steel with 0.045-inch (1.2-mm) maximum perforations.
   e. Pressure rating: 250 psi (1720 kPa) saturated steam, 400 psi (2760 kPa) cold working pressure.
   f. Basis of design: Spirax Sarco BT.

B. Air vents:

1. Automatic air vent: Air vent designed for use in hydronic systems with built-in check valve.

   a. Body: Cast brass.
   b. Internal Parts: Nonferrous metal.
   c. Inlet and drain connections: Threaded.
   d. Operating pressure: 150 psig (1030 kPa) minimum.
   e. Operating temperature: 250 degrees F (121 degrees C) minimum.

2. Manual air vent:

   a. Body: Bronze or brass.
   b. Internal Parts: Nonferrous metal.
   c. Operator: Screwdriver or thumbscrew.

d. Inlet and drain connections: Threaded.
e. Pressure rating: 150 psig (1030 kPa) minimum.
f. Maximum Operating Temperature: 225 degrees F (107 degrees C) minimum.

PART 3 – EXECUTION

3.1 INSTALLING FLEXIBLE CONNECTIONS

A. Provide flexible connections where shown on details and drawings and as follows:

1. Connections to base-mounted pumps.
2. Connections to equipment provided with external vibration isolation.
3. Connections to air-handling units where indicated.
4. Connections to equipment to allow for proper alignment of piping with equipment connections without putting stress on the piping system.

3.2 INSTALLING WATER SPECIALTIES

A. Y-type strainers: Provide Y-type strainers where indicated on piping diagrams to protect valves and coils. Provide shut-off valve in blow down connection with cap within mechanical rooms.

B. Air vents:

1. Automatic air vents: Provide automatic air vents where indicated on piping diagrams and at high points of piping within mechanical rooms. Provide copper tubing, full size of the automatic air vent discharge connection, from each automatic vent to nearest floor drain. Provide shut off valves in inlet piping to automatic air vents.
2. Manual air vents: Provide manual air vents where indicated on piping diagrams, at each high point in piping outside of mechanical rooms, and at each terminal equipment hydronic coil.

END OF SECTION 230508

SECTION 230519 - METERS AND GAUGES FOR HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Combination pressure-temperature connections.

1.2 RELATED SECTIONS

A. Ceiling identification tags: Section 230500.

B. Pipe installation and testing: Section 230500.

C. Valve tags and charts: Section 230500.

1.3 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Combination pressure-temperature connections.

B. Show flow measurement locations on valve charts specified in Division 23 Section “General-Duty Valves for HVAC Piping”.

C. Operation and maintenance data: Include operating and maintenance data for the following in the project Operation and Maintenance Manual as specified in Division 01 with supplemental requirements as specified in Section 230101.

1. Venturi flow meters.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Combination pressure-temperature connections:

1. H.O. Trerice Co.
2. Miljoco Corporation
3. Peterson Equipment Company
4. Sisco
5. Texas Fairfax Company
6. Utilities Materials and Controls, Inc.
7. Weiss Instruments

2.2 COMBINATION PRESSURE-TEMPERATURE CONNECTIONS

A. Combination pressure-temperature connections:

1. Plugs shall have self-closing valve which will operate at a temperature up to 300 degrees F (149 degrees C). Body and cap shall be brass, and shall receive either a temperature or pressure probe. Provide with a kit including gauges and thermometers in a protective case.

PART 3 - EXECUTION

3.1 INSTALLING COMBINATION PRESSURE-TEMPERATURE CONNECTIONS

A. Provide combination pressure-temperature connections where indicated on the drawings.

B. As an option, provide combination pressure-temperature connections, complete with kits, where thermometer wells or gauge cocks only are called for on the drawings.

END OF SECTION 230519

SECTION 230523 - GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Valves for HVAC hydronic piping systems.

1.2 RELATED SECTIONS

A. Piping installation and testing and valve identification: Section 230500.

B. Access doors: Division 08.

C. Hydronic piping systems: Section 232113.

1.3 REFERENCES

A. ASME B16.10: Face-to-Face and End-to-End Dimensions of Valves.

B. ASME B16.34: Valves - Flanged, Threaded, and Welding End.

1.4 SUBMITTALS

A. Product data: For each type of valve, include a description, characteristics, body material, composition, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions, and required clearances.

B. Operation and maintenance data:

1. Include operating and maintenance data for each valve in the project Operation and Maintenance Manual as specified in Division 01 with supplemental requirements as specified in Section 230101.
2. Include instructions for adjusting, servicing, disassembling, and repairing.

1.5 QUALITY ASSURANCE

A. Ferrous valves shall conform to ASME B16.10 and B16.34 for dimension and design criteria.

B. Copper alloy valves (brass and bronze) shall have no more than 15 percent zinc in the alloy.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Ball valves: Subject to compliance with requirements, provide the specified NIBCO valve, or comparable product by one of the following:

1. Apollo Valves
2. Milwaukee Valve Co.
3. NIBCO

B. High-performance butterfly valves: Subject to compliance with requirements, provide the specified high performance Bray valve, or comparable product by one of the following:

1. DeZurik
2. Belimo

C. Check valves: Subject to compliance with requirements, provide the specified NIBCO valve, or comparable product by one of the following:

1. Combination Pump and Valve Co.
2. Mueller Steam Specialty
3. NIBCO

D. Balancing valves: Subject to compliance with requirements, provide specified venturi ball valve (readable) by Flo-Pac or NuTech Hydronic Specialty Products, or comparable product by one of the following:

1. IMI Flow Design
2. Gerand Engineering
3. Griswold Controls
4. Pro Hydronic Specialties
5. Taco
6. Tour & Andersson
7. For sizes specified to be high performance butterfly valves with memory stop and venturi flow-measuring assembly, include specified high performance butterfly valve.

E. Drain valves: Subject to compliance with requirements, provide the specified NIBCO valve, or comparable product by one of the following:

1. Apollo Valves
2. Milwaukee Valve Co.
3. NIBCO

2.2 VALVES

A. Full-port ball valves:

1. Valves NPS 2 (DN 50) and smaller:

a. Class 150 SWP, bronze, two-piece body, full port, TFE seats and seals, stainless-steel ball and stem, threaded or soldered ends. Extension handle for use in insulated piping.
b. NIBCO T-585-70-66 or S-585-70-66.

B. High performance butterfly valves, NPS 2.5 (DN 65) and larger: High-performance full lug body.

1. Class 150 suitable for use with ASME B16.5 Class 150 flanges.
2. Bidirectional service at 200 psi (1379 kPa) and maintain bubble-tight rating according to ANSI/FCI 70-2 Class VI or API 598 shutoff against 270 psi operating at cold working temperatures.
3. Body: Carbon steel, for flanged connection with alignment bolts, holes, or guides.
4. Seat: Single-piece, reinforced, PTFE, suitable for continuous operation at 121 degrees C, field-replaceable.
5. Bearings: Stainless-steel, PTFE-backed, self-lubricating.
6. Stem seals: PTFE.
7. Shaft: Type 316 stainless steel, including shaft seat, retaining ring, and fasteners. Double offset shall reduce torque on seat.
8. Disk: Type 316 stainless steel.
9. Insert: Stainless steel
10. Operator:

a. NPS 6 (DN 150) and smaller: Ten-position leverlock handle.
b. NPS 8 to 10 (DN 200 to 250): Gear operator (30 to 1 gear reduction).
c. NPS 12 (DN 300): Gear operator (50 to 1 gear reduction).
d. NPS 14 (DN 350) and larger: Gear operator (80 to 1 gear reduction).

11. Provide 2-inch minimum extension handle where required in insulated piping.
12. Where used for balancing, provide memory stop.

C. Center-guided, spring-loaded silent-action type check valves:

1. Valves NPS 2 (DN 50) and smaller:

a. Class 125, bronze body, Teflon disk, Teflon seat ring, stainless-steel stem and spring, threaded or soldered ends.
b. Basis of design: NIBCO Fig. S-480Y or T-480-Y.

2. Valves NPS 2.5 (DN 65) and larger:

a. Class 125, cast-iron body, bronze trim, stainless-steel spring, flanged.
b. Basis of design: NIBCO Fig. F-910.

D. Balancing valves:

1. NPS 2 (DN 50) and smaller: Venturi ball valve (readable valve) with threaded or soldered ends.

a. Materials: Brass and bronze body, chrome-plated brass ball, PTFE seats and stem packing.

b. Ratings: Entire assembly 250 psi, 250 degrees F (1725 kPa, 121 degrees C).
c. Flow element: Low-loss, high-signal venturi section with schrader or quick-connect pressure-ports, reliability one to ten and accuracy 2 percent.
d. Stem: Blowout-proof.
e. Memory stop: On valve section, adjustable, with extended handle.
f. Bellows type meter gauge kit with case, provide one for use on the entire project.
g. Basis of design:

(1) Taco “Accu-Flo (ACUF).”
(2) Gerand “Balvalve-Venturi (BV).
(3) Tour & Andersson STAD and STAS Series.
(4) Griswold Controls “QuickSet.”
(5) IMI Flow Design Model UA.
(6) Pro Hydronic Specialties Model CBV

2. NPS 2.5 (DN 65) and larger: High-performance Butterfly valve with memory stop coupled with a Venturi flow-measuring assembly.

a. Venturi type flow element: Low-loss, high-signal venturi with schrader or quick-connect pressure ports, accuracy plus or minus 3 percent FS.
b. Provide Owner, one bellows-type meter gauge kit with case for use on the entire project.

2.3 DRAIN VALVES

A. Two-piece full-port ball valve, NPS 0.75 (DN 20), 600 psi (4137 kPa) CWP, 400 deg F (204 deg C) maximum operating temperature, bronze body, PTFE seats and seals, chrome-plated brass ball, threaded hose outlet with brass cap and chain, lever handle, threaded or soldered inlet. Provide extension handle where used in insulated piping.

1. Provide a removable handle where valve is accessible to the general public.
2. Basis of design: NIBCO T-585-70-HC or S-585-70-HC.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Provide valves to be readily accessible for operation and maintenance, and with ample clearance for turning handles. Provide access doors for valves in inaccessible locations.

B. Valves installed above ceilings shall not be greater than 36 inches (915 mm) above acoustical tile ceilings or 24 inches (610 mm) above gypsum board ceilings.

C. Identify valves as specified in Section 230500, Common Work Results for HVAC.

3.2 INSTALLING SHUTOFF AND BALANCING VALVES

A. Install shutoff and balancing valves where indicated. Generally, install balancing valves in return lines of heating and cooling coils and elements, and shutoff valves in supply lines.

B. Shutoff valves for water piping systems shall be as follows:

1. Sizes NPS 2 (DN 50) and smaller: Ball valves.
2. Sizes NPS 2.5 (DN 65) and larger: High-performance butterfly valves.

C. Balancing valves: Locate valve to provide 5 pipe diameters straight inlet and 2 pipe diameters straight outlet.

3.3 INSTALLING CHECK VALVES

A. Provide center-guided, spring-loaded silent-action where indicated.

3.4 INSTALLING DRAIN VALVES

A. Install drain valves, NPS 0.75 (DN 20) or size indicated on the drawings, at every low point of a water system, and where indicated.

END OF SECTION 230523

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SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hangers and clamps.

B. Trapeze pipe hangers.

C. Supplemental materials.

D. Metal framing systems.

E. Insulation protection.

F. Fasteners.

G. Equipment foundations and supports.

1.2 RELATED SECTIONS

A. HVAC Piping Insulation: Section 230719

B. Duct supports: Section 233113.

1.3 REFERENCES

A. American Society of Mechanical Engineers

1. ASME B31.1: Power Piping.
2. ASME B31.9: Building Services Piping.

B. ASTM International

1. ASTM A 36: Standard Specification for Carbon Structural Steel
2. ASTM A 53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
3. ASTM A 307: Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
4. ASTM A 563: Standard Specification for Carbon and Alloy Steel Nuts ASTM A 1064: Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
5. ASTM C 533: Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation
6. ASTM C 552: Standard Specification for Cellular Glass Thermal Insulation

7. ASTM F 594: Standard Specification for Stainless Steel Nuts
8. ASTM F 3125: Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated

C. American Welding Society

1. AWS-D.1.1: Structural Welding – Steel

D. Metal Framing Manufacturer's Association

1. MFMA-4: Metal Framing Standards Publication
2. MFMA-103: Guidelines for the Use of Metal Framing

E. Manufacturer's Standardization Society

1. MSS SP-58: Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.

1.4 DEFINITIONS

A. High Temperature Hot Systems: Operating temperatures 200 degrees F (93 degrees C) and above.

B. Hot Systems: Operating temperatures 120 degrees F (49 degrees C) to 200 degrees F (93 degrees C).

C. Ambient Systems: Operating temperatures 60 to 119 degrees F (16 to 48 degrees C).

D. Cold Systems: Minimum operating temperatures 59 degrees F (15 degrees C) and below.

1.5 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Hangers and clamps.
2. Trapeze pipe hangers.
3. Supplemental materials.
4. Metal framing systems.
5. Insulation protection.
6. Fasteners.

B. Product application schedule: Include the following:

1. Provide a schedule of piping types and sizes and associated pipe hanger types.
2. Provide a schedule of building attachment types and associated attachment hardware.
3. Provide a schedule of pipe types and sizes and proposed hanger spacing and support rod diameters.

C. Welding certificates.

1.6 QUALITY ASSURANCE

A. Qualifications of welders: As specified in Section 230500, Common Work Results for HVAC.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Pipe hangers:

1. Anvil International
2. Carpenter and Paterson, Inc.
3. Cooper Industries
4. National Pipe Hanger Corporation
5. PHD Manufacturing, Inc.
6. PHP Systems/Design

B. Metal framing systems:

1. Anvil International
2. Cooper Industries
3. Hydra-Zorb
4. PHD Manufacturing, Inc.
5. PHP Systems/Design
6. Unistrut

C. Pipe covering protection shields:

1. Anvil International
2. Carpenter and Patterson, Inc.
3. Cooper Industries
4. National Pipe Hanger Corporation
5. PHD Manufacturing, Inc.
6. Pipe Shields, Inc.
7. Rilco Manufacturing Co., Inc.

2.2 PIPE HANGERS AND SUPPORTS

A. General: Comply with requirements of MSS SP-58.

B. Hangers and clamps:

1. Typical interior applications: Galvanized steel or factory painted.
2. Exterior and corrosive applications: Stainless steel.
3. For use with uninsulated copper pipe: Copper plated.

C. Trapeze pipe hanger: MSS SP-58, Type 59, shop-fabricated or field-fabricated pipe support assembly made from structural carbon-steel shapes with pipe saddles and U-bolts to secure piping on top of hanger.

D. Supplemental materials:

1. Threaded rod: Continuously threaded.

    a. Zinc-plated or galvanized carbon steel for indoor applications.
    b. Stainless steel for outdoor and corrosive applications.

2. Nuts and washers: Provide the same material used for threaded rods (ASTM A 563 for steel, ASTM F 594 for stainless steel).
3. Structural carbon-steel shapes: ASTM A 36.
4. Steel pipe: ASTM A 53, Grade B, Type E (electric resistance welded), Schedule 40, black and galvanized steel.

E. Metal framing systems:

1. Description: Shop- or field-fabricated, pipe-support assembly made of channels, nuts, bolts, structural connections, accessories, fittings, and other manufactured components, including brackets and braces required to resist lateral loads.
2. Standard: Comply with MFMA-4 for factory-fabricated components for field assembly.
3. Channels: Continuous slotted galvanized steel channel with inturned lips, width selected for applicable load criteria.
4. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
5. Zinc-plated or galvanized carbon steel for indoor applications.
6. Stainless steel for outdoor and corrosive applications.
7. Metal framing system pipe clamps:

    a. Galvanized steel clamp pipe support with elastic stop nut, and hex head machine screw, and manufactured to connect to metal framing system channels.
    b. For insulated piping: Clamp shall have friction tape on inside of clamp surface, manufactured to connect to pipe clamp insulating insert over pipe.
    c. For uninsulated piping: Clamp shall have an integral molded thermoplastic elastomer clamping insert on inside of clamp surface, manufactured to connect to uninsulated pipe.

F. Insulation protection:

1. Pipe covering protection shield:

    a. Shield: Galvanized steel, meeting the requirements of MSS SP-58 Type 40. Provide alignment ridges when used in conjunction with pipe hanger.
    b. Structural insulation insert: Structural insulation insert to form the insulation for the lower half of, or the entire pipe circumference. Provide ASTM C 533, Type I calcium silicate with 100-psig (688-kPa) minimum compressive strength; or ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength. Insert thickness shall match adjacent piping insulation thickness.

2. Combination insulating insert and insulation protection shield:

    a. Insulating insert material for cold and ambient system piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength and vapor barrier. Insert thickness shall match adjacent piping insulation thickness.
    b. Insulating insert material for hot system piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig (688-kPa) minimum compressive strength; or ASTM C 552, Type II cellular glass with 100-psig (688-kPa) minimum compressive strength. Insert thickness shall match adjacent piping insulation thickness.
    c. Insulation protection shield: Galvanized steel.
    d. Insulating insert and insulation protection shield shall cover entire circumference of pipe.
    e. Insulating insert length: Extend 2 inches minimum (50 mm) beyond insulation protection shield.

3. Pipe covering protection saddle:

    a. Saddle: Steel, meeting requirements of MSS SP-58 Type 39
    b. Insulation insert: Insulating material located in the space between saddle and pipe.

4. Pipe clamp insulating insert:

    a. Insulating insert material: Closed-cell, sponge or expanded rubber, ASTM C 534, Type I for tubing material, with integral supports constructed from non-compressive closed cell material, single piece construction with self-adhesive closure strips. Insert thickness shall match adjacent piping insulation thickness. If insulation thickness is not available, provide maximum available thickness and seal insulation vapor barrier at thickness transition.
    b. Insulation protection jacket: Aluminum or stainless steel, bonded to insulation insert.
    c. Insulating insert and jacket shall cover entire circumference of pipe.
    d. Equal to Armacell “Armafix” insulating inserts.

2.3 FASTENERS

A. Mechanical expansion anchors:

1. Self-drilling type expansion shields or machine bolt drop-in anchors for drilled holes. Fasteners to floor slabs shall be vibration and shock resistant. Load applied to fasteners shall not exceed 25 percent of manufacturer’s stated load capacity in 3500 psi (24,000 kPa) concrete. Provide zinc-coated anchors for indoor applications and stainless-steel anchors for outdoor applications.
2. Basis of design: ITT Phillips Anchors “Red Head.”

B. Fasteners to drywall or cavity wall construction:

1. Toggle bolts with hollow wall drive anchors or nylon anchors as required.
2. Basis of design: ITT Phillips Anchors “Red Head” toggle bolts.

C. Bolts, nuts, and washers: ASTM A 307, or ASTM F 3125 where high strength is required.

2.4 CONCRETE AND GROUT

A. Concrete:

1. Concrete shall be no less than 3000-psi (25,000 kPa) strength.
2. Reinforcement: 6 by 6 inch (150 by 150 mm) welded steel wire fabric, ASTM A 1064.

B. Grout:

1. Premixed, non-shrink grout consisting of non-metallic aggregate, cement, and water-reducing and plasticizing agents; capable of developing minimum compressive strength of 7,000 psi (48,000 kPa) in 28 days.
2. Provide grout by one of the following manufacturers:

a. Sonneborn-Rexnord “Sonogrout”
b. L&M Construction Chemical Company “Crystex”
c. US Grout Corporation “Five-Star Grout”

PART 3 - EXECUTION

3.1 GENERAL

A. Provide hangers and supports in accordance with schedules at the end of this section, as modified by specifications for each location and type.

B. Comply with MSS SP-58. Provide hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

C. Provide hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

D. Where required, provide structural steel shapes or metal framing system channels and hardware to transfer load from a hanger location to multiple locations in the structure to get support from an appropriate location or to increase the strength of the connection to the structure.

E. Support horizontal piping from above with hangers and threaded rod where possible, unless otherwise indicated.

F. Riser support:

1. Support pipe risers through floor slabs with riser clamps.
2. Where pipe sleeves or associated water dams are not capable of accepting the weight of the piping, provide supplemental supports to transfer the weight of the piping to the structure.
3. Provide additional supports as needed not to exceed scheduled maximum vertical support spacing.

G. Provide hanger sizes to allow for continuous insulation for insulated piping systems.

H. Fabricate wall-mounted and floor-mounted supports using metal framing systems or structural steel where required.

I. Support groups of small piping along a structural wall using a metal framing system secured to the wall.

J. Trim threaded rods with a maximum excess length of 1 inch (25 mm). Provide protective rubber red end caps on the ends of threaded rods exposed and within 8 feet (2.4 meters) of the floor, roof, or grade below.

K. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

L. Install lateral bracing with pipe hangers and supports to prevent swaying.

M. Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

N. Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

O. Trapeze pipe hangers: Provide where required for grouping of parallel runs of horizontal piping.

1. Weld steel according to AWS D-1.1.
2. Hang with threaded rods. Size threaded rods in accordance with MSS SP-58.
3. Design trapeze pipe hangers and supports based on supported load plus a 50 percent minimum safety factor.
4. Hanger spacing shall not exceed the requirements for the smallest pipe in the rack.
5. Hanger spacing shall not exceed 6 feet (1.8 m) where hung from wood.

P. Metal framing systems: Provide where required for grouping of parallel runs of piping, and support together on field-assembled strut systems. Comply with MFMA-103 for metal framing system selections and applications.

Q. Piping supported from a roof structure:

1. Provide support from rails using a method indicated below:

a. Support with hangers, metal framing systems, and supplemental materials mounted to equipment support rails.
b. Support piping and pipe supports using a pipe support rail. See Section 230506.

R. Piping supported from grade:

1. Support with hangers, a metal framing system, and supplemental materials.
2. Mount to concrete piers.
3. Supports shall resist both gravity and lateral wind loads. Provide bracing as required.

S. Where piping penetrates metal studs within metal stud partitions, provide polymer inserts manufactured for the purpose to isolate piping and insulation from the metal stud material.

T. Remove, add, and modify existing hangers and supports to coordinate with new work and support existing to remain elements.

3.2 BUILDING ATTACHMENTS

A. Attaching to structural walls:

1. Provide a minimum of two 0.375 inch (9.5 mm) minimum screw-type fasteners for attaching brackets and a minimum of three 0.5 inch (13 mm) minimum bolt-type fasteners for attaching structural supports.

B. Attaching to structural steel beams, channels, or angles:

1. Secure threaded rods to MSS SP-58 Type 20 adjustable beam clamps that are clamped to the bottom flange of steel beams for any pipe size.
2. Secure threaded rods to MSS SP-58 Type 23 beam clamps for beams with maximum flange thickness of 0.75 inch (19 mm) and for single pipes NPS 2 (DN 50) and smaller.

C. Attaching to concrete slabs and composite slabs:

1. Obtain approval from the structural engineer and confirm allowable loads prior to supporting pipe from concrete slabs or composite slabs. Where approved, provide mechanical expansion anchors and steel bolts or rods.

D. Attaching to steel decks: Not permitted.

3.3 INSTALLING EQUIPMENT FOUNDATIONS AND SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor. Provide lateral bracing, to prevent swaying.

B. Provide minimum four-inch (100-mm) -high concrete foundations (housekeeping pads) or as indicated on drawings, reinforced with welded-wire fabric, for floor-mounted equipment and where indicated. Anchor concrete foundations by dowels inserted into the floor slab.

C. Unless otherwise specified, provide concrete foundations, bolts, sleeves, and appurtenances as work of the section where the supported equipment is specified and in accordance with the requirements of Division 03.

D. Equipment shall be properly aligned and leveled and grouted where necessary. Support piping independently of equipment and so as not to cause a strain or thrust.

E. Coordinate exact size, configuration and location of equipment, foundations, and supports using approved shop drawings of equipment.

3.4 PIPING HANGER AND SUPPORT SCHEDULES

A. Hanger and support types (cold and ambient hydronic applications): Applications include, but are not limited to, chilled water systems, condenser water systems, geothermal heat pump systems, and portions of dual temperature systems that only experience cold and ambient conditions.

HANGERS & SUPPORTS FOR INSULATED COLD AND AMBIENT HYDRONIC APPLICATIONS		
MSS SP-58 Classification	Description	Piping applications
Hung from Above		
Types 1 & 40	Clevis hanger & pipe covering protection shield.	NPS 0.5 (DN 15) through NPS 2 (DN 50)
Types 1 & 40 (with structural insulation insert)	Clevis hanger & pipe covering protection shield, with structural insulation insert.	NPS 2.5 (DN 65) and larger
Type 59 (with combination insulating insert and insulation protection shield)	Trapeze pipe hanger with pipe saddles & U-bolts (with combination insulating insert and insulation protection shield).	NPS 0.5 (DN 15) through NPS 4 (DN 100)
N/A	Metal framing system with metal framing system pipe clamps and pipe clamp insulating inserts.	NPS 0.5 (DN 15) through NPS 4 (DN 100)
Supported from Below		
Type 37 (with combination insulating insert and insulation protection shield)	Adjustable pipe stanchion saddle with U-bolt and floor flange anchored to floor (with combination insulating insert and insulation protection shield).	All sizes where supported from floor or a concrete support pier.
N/A	Metal framing system with metal framing system pipe clamps and pipe clamp insulating inserts.	NPS 0.5 (DN 15) through NPS 8 (DN 200)
Risers		
Type 8	Riser clamp.	All sizes

B. Hanger and support types (hot hydronic applications): Applications include, but are not limited to heating water systems, and portions of dual temperature systems that only experience hot conditions.

HANGERS & SUPPORTS FOR INSULATED HOT HYDRONIC APPLICATIONS		
MSS SP-58 Classification	Description	Piping applications
Hung from Above		
Types 1 & 40	Clevis hanger & pipe covering protection shield.	NPS 0.5 (DN 15) through NPS 2 (DN 50)
Types 1 & 40 (with structural insulation insert)	Clevis hanger & pipe covering protection shield, with structural insulation insert.	NPS 2.5 (DN 65) to NPS 6 (DN 150)
Type 59 (with combination insulating insert and insulation protection shield)	Trapeze pipe hanger with pipe saddles & U-bolts (with combination insulating insert and insulation protection shield).	NPS 0.5 (DN 15) through NPS 4 (DN 100)
N/A	Metal framing system with metal framing system pipe clamps and pipe clamp insulating inserts.	NPS 0.5 (DN 15) through NPS 4 (DN 100)
Supported from Below		
Type 37 (with combination insulating insert and insulation protection shield)	Adjustable pipe stanchion saddle with U-bolt and floor flange anchored to floor (with combination insulating insert and insulation protection shield).	All sizes where supported from the floor or a concrete support pier. Use only where no significant horizontal pipe movement is anticipated.
Types 41 & 39	Adjustable roller support & pipe covering protection saddle (cast-iron roll and sockets, steel roll rod, supported from below with threaded rods).	All sizes where supported from racks, fixed structural supports, or brackets where vertical adjustment is required.
Types 44 & 39	Roller chair & pipe covering protection saddle (Cast-iron roll, steel roll rod, steel chair, bolts, and hex nuts).	All sizes where supported from racks, fixed structural supports, or brackets where vertical adjustment is not required.
N/A	Metal framing system with metal framing system pipe clamps and pipe clamp insulating inserts.	NPS 0.5 (DN 15) through NPS 6 (DN 150)
Risers		
Type 8	Riser clamp.	All sizes

C. Minimum threaded rod sizes: Provide at least the following minimum rod diameters for single rods supporting a single pipe hanger.

PIPE SIZE	MINIMUM ROD DIAMETER
NPS 2 (DN 50) and below	0.375 inches (10 mm)
NPS 2.5 and NPS 3 (DN 65 and DN 75)	0.5 inches (15 mm)
NPS 4 and NPS 5 (DN 100 and DN 125)	0.625 inches (16 mm)
NPS 6 and NPS 8 (DN150 and DN 200)	0.75 inches (20 mm)

D. Maximum hanger and support spacing:

1. Provide additional hangers or supports for concentrated loads such as flanges, valves, expansion compensators, fittings, and other specialties.
2. Spacing schedule for metallic piping:

<table>
<tr><th>PIPE SIZE</th><th>COPPER HYDRONIC PIPING</th><th>STEEL HYDRONIC PIPING</th></tr>
<tr><td>NPS 0.75 (DN 20) and below</td><td>5 feet (1.5 m)</td><td rowspan="3">7 feet (2.1 m)</td></tr>
<tr><td>NPS 1 (DN 25)</td><td>6 feet (1.8 m)</td></tr>
<tr><td>NPS 1.25 (DN 32)</td><td>7 feet (2.1 m)</td></tr>
<tr><td>NPS 1.5 (DN 40)</td><td rowspan="2">8 feet (2.4 m)</td><td>9 feet (2.7 m)</td></tr>
<tr><td>NPS 2 (DN 50)</td><td>10 feet (3 m)</td></tr>
<tr><td>NPS 2.5 (DN 65)</td><td>9 feet (2.7 m)</td><td>11 feet (3.4 m)</td></tr>
<tr><td>NPS 3 (DN 75)</td><td>10 feet (3 m)</td><td>12 feet (3.7 m)</td></tr>
<tr><td>NPS 4 (DN 100)</td><td rowspan="2">12 feet (3.7 m)</td><td>14 feet (4.3 m)</td></tr>
<tr><td>NPS 5 (DN 125)</td><td>16 feet (4.9 m)</td></tr>
<tr><td>NPS 6 (DN 150)</td><td>14 feet (4.3 m)</td><td>17 feet (5.2 m)</td></tr>
</table>

END OF SECTION 230529

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SECTION 230593 - TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. The Contractor shall engage and the Architect shall approve an independent balancing and testing subcontractor.

B. This section includes testing, adjusting, and balancing HVAC systems to produce design objectives, including the following:

1. Balancing airflow and water flow within distribution systems, including submains, branches, and terminals, to indicated quantities according to specified tolerances.
2. Adjusting total HVAC systems to provide indicated quantities.
3. Measuring electrical performance of HVAC equipment.
4. Setting quantitative performance of HVAC equipment.
5. Verifying that automatic control devices are functioning properly.
6. Reporting results of the activities and procedures specified in this section.

1.2 RELATED SECTIONS

A. Testing and adjusting requirements unique to particular systems and equipment are included in the sections that specify those systems and equipment.

B. Field quality-control testing to verify that workmanship quality for system and equipment installation is specified in system and equipment sections.

1.3 PERFORMANCE REQUIREMENTS

A. Select and obtain approval of the testing and balancing subcontractor at the earliest possible time and before beginning ductwork installation.

B. The testing and balancing subcontractor shall visit the job site periodically, beginning with the initial stages of construction of the mechanical systems, and shall ensure that the necessary devices are properly installed so that specified testing and balancing can be performed.

1.4 SUBMITTALS

A. Submit qualifications of testing and balancing subcontractor, as required in article “Quality Assurance” below.

B. Submit certified balance report. In addition to general requirements for submittals, submit three copies of final reports and certificates, bound into a booklet.

1.5 QUALITY ASSURANCE

A. Testing and balancing subcontractor qualifications:

1. Current certified member of the Associated Air Balance Council, or certified by National Environmental Balancing Bureau for air and hydronic systems testing and balancing.
2. Has successfully completed at least five projects of similar size and scope.
3. Not affiliated with any other subcontractor participating in this project. Work performed by the subcontractor shall be limited to testing, adjusting, and balancing HVAC systems.

B. Testing and balancing work shall comply with one of the following standards:

1. National Standards for Testing and Balancing Heating, Ventilating and Air Conditioning Systems, published by the Associated Air Balance Council.
2. Procedural Standards for Testing Adjusting Balancing of Environmental Systems, published by the National Environmental Balancing Bureau.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Instruments: Approved and properly calibrated.

B. Pyrometer surface temperature measurements may be used for piping system water temperatures where thermometer wells are not provided in the piping.

PART 3 - EXECUTION

3.1 PREPARATION

A. Witness air duct leakage tests required in Section 233113, Metal Ducts, and advise and approve the methods and instruments used.

B. Using bench-calibrated instruments, field-calibrate pressure gages and dial-type duct thermometers.

3.2 BALANCING OF SYSTEMS, GENERAL

A. Tabulate settings of temperature control devices and ascertain that thermostats, controllers, and valves are set at specified or approved positions. Verify and certify that the sequence of operation for each system is as shown on drawings, specified, or approved.

B. Provide all labor and devices necessary for the testing and balancing work.

3.3 AIR SYSTEMS BALANCING

A. Balance all air distribution, supply, return, exhaust, and outdoor air systems and equipment.

B. Test and adjust fans to deliver design airflow at lowest possible speed. Adjust air-handling equipment to deliver the required air volumes. Note that air quantities scheduled on drawings do not include allowances for duct leakage. Preliminary adjustments of fan speed should be slightly in excess of scheduled airflow delivery. Make adjustments by adjusting adjustable sheaves, changing sheaves and associated belts, changing wiring connections of motors, or adjusting speed controller.

C. Test and adjust system to design airflow requirements to the greatest extent possible. Manual volume dampers in ducts shall be adjusted to obtain required airflow rates at grilles, registers, and diffusers. Dampers integral to airflow devices should be fully open or minimally closed for airflow fine adjustments.

D. Make pitot tube traverse of main supply, return, and outdoor air ducts to obtain total airflow for fan or air-handling unit.

E. Adjust rooms or zones to design airflow (supply, return, and exhaust).

F. Adjust general HVAC systems to design airflow within the following tolerances:

1. Total system supply, return, and exhaust: (design to plus 10 percent).
2. Outdoor air: (minus 5 percent to plus 5 percent).
3. Total supply, return, and exhaust for a room or space: (minus 5 percent to plus 5 percent).
4. Grilles, registers, and diffusers:

    a. One per room or space: (minus 5 percent to plus 5 percent).
    b. Two or more per room or space: (minus 10 percent to plus 10 percent).

G. Grilles, registers, and diffusers:

1. Identify each grille, register, and diffuser as to location and area. List manufacturer, type, and size.
2. Identify type of testing equipment used.
3. Test and adjust each grille, register, and diffuser to design airflow. List (design-actual) cfm (cubic meters per minute) and (design-actual) velocity in fpm (meters per second) when applicable.
4. Adjust diffusers, grilles, and registers to minimize drafts. Adjust blades in supply diffuser straightening grids to ensure uniform air distribution across diffuser. Check position of deflection blades in return air lighting fixtures to ascertain uniform air return into ceiling plenum.
5. Adjust linear slot diffusers to provide throw direction as indicated on the drawings. Unless otherwise noted, discharge pattern shall be horizontal. Where two-way throw is indicated, divide the number of slots equally for each direction.

H. Test and record the following data, as applicable, for air-handling equipment:

1. Manufacturer and model number.
2. Total airflow (design-actual).
3. Return air airflow (design-actual).
4. Outdoor air airflow (design-actual).

5. Total and external static pressure (design-actual). Include static pressure at suction, discharge, and between unit coil and filter components.
6. Entering air temperatures (db heating, db and wb cooling).
7. Leaving air temperatures (db heating, db and wb cooling).
8. Motor horsepower (rated-actual).
9. Voltage and phase (rated-actual).
10. Fan speed, rpm (rated-actual).
11. Amperage (rated-actual).

I. In cooperation with the control manufacturer's representative, set adjustments of automatically operated dampers to operate as specified.

J. Adjust air systems feeding terminal reheat units to deliver design airflow with a maximum static pressure at any unit air inlet not over 0.5 inches w.g. Eliminate excess static pressure by slowing fan rpm and modulating duct dampers, and not at the reheat unit where excess noise may result.

3.4 VARIABLE VOLUME SYSTEM BALANCING

A. Balance system air distribution, supply, return, and exhaust including air distribution equipment in accordance with AABC standards for Testing and Balancing Variable Volume systems and as specified below.

B. Static pressure sensor locations shall be in those duct runs which are of the longest equivalent length (greatest friction loss).

1. Measure the supply duct static pressure at each location.
2. Monitor each location during the adjusting and balancing to assure proper inlet static pressure is being maintained to the air terminal units.
3. Determine pressure setpoints at each location and forward data to the control subcontractor.

C. Calibrate supply and return fan variable frequency drives.

1. Balance system at 100 percent airflow, noting supply and return cfm (L/s) and the resulting cfm (L/s) differential.
2. Set the system to operate at 50 percent of total supply airflow, noting supply fan motor frequency. Adjust the return fan motor frequency so that the cfm (L/s) differential is the same as at 100 percent airflow.
3. Set the system to operate at 100 percent outdoor air and traverse the ducts. Adjust outdoor air, return air, and exhaust air dampers to maintain total airflow.
4. Set duct system static pressure controllers to provide adequate static pressure for the most demanding air terminal unit.
5. Forward test and setpoint data to the control subcontractor.

D. Determine the static pressure setpoint in mixed entering air plenum of each unit.

1. Set system to operate at 100 percent airflow.

2. Balance outdoor and return air dampers to provide minimum outdoor airflow scheduled. Adjust dampers to produce a mixed air plenum static pressure which is within the control range of the sensor provided as specified for the automatic temperature control system. Verify the return fan capacity control and static pressure controls functions throughout the 30 to 100 percent airflow range.
3. Forward test and setpoint data to the control subcontractor.

E. Balance the secondary duct system and make adjustments to the VAV terminal unit volume regulators. Record the following data:

1. Terminal unit designation.
2. Manufacturer, model number, and size.
3. Minimum primary airflow (design - actual).
4. Maximum primary airflow (design - actual).
5. Terminal unit fan airflow (design - actual).
6. Fan motor speed setting, voltage, and current.

F. Walk through the building and listen for noise generated by the air distribution system. Correct balancing to eliminate excess noise. Report noise not related to balancing.

3.5 HYDRONIC SYSTEMS BALANCING

A. Balance all hydronic piping systems.

B. Adjust and balance the following items listed under the various systems in accordance with the specified standards.

1. Heating system:

a. Pump
b. Convector
c. Unit heater
d. Finned pipe radiation
e. Heat and ventilating unit
f. Air-handling unit
g. Reheat coil
h. Cabinet unit heater
i. Make-up air unit
j. Duct coil

C. After the above items have been adjusted and balanced, submit a certified report listing the specification requirements and the operating conditions of these items as follows:

1. Pump:

a. Flow - gpm
b. Suction pressure
c. Discharge pressure
d. Pressure differential
e. Total dynamic head

f. Motor - HP voltage, hertz, phase, design full load amps
g. Motor - operating line voltage and amperage, overload heater ratings.

2. Heating water coil (such as coils in air-handling units, ducts, VAV units, unit heaters, convectors, finned-tube radiators, and reheat coils):

a. Flow - gpm
b. Entering water temperature
c. Leaving water temperature
d. Entering air - D.B.
e. Leaving air - D.B.

3. Piping system:

a. Flow - gpm reading of flow meter in various systems: See drawings for locations.

3.6 MARKING OF SETTINGS

A. Following final balance procedures, permanently mark the settings of valves, splitters, dampers, and other adjustment devices, so that adjustment can be restored if disturbed at any time. Set memory stops on balancing valves. Return and make required adjustments after submittal and approval of the Certified Balance Report.

END OF SECTION 230593

SECTION 230700 - HVAC INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Definitions and general requirements applicable to the insulation systems specified in “Related Sections.”

1.2 RELATED SECTIONS

A. HVAC piping insulation: Section 230719.

B. Duct insulation: Section 230713.

1.3 REFERENCES

A. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials

B. NFPA 255: Standard Method of Test of Surface Burning Characteristics of Building Materials

C. UL 723: Standard for Test for Surface Burning Characteristics of Building Materials

1.4 DEFINITIONS

A. Ceiling space: The space between the ceiling and the floor of an air-conditioned space above.

B. Roof space: The space between the ceiling and the roof, where building insulation is located at the roof level or the space between the ceiling and the floor of a non-air conditioned space above.

C. Attic space: The space between the ceiling and the roof, where building insulation is located at the ceiling level.

D. Air-conditioned areas or spaces: Areas or spaces where the occupied room temperature is maintained between 65 and 80 degrees F (18.3 and 26.7 degrees C).

E. Concealed insulation shall include work:

1. Above ceilings.
2. In crawl spaces and tunnels.
3. Where furred in and in pipe chases.

F. Exposed insulation shall include work:

1. In all rooms and areas.

2. In mechanical equipment rooms, penthouses, or other similar utility spaces.
3. In storage rooms.

G. Unconditioned areas: Areas outside of the insulated envelope.

H. Finished spaces: Areas of the building accessible to the public and to building occupants other than service personnel.

1.5 QUALITY ASSURANCE

A. Perform work in strict accordance with the building, fire and safety codes of the state, county or city in which the work is performed.

B. Insulation, including fittings and butt strips, jackets, facings, and accessories such as adhesives, mastics, cements, tapes and cloth, shall have a fire and smoke hazard rating and label as tested by ASTM E84, NFPA 255, and UL 723, not exceeding Flame Spread 25, Fuel Contributed 50, Smoke Developed 50.

C. All insulation and accessories shall be free of asbestos.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver insulation and accessory products in manufacturers' wrapping or cartons, identified on the exterior and bearing labels showing conformance to flame and smoke rating requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Refer to sections listed in "Related Sections."

PART 3 - EXECUTION (Not Used)

END OF SECTION 230700

SECTION 230713 - DUCT INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Duct insulation.

B. Work of this section includes:

1. Insulation for new ductwork installed under this contract.
2. Patching existing insulation where removed to make connections to existing ductwork.
3. Patching existing insulation damaged during demolition and construction.

1.2 RELATED SECTIONS

A. Painting: Division 09.

B. Definitions and general insulation requirements: Section 230700.

1.3 REFERENCES

A. American Society of Testing and Materials

1. ASTM C 553: Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
2. ASTM C 612: Standard Specification for Mineral Fiber Block and Board Thermal Insulation
3. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials

1.4 SUBMITTALS

A. Product data:

1. For each type of product, include a description, characteristics, materials, composition, finishes, and performance.
2. Submit a single manufacturer for each product. Submittals that include multiple manufacturers for a single product are not acceptable.

B. Product application schedule: Indicating the following for each application:

1. Insulation material.
2. Insulation thickness.
3. Insulation jacket.
4. Vapor barrier continuity requirements.

C. Installer qualifications.

1.5 QUALITY CONTROL SUBMITTALS

A. Manufacturer's instructions: Recommended accessory materials and products; installation instructions.

1.6 QUALITY ASSURANCE

A. Comply with requirements for LEED certification specified in Division 01.

B. Installer qualifications: Installers shall be mechanics skilled in this trade, employed with a firm that has a minimum of five years of experience installing mechanical insulation.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store rigid insulation products to protect them from breakage.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The listed manufacturers and particular products are intended to set a standard for materials, composition, and performance. Products of other manufacturers may be proposed as permitted by the provisions of Division 01 and the article "Product Options" in Section 230101.

B. Mineral fiber insulation:

1. CertainTeed Corporation.
2. Johns Manville.
3. Knauf Insulation
4. Manson Insulation
5. Owens-Corning.

C. Coatings, adhesives, and fabrics:

1. Childers
2. Foster
3. Manville Building Materials Group
4. Rock Wool Manufacturing Company
5. Trimac

2.2 MINERAL FIBER INSULATION MATERIALS

A. Flexible mineral fiber insulation: ASTM C 553, Type I, nominal density at least 1 pound per cubic foot (16 kg per cubic meter), k-factor of 0.27 at 75 degrees F (k(SI) of 0.037 at 24 degrees C) mean temperature, of thickness as specified in Part 3 below, with foil-scrim-kraft vapor-barrier jacket. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

1. Minimum 1.5 inches (38 mm) of thickness with R-value of R-4.5 (RSI-0.79) in the installed condition with 25% compression.
2. Minimum 2 inches (50 mm) of thickness with R-value of R-6 (RSI-1.06) in the installed condition with 25% compression.

B. Rigid mineral fiber insulation: ASTM C 612, Types IA-IB, nominal density at least 6 pounds per cubic foot (96 kg per cubic meter), with k-factor of 0.22 at 75 degrees F (k(SI) of 0.032 at 24 degrees C) mean temperature, of thickness as specified in Part 3 below, with factory-applied jacket composed of a reinforced white kraft and aluminum-foil laminate with the white kraft facing out. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

1. Minimum R-value of R-6.8 (RSI-0.79) with 1.5 inches (38 mm) of thickness.
2. Minimum R-value of R-9.1 (RSI-1.06) with 2 inches (50 mm) of thickness.

C. Mineral fiber insulation accessories

1. Mechanical fasteners: Adhesively attached, minimum 12-gauge zinc-plated steel pin welded to a 2 inch by 2-inch, 22-gauge minimum galvanized steel perforated baseplate and self-locking retaining washer. Pin length as required. Comply with the SMACNA HVAC Duct Construction for Mechanical Fasteners. Provide adhesive recommended by fastener manufacturer. Peel and press (self-sticking) type fasteners are not acceptable.
2. Tape for flexible mineral fiber insulation: Self-adhesive foil-scrim-kraft vapor-barrier tape with removable backing and pressure-sensitive acrylic adhesive, 3” (75 mm) wide minimum. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
3. Tape for rigid mineral fiber insulation: Self-adhesive foil faced vapor-barrier tape with removable backing and pressure-sensitive acrylic adhesive, 2” (50 mm) wide minimum. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
4. Mineral fiber insulation vapor barrier mastic:

    a. Vapor barrier coating for use over ASJ jackets to give a vapor barrier seal at joints, laps and punctures. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
    b. Basis of design: Foster 30-65 “Vapor-Fas”.

5. Corner Angles: Aluminum, 0.040 inch (1.0 mm) thick, minimum 1 by 1 inch (25 by 25 mm).
6. Trapeze hanger support inserts: Calcium silicate insulation, ASTM C 533, Type I.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Apply insulation in a neat and workmanlike manner and in accordance with manufacturer's printed instructions.

B. Tape and seal terminations of insulation with vapor barrier mastic.

C. Provide continuous insulation and jacket through trapeze hanger supports. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

D. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

E. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

F. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

G. Install insulation with longitudinal seams at top and bottom of horizontal runs.

H. Install multiple layers of insulation with longitudinal and end seams staggered.

I. Install insulation with least number of joints practical.

J. Stagger joints.

K. Install insulation continuously around hangers.

L. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

3.2 INSTALLATION INSIDE BUILDINGS

A. Install in accordance with the Minimum Insulation Thickness and R-Value Schedule at the end of this section.

B. Concealed ducts: Provide flexible mineral fiber insulation.

1. Mechanical fasteners: On ducts more than 24 inches (610 mm) wide, secure insulation on the underside with mechanical fasteners as required to prevent sagging, 16" (406 mm) maximum on center and 3" (75 mm) maximum from joints. Secure insulation in place with washers firmly embedded in insulation. Cut excess portion of pins extending beyond washers. Cover exposed pins and washers with tape.

2. Transverse joints and longitudinal seams: Butt insulation with facing overlapping at least 2 inches (50 mm). Staple and seal with tape.
3. Seal breaks and punctures with tape.

C. Exposed ducts: Provide rigid mineral fiber insulation.

1. Mechanical fasteners: Fastened with mechanical fasteners. Fasteners shall be spaced 16" (406 mm) on center with a minimum of two rows per side of duct and 3" (75 mm) maximum from joints. Secure insulation in place with washers firmly embedded in insulation. Cut excess portion of pins extending beyond washers. Cover exposed pins and washers with tape.
2. Transverse joints and longitudinal seams: Provide a continuous unbroken vapor barrier. Create a facing lap by removing 2 inches (50 mm) from one edge and one end of insulation segments. Secure laps to adjacent insulation section with staples, 6 inches (150 mm) on center maximum. Seal seams and joints with tape.
3. Seal breaks and punctures with tape.
4. Apply corner angles to all outside corners and straight edges.
5. For curved surfaces, such as exposed elbows, score or cut insulating board in narrow strips as necessary for snug and neat fit.
6. Installing canvas jacket: Adhere canvas jacket with lagging adhesive. Finish with lagging finish coating, ready for painting.

D. Ductwork which transmits air that may be either cooled or heated, or untempered air, shall be insulated as specified below for cooling systems.

E. Where necessary to conceal the standing seams and reinforcing angles on exposed ducts, increase insulation thickness to 2 inches (50 mm).

F. Casings and headers of reheat coils shall be insulated with the same thickness as adjacent ductwork.

3.3 SCHEDULES

Minimum Insulation Thickness and R-Value for Duct Insulation Inside Buildings[1]						
	Default Unless Otherwise Noted	Exposed in Area Served	Ceiling, Chase, or Shaft Space in Air-Conditioned Area	Roof Space[3]	Roof Space[3] Return Plenum of Air-Conditioned Area	Attic Space[3] and other Unconditioned Space
Outside Air and Exhaust Air						
Outdoor air	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)
Exhaust air from air-conditioned areas	Not required	Not required	Not required	1.5 inches (38 mm)	Not required	1.5 inch (38 mm) R-4.5 (RSI 0.79)
Exhaust air and pressure relief between exterior connection and ATC damper, but not less than 10 feet (3 meters)	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)
Cooling Systems						
Supply air	1.5 inch (38 mm)	Not required	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)	2 inch (50 mm) R-6 (RSI 1.06)
Lined supply air	1.5 inch (38 mm)	Not required	Not required	1.5 inch (38 mm)	Not required	2 inch (50 mm) R-6 (RSI 1.06)
Pre-insulated round or oval supply air	1.5 inch (38 mm)	Not required	Not required	1.5 inch (38 mm)	Not required	2 inch (50 mm) R-6 (RSI 1.06)
Return air and transfer	1.5 inch (38 mm)	Not required	Not required	1.5 inch (38 mm)	Not required	2 inch (50 mm) R-6 (RSI 1.06)
Lined return air and transfer	Not required	Not required	Not required	Not required	Not required	1.5 inch (38 mm) R-4.5 (RSI 0.79)[2]
Pre-insulated round or oval return air and transfer	Not required	Not required	Not required	Not required	Not required	1.5 inch (38 mm) R-4.5 (RSI 0.79)[2]
Heating Systems						
Supply air	1.5 inch (38 mm)	Not required	1.5 inch (38 mm)	1.5 inch (38 mm)	1.5 inch (38 mm)	2 inches (50 mm) R-6 (RSI 1.06)
Lined supply air	Not required	Not required	Not required	Not required	Not required	2 inches (50 mm) R-6 (RSI 1.06)
Pre-insulated round or oval supply air	Not required	Not required	Not required	Not required	Not required	2 inches (50 mm) R-6 (RSI 1.06)
Return air and transfer	Not required	Not required	Not required	Not required	Not required	2 inches (50 mm) R-6 (RSI 1.06)
Lined return air and transfer	Not required	Not required	Not required	Not required	Not required	2 inches (50 mm) R-6 (RSI 1.06)
Pre-insulated round or oval return air and transfer	Not required	Not required	Not required	Not required	Not required	2 inches (50 mm) R-6 (RSI 1.06)

Notes:
1: Insulation thickness shall be increased to 2 inches (50 mm) where necessary to conceal standing seams and reinforcing angles on exposed ducts.
2: Insulation R-value added to the R-value of lined or pre-insulated duct exceeds R-6 (RSI 1.06).
3: See Section 230700 for definitions of “Roof Space” and “Attic Space.”

END OF SECTION 230713

SECTION 230719 - HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Mineral fiber insulation materials.

B. Flexible elastomeric insulation materials.

C. Fasteners.

D. Field-applied fabric-reinforcing mesh.

E. Work of this section includes:

1. Insulation for new piping installed under this contract.
2. Patching existing insulation where removed to make connections to existing piping.
3. Patching existing insulation damaged during demolition and construction.

1.2 RELATED SECTIONS

A. Firestopping: Division 07.

B. Painting: Division 09.

C. Definitions and general insulation requirements: Section 230700.

D. Pipe hangers and protection shields: Section 230529.

1.3 REFERENCES

A. American Society of Testing and Materials

1. Standards for mineral fiber insulation materials

a. ASTM C 449: Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement
b. ASTM C 547: Mineral Fiber Pipe Insulation.
c. ASTM C 553: Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
d. ASTM C 1136: Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

2. Standards for flexible elastomeric insulation materials

    a. ASTM C411: Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation
    b. ASTM C 534: Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

3. Standards for all insulation materials

    a. ASTM C 450: Prefabrication and Field Fabrication of Thermal Insulating Fitting Covers for NPS Piping, Vessel Lagging, and Dished Head Segments.
    b. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials

1.4 SUBMITTALS

A. Product data:

1. For each type of product, include a description, characteristics, materials, composition, finishes, and performance.
2. Submit a single manufacturer for each product. Submittals that include multiple manufacturers for a single product are not acceptable.

B. Product application schedule: Indicating the following for each application:

1. Insulation material.
2. Insulation thickness.
3. Insulation jacket.
4. Vapor barrier continuity requirements.

C. Installer qualifications.

1.5 QUALITY CONTROL SUBMITTALS

A. Manufacturer’s instructions: Recommended accessory materials and products; installation instructions.

1.6 QUALITY ASSURANCE

A. Comply with requirements for LEED certification specified in Division 01.

B. Installers shall be mechanics skilled in this trade, employed with a firm that has a minimum of five years of experience installing mechanical insulation.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. The listed manufacturers and particular products are intended to set a standard for materials, composition, and performance. Products of other manufacturers may be proposed as permitted by the provisions of Division 01 and the article “Product Options” in Section 230101.

B. Mineral fiber insulation:

1. CertainTeed Corporation.
2. Johns Manville
3. Knauf Insulation
4. Manson Insulation
5. Owens-Corning

C. Flexible elastomeric insulation:

1. Aeroflex USA*
2. Armacell LLC*
3. K-Flex USA
4. Rubatex

D. Coatings, adhesives, and fabrics:

1. Childers
2. Foster
3. Manville Building Materials Group
4. Rock Wool Manufacturing Company
5. Trimac

2.2 MINERAL FIBER INSULATION MATERIALS

A. Mineral fiber preformed pipe insulation: Glass fibers bonded with a thermosetting resin, ASTM C 547 Type I, with factory-applied ASJ-SSL jacket. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

B. ASJ-SSL jacket:

1. All service jacket with self-sealing lap
2. White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip
3. Complying with ASTM C 1136, Type I.

C. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, pressure sensitive, complying with ASTM C 1136; 3 inch (75 mm) width. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

D. Mineral fiber blanket insulation: Glass fibers bonded with a thermosetting resin, ASTM C 553, Type IV, without facing. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

E. Mineral fiber preformed fitting and valve covers: Glass fibers bonded with a thermosetting resin, made from the same material and density as adjacent pipe insulation, meeting ASTM C 450 requirements for dimensions used in forming insulation to cover valves, elbows, tees, flanges, strainers, and unions. Provide with preformed PVC field-applied jacket. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

F. Mineral fiber insulation adhesive:

1. Solvent free, low VOC, water-based adhesive designed for bonding mineral fiber insulation to steel or aluminum surfaces, and compatible with service temperatures. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
2. Basis of design: Foster 85-60 “Quick-Tack”.

G. Mineral fiber insulation vapor barrier mastic:

1. Vapor barrier coating for use over ASJ jackets to give a vapor barrier seal at joints, laps and punctures. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
2. Basis of design: Foster 30-65 “Vapor-Fas”.

H. Insulating cement: Mineral fiber cement with a hydraulic-setting binder, conforming to ASTM C 449. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

2.3 FLEXIBLE ELASTOMERIC INSULATION MATERIALS

A. Flexible elastomeric preformed pipe insulation: Closed-cell, sponge- or expanded-rubber, ASTM C 534, Type I for tubular materials. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

B. Flexible elastomeric preformed fitting and valve covers: Closed-cell, sponge- or expanded-rubber, made from the same material and density as adjacent pipe insulation, meeting ASTM C 450 requirements for dimensions used in forming insulation to cover valves, elbows, tees, flanges, strainers, and unions. Provide with preformed PVC field-applied jacket. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

1. Where flexible elastomeric insulation is used on hot gas piping in VRF applications, insulation shall be tested in accordance with ASTM C411 at 250 degrees F (121 degrees C) for a 96 hour time period and shall meet an ASTM E 84 surface burning characteristic (flame spread/smoke developed) rating less than 25/50 at 2 inches (50 mm) of thickness.

C. Flexible elastomeric insulation adhesive:

1. Water resistant contact cement designed especially suited for bonding two impermeable surfaces and recommended for rubber foam, steel, or aluminum surfaces, and compatible with service temperatures. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

2. Basis of design: Foster 85-75 “Drion”.

D. Flexible Elastomeric Tape:

1. Black, closed cell, self-adhering, elastomeric thermal insulation tape for insulating pipes and fittings, 0.125 inch (3 mm) thick, 2 inches (50 mm) wide.
2. ASTM C 534 Grade 1.
3. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.

E. Flexible elastomeric insulation vapor barrier coating:

1. Water-based latex enamel coating for use over flexible elastomeric insulation, providing a moisture-resistant protective finish suitable for both indoor and outdoor applications. ASTM E 84 surface burning characteristics (flame spread/smoke developed) rating less than 25/50.
2. Basis of design: Armacell “WB Armaflex” latex enamel.

2.4 FASTENERS

A. Aluminum bands: ASTM B 209, 0.75 inches (19 mm) wide and 0.020 inches (0.4 mm) thick.

2.5 FIELD-APPLIED FABRIC-REINFORCING MESH

A. Fabric-reinforcing mesh:

1. Woven Glass-Fiber Fabric: Approximately 2 ounces per square yard (68 grams per square meter) for covering pipe and pipe fittings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Provide interior piping insulation in accordance with the Minimum Insulation Thickness Schedule for Interior Applications at the end of this section, as modified by specifications for each location and type.

B. Provide field applied jackets in accordance with the Field-Applied Jacket Schedule at the end of this section, as modified by specifications for each location and type.

C. Provide mineral fiber insulation unless otherwise indicated.

D. Provide flexible elastomeric insulation for refrigerant piping

E. Insulation is not required on the following interior piping systems:

1. Non-geothermal (boiler and cooling tower type) heat pump loop piping that operates between 60 degrees F (16 degrees C) and 104 degrees F (40 degrees C).

2. Condenser water systems not used in water side economizer applications.

F. Insulate piping containing water and piping containing glycol solutions with the same thickness of insulation based on application and temperature.

G. Apply insulation in a neat and workmanlike manner and in accordance with manufacturer's printed instructions.

H. Maintain a continuous vapor barrier on systems that convey fluid at below-ambient temperatures, including the following applications:

1. Chilled water piping
2. Refrigerant piping

I. Where a continuous vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

J. Installation at pipe hangers:

1. Insulation shall be continuous through hangers for all piping systems.
2. Install pipe covering protection shields with thickness of structural insulation inserts equal, under load, to that of adjoining insulation.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
5. Shields and structural insulation inserts are specified in Section 23 0529, Hangers and Supports for HVAC Piping and Equipment.

K. Where insulated piping systems pass through sleeves or openings in partitions and floors, the insulation shall be continuous through the sleeves and openings. See Firestopping specifications for coordinating insulation and firestopping.

L. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

M. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

N. Install insulation with longitudinal seams at top and bottom of horizontal runs.

O. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

P. Install insulation with least number of joints practical.

Q. Finish installation with systems at operating conditions. Repair separations and cracking caused by thermal movement.

R. Return piping systems shall be insulated to meet the temperature demands of supply piping systems. There shall be no reduction of insulation thickness for anticipated temperature change between supply and return.

3.2 INSTALLING MINERAL FIBER INSULATION

A. Install insulation with factory-applied jackets as follows:

1. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive.
2. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap.
3. Cover circumferential joints and longitudinal seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
4. Where a continuous vapor barrier is indicated, apply vapor-barrier mastic on longitudinal seams and circumferential joints and at ends adjacent to pipe flanges and fittings.
5. Repair damaged insulation jackets by applying same jacket material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere and seal patches.

B. Installation on fittings, valves, strainers, flanges, and unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate using mineral fiber preformed fitting and valve covers whenever possible. Install preformed fittings with adhesive.
3. Where mineral fiber preformed fitting and valve covers are not available, insulate using mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining pieces and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation. Coat with mastic. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
4. Install fitted PVC cover. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
5. Valves: Insulate up to and including the bonnets, stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
6. Strainers: Insulate so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover.
7. Flanges and unions: Install preformed pipe insulation to outer diameter of flange or union. Make width of insulation section same as overall width of union or flange and bolts, plus twice the thickness of pipe insulation. Fill voids between inner circumference of flange or union insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation. Coat with vapor barrier coating and reinforcing mesh before applying fitting cover.

C. Installation of casings and headers of coils:

1. Adhere mineral fiber insulation to casings and headers, same thickness as adjacent piping.
2. Coat with mastic.
3. Finish with two coats of lagging finish coating with glass cloth and tape between coats.

3.3 INSTALLING FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and circumferential joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Installation on fittings and flanges:

1. Install insulation over fittings and flanges with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate using flexible elastomeric preformed fitting covers whenever possible. Install preformed fittings with adhesive. Tape and seal with vapor barrier coating.
3. Where flexible elastomeric preformed fitting covers are not available, insulate using mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining pieces and bonded with adhesive. Tape and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated. Seal with vapor barrier coating.
4. Install fitted PVC cover. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
5. Flanges: Install pre-formed pipe insulation to outer diameter of pipe flange. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation. Secure insulation to flanges and tape and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated. Seal with vapor barrier coating.

3.4 SCHEDULES

A. Minimum insulation thickness schedule for interior heating water applications:

MINIMUM INSULATION THICKNESS SCHEDULE FOR INTERIOR HEATING WATER PIPING APPLICATIONS (1)		
Fluid Temperature Range	NPS 1.25 (DN 32) & Smaller (note 2)	NPS 1.5 (DN 40) & Greater
105F to 200F (40C to 93C)	1.5-inch (38 mm)	2-inch (51 mm)
(1) - See additional thickness requirements for exterior applications. (2) - Contractor’s option within partitions only: 1-inch (25 mm) flexible elastomeric insulation.		

END OF SECTION 230719

SECTION 230901 - AUTOMATIC TEMPERATURE CONTROL SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Extension of existing automatic temperature control (ATC) system.

B. Sequences of operation for automatically controlled equipment are shown on drawings. ATC subcontractor shall cooperate with the unit suppliers and provide all relays and wiring required to integrate the sequence of operation.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. UL label, demonstration, training, and equipment installation: Section 230500.

1.3 RELATED SECTIONS

A. Controls: Sections 230901 through 230923.

B. Balancing: Section 230593.

1.4 SYSTEM DESCRIPTION

A. Provide an extension of existing system of electronic direct digital temperature controls with electronic actuation.

B. The system shall consist of two levels of network communication and wiring, DDC controllers, application-specific controllers, software, operator I/O devices, sensors and other necessary input hardware, dampers, valves, actuators and other necessary output hardware, fire and smoke devices, electrical power surge protection, other necessary equipment and a complete system of wiring to fulfill the intent of the sequences of operation shown on the drawings.

1.5 DESIGN REQUIREMENTS

A. The products specified, scheduled, and shown on drawings are the basis of the design of this project.

B. For requirements affecting use of optional manufacturers, or substitutions, see Division 01 and Section 230101, HVAC General Provisions, and Section 230500, Common Work Results for HVAC.

1.6 SUBMITTALS

A. Shop drawings: Provide a point schedule and composite control diagram of all equipment provided for each control sequence, including factory and field controls. Include a written description of sequences, in which each control device or item of equipment is identified by the designation indicated on the diagram.

B. Product data: See individual controls sections.

C. Certifications:

1. Factory authorization and certification of the installing company.
2. Evidence of training and certification of each supervisor and mechanic assigned to this project.

D. Project record documents: As specified in Division 01 and Section 230101, provide a drawing at the same scale as the contract drawings, showing the locations of all components installed.

1.7 QUALITY ASSURANCE

A. Subcontractor qualifications: One hundred percent company-owned, full-service, local branch or authorized factory-direct contractor for one of the acceptable national temperature control manufacturing companies named below, as follows:

1. Full service: Includes system engineering, shop drawing preparation, software programming, installation, commissioning, and service.
2. Factory-direct contractor: Is contracted directly with manufacturer to buy components and has direct access to manufacturer's local branch office for engineering, service, and technical support without any third-party involvement.
3. Experience: The branch or factory-direct contractor shall have completed at least three system installations of the same type, size, and design, which have successfully operated their sequence of operations for at least three years.
4. Supervisors and mechanics: Factory-trained and certified in the type of control system (pneumatic, electric, digital, electronic) being installed, and directly employed by the subcontractor.

a. The programmer responsible for programming digital controllers shall have a minimum of three years' experience programming digital controllers of the manufacturer, for HVAC systems.

B. Qualified subcontractor shall prepare control diagrams.

C. Perform work in accordance with the plumbing, electrical, building, fire and safety codes of the state, county, or city in which the work is performed.

D. UL label: As specified in Section 230500, Common Work Results for HVAC.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Electric, electronic, or direct digital system:

1. Reliable Controls (Installed by Pritchett Controls, Inc.)

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Coordinate with equipment suppliers to integrate controls provided by manufacturers into the control sequences shown on drawings.

B. Mount devices and control panels provided by equipment manufacturers, and provide required control wiring.

C. Operate, test, calibrate, and adjust each control system until it operates as intended by the manufacturer and as specified in the control sequence.

3.2 REFURBISHING EXISTING SYSTEM

A. Adjust existing dampers and free them to operate smoothly. Recondition existing valves to seat properly without leakage.

3.3 TESTS

A. Thoroughly test and check the completed system to ascertain that all equipment is functioning as intended and that dampers and valves respond properly to their controls. Installer of work of this section shall cooperate with the equipment suppliers, and with balancing and testing work, to make necessary adjustments to ATC devices for proper operation of the completed system.

3.4 DEMONSTRATION AND TRAINING

A. Provide demonstration and training as specified in Section 230500.

END OF SECTION 230901

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SECTION 230902 - CONTROL SYSTEMS WIRING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wiring.

B. Conduit and fittings.

C. Control power transformers.

D. Requirements to provide power for control systems.

1.2 RELATED SECTIONS

A. Automatic temperature control system: Sections 230901 through 230923.

B. Disconnect switches: Division 26.

1.3 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Wiring.
2. Conduit and fittings.
3. Control power transformers.

1.4 QUALITY ASSURANCE

A. UL label: As specified in Section 230500, Common Work Results for HVAC.

B. Control system power circuits shall not supply power to other building components such as lights or receptacles.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Electrical materials and devices shall be UL listed and shall meet the requirements of NEC (NFPA 70) and Division 26, Electrical.

2.2 WIRING

A. Wiring 50 V and below: Fully color coded, copper 600 V type THW or THHN, minimum No. 22 or as specified in Division 26, Electrical.

B. Wiring above 50 V: As specified in Division 26.

2.3 CONDUIT AND FITTINGS

A. Galvanized steel conduit: Minimum size 0.75 inches (21 mm), hot-dip galvanized with threads galvanized after cutting, one of the following:

1. Rigid full weight, heavy-wall steel conduit (RGS) conforming to UL 6 and ANSI C80.01.
2. Intermediate steel conduit (IMC) conforming to UL 1242 and ANSI C80.03.

B. Steel conduit fittings: Cast malleable iron fittings with smooth finish and full threaded hubs. Include steel or malleable iron locknuts, bushings, and other fittings.

1. Insulating bushings.

    a. Basis of design: Thomas & Betts Series 22.

2. Hub fittings with recessed sealing ring and nylon insulated throat.

    a. Basis of design: Thomas & Betts Series 370.

3. Fittings for exposed locations: Conduit outlet bodies, zinc- or cadmium-plated.

C. Electrical metallic tubing (EMT):

1. Minimum size 0.5 inch (16 mm), maximum 1.5 inch (41 mm), hot-dip galvanized or sherardized thin-wall steel conduit conforming to UL 797 and ANSI C 80.03.
2. Connectors and couplings for EMT: Concrete- or rain-tight, compression or set screw type, made of cadmium-plated steel with nylon insulating throat.

    a. Basis of design: Thomas & Betts Series 5031, 5123 and 5120.

D. Flexible metal conduit:

1. Minimum size 0.5 inch (16 mm), made of sheet metal strip, interlocked construction, conforming to UL 1.
2. Connectors for flexible metal conduit: Angle wedge type with nylon insulated throat.

    a. Basis of design: Thomas & Betts Series 3110 and 3130, “Tite-Bite.”

E. Liquidtight flexible metal conduit:

1. Conform to UL 360.
2. Liquidtight connectors: UL 14814A, with fittings and nylon-insulated throat.

a. Basis of design: Thomas & Betts Series 5331.

F. Surface metal raceway: Raceway dimensions 0.65 by 0.75 inches minimum size, complete with fittings, connectors, and accessories.

1. Basis of design: Wiremold No. 700.

G. Plastic conduit:

1. Polyvinyl chloride (PVC) Schedule 40, rated for use with 90-degree conductors, for exposed, underground, and encased applications, complying with NEMA Specification TC-2 and UL 651.
2. Plastic conduit fittings and cement:

a. Fittings: Complying with NEMA TC 3 and UL 514.
b. Cement: Solvent cement made by the manufacturer of the conduit and fittings.

2.4 CONTROL POWER TRANSFORMERS

A. Designed to provide power sources for 24-V ac control circuits, and precision built to ensure rated power, proper voltage regulation and maximum efficiency. Units shall be equipped with integral manual reset circuit breaker for over-current protection on the secondary winding. Output regulation shall be 10 percent from no load to full load.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Electrical equipment is specified in Division 26. Provide circuit breakers, disconnect switches, power wiring, control power transformers, control wiring, and other equipment, meeting requirements of Division 26, so the automatic temperature control system will function as specified and indicated on the drawings.

B. Control system power source: Provide power for control systems as follows:

1. Terminal equipment control applications:

a. Applications include VAV terminal units, fan-coil units, unit heaters, unit ventilators, and other similar space conditioning equipment dedicated to conditioning a single space.
b. Terminal equipment power may be used to power associated terminal equipment controllers with the following additional requirements.

(1) Provide power for the controller upstream of the terminal unit disconnect switch, allowing the controller to remain energized when power to the equipment is disconnected.
(2) Provide a fused disconnect between the power source and the controller.

c. Where these conditions cannot be met, provide circuit breakers in panelboards and power circuits to power terminal equipment controllers.
d. Where terminal equipment does not have a power connection, provide circuit breakers in panelboards and power circuits to power terminal equipment controllers.

2. Equipment control applications other than terminal equipment:

a. Applications include, but are not limited to, air-handling equipment, large, centralized exhaust systems, pumps, central plant equipment, and other non-terminal type equipment and systems.
b. Do not use equipment power as a source for control system power. Controllers shall remain energized when the power circuit to the equipment is deenergized.
c. Provide circuit breakers in panelboards and power circuits to power controllers.
d. Provide switches at each control panel to serve as disconnect switches; a panel may consist of multiple controllers within a single enclosure. Each panel shall be fused together.
e. Provide metal-oxide varistors to protect controllers.

3. Servers, switches, and other central control system components:

a. Provide circuit breakers in panelboards and power circuits to power central control system components.
b. Provide UPS and surge protection.

4. Provide circuit breakers that match and are compatible with other breakers in a panelboard.
5. Provide optional standby power for controls that support equipment provided with optional standby power.

C. Conduit:

1. Install conduit and wiring as specified in Division 26.
2. Where necessary to connect conduit to motors or motor-driven equipment, or to attach conduit to fan housings or air-handling units which contain fans, use a 24-inch (610-mm) looped section of flexible metallic conduit.

D. Data systems:

1. Provide data systems, including outlets, cabling, and required infrastructure, to support the manufacturers' requirements.
2. Data system components shall meet the requirements of Division 27.

E. Make each run of cable or conductor connecting two points with a single continuous piece of cable or conductor. Do not splice. Cable or conductor may be extended by use of suitable connectors if approved by the Architect.

F. Shielding:

1. All input, output, and communications wire is to be shielded except when specifically disallowed by the controller or end device manufacturer.

2. All shields on controller input and output wiring shall be terminated except when specifically disallowed by the controller or end device manufacturer. The shield must be terminated at the controller end only.
3. RS-485 communication shield wiring shall be continuous from one end of the trunk to the other and must only be terminated at the 'originating' router.
4. The shields (foil and drain wire) from individual wire segments at a controller must be twisted, and the free end of the shield taped back (using electrical tape) to one of the communication wires. A portion of the shield must be exposed to allow a technician to verify the continuity of the shield.

G. When connecting to electrical wiring of equipment provided with pilot lights, connect to circuit so that pilot light is energized only when equipment is energized.

H. When connecting to electric wiring of fans with Hand/Off/Automatic (HOA) switches and isolation dampers, connect to circuit so that isolation dampers open in both Hand and Automatic positions.

I. Securely attach disconnect switches and starters to the wall with anchors.

3.2 RENOVATION PROCEDURES

A. Wherever possible, provide concealed wiring within wall cavities to wall-mounted devices.

B. Wherever wall cavities are not available for wiring, provide wiring from ceiling cavities to wall-mounted devices concealed in surface metal raceway.

C. Wherever possible, provide concealed wiring above existing ceilings.

D. Conceal wiring in surface metal raceway or provide wiring in an alternative concealed path where ceiling cavities are not available for wiring.

E. Create hand holes in existing surfaces where required to provide concealed wiring. Patch existing surfaces to match adjacent surfaces.

F. Patch existing surfaces in accordance with requirements of Division 01 and Section 230101.

G. Existing electrical conduits may be reused for new wiring provided they meet the requirements of the NEC.

END OF SECTION 230902

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SECTION 230903 - CONTROL AIR PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pneumatic control piping.

1.2 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Pneumatic control piping.

B. Welder certificates certifying that welders have been trained by the manufacturer of the piping system and comply with the installation procedures as outlined by ASME NM.1 and/or ASTM D2657 and/or AWS B2.4 and/or DVS 2207. All required training should be scheduled and completed at job start-up.

C. Qualifications of firms supplying polyethylene piping. Firms must have the appropriate experience in installation (fusion welding) and operation of a thermoplastic piping system.

1.3 QUALITY ASSURANCE

A. Obtain components from a single source having responsibility and accountability to answer and address questions regarding proper installation, compatibility, performance, and acceptance.

B. Design and install piping to meet ASME/ANSI B31.3 where applicable manufacturer shall provide thermal stress analysis demonstrating the ability of the piping system to handle the stated piping conditions.

1.4 STORAGE AND HANDLING

A. Care shall be taken to prevent damage to the supplied components. Avoid scraping, denting, and gouging the components. Surface damage deeper than 10% of the wall thickness shall be rejected. Pipe shall have adequate support at all times to prevent sagging or distortion.

B. Store products on elevated platforms in a dry location with protection from elements affecting product integrity.

C. Lift, support, and transport piping per manufacturers recommendations.

PART 2 - PRODUCTS

2.1 PNEUMATIC CONTROL PIPING

A. Base Bid: Non-metallic piping:

1. Underground Compressed Air Pipe: Virgin polyethylene, ASTM D 3035, meeting the design requirements of ASME/ANSI B31.3 Chapter VII for design criteria where temperature and pressure fall within the limits of that code.

   a. System shall be a piping system of material and pressure rating as specified below. System product pipe shall be capable of transporting stated media under continuous exposure for 50 years
   b. Furnish a complete polyethylene piping system for compressed air including piping, fittings, anchors, pipe supports, valves, and associated pipe joining equipment.
   c. Basis of design: Air-Pro

2. Fittings for nonmetallic tubing: Rated for instrument service, brass or delrin, compression or barb push-on type.

B. Alternate: Black steel, ASTM A 53, Grade B, Type E (electric resistance welded), Schedule 40.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install piping in accordance with manufacturer recommendations for underground installation.

3.2 FIELD TEST

A. Upon completion, test the entire air piping system for 24 hours at 30 psi (107 kPa) or 1.5 times the operating pressure. Pressure drop shall be 5 psi (34 kPa) or less.

END OF SECTION 230903

SECTION 230908 - CONTROL VALVES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Control valves.

B. Valve actuators.

1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Control valves.

1.3 RELATED SECTIONS

A. Piping installation and testing and valve identification: Section 230500.

B. Access doors: Division 08.

C. General control system requirements: Section 230901.

D. Direct digital control building system control: Section 230923.

E. Installation of hydronic system control valves: Section 232113.

1.4 REFERENCES

A. American Nationals Standards Institute:

1. ANSI/FCI 70-2: Control Valve Seat Leakage Classifications.
2. ANSI/ISA 75.08.01-2016: Face-to-Face Dimensions for Integral Flanged Globe-Style Control Valve Bodies (Classes 125, 150, 250, 300, and 600) ASME B16.5:

B. American Society of Mechanical Engineers:

1. ASME B16.5: Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24.
2. ASME B16.15: Cast Copper Alloy Threaded Fittings: Classes 125 and 250.
3. ASME B61: Standard Specification for Steam or Valve Bronze Castings.

C. ASTM

1. ASTM A126: Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings
2. ASTM A536: Standard Specification For Ductile Iron Castings.

D. Manufacturers Standardization Society

1. MSS SP-67: Butterfly Valves
2. MSS SP-68: High Pressure Butterfly Valves with Offset Design

1.5 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Control valves
2. Valve actuators

B. Product schedule: Provide a control valve schedule with the following as a minimum:

1. Hydronic control valves:

a. General information:

(1) Control valve part number.
(2) Associated equipment identifier.
(3) Type of valve such as globe, ball, butterfly, etc.
(4) Line size of associated piping.

b. Flow information:

(1) Maximum design flow.
(2) Valve flow coefficient.
(3) Pressure differential across open valve at design flow, including any required corrections for glycol in the fluid.
(4) Design system differential pressure.
(5) Indicate if the valve is a two-way or three-way valve.

c. Temperature information:

(1) Maximum and minimum anticipated fluid inlet temperature.
(2) Required fluid temperature range.
(3) Valve fluid temperature range.

d. Pressure information:

(1) Required pressure rating.
(2) Valve pressure class where available. Where valve pressure class is not available, pressure rating at maximum fluid operating temperature.
(3) Maximum system pressure differential across valve (based on distribution pump maximum differential pressure or campus utility maximum differential pressure).
(4) Maximum valve close-off pressure.

e. Actuator information:

(1) Required torque.
(2) Actuator selection indicating torque provided.
(3) Indication of whether the actuator is modulating fail in place, modulating spring return, or two-position spring return.
(4) Indication of normal position for valves with spring return actuators.
(5) Indication of whether the valve actuator includes position indication.

C. Operation and maintenance data: Include operating and maintenance data for the following in the project Operation and Maintenance Manual as specified in Division 01 with supplemental requirements as specified in Section 230101:

1. Control valves.
2. Valve actuators.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Basis-of-design products: Subject to compliance with requirements, provide products, or comparable product by one of the following:

1. Control valves and actuators:

a. Belimo
b. Johnson Controls, Inc.
c. Siemens Building Technologies, Inc.

2.2 GENERAL VALVE REQUIREMENTS

A. Size:

1. Two-position control valves: Line size unless otherwise indicated.
2. Modulating control valves:

a. Valves shall be stable throughout full operation range, from design flow to minimum flow.
b. No smaller than two sizes below pipe line size.
c. Hydronic control valves: Maximum pressure drop of 5 psi at design flow (34 kPa).

B. Fluid temperature range: Provide control valves with at least the following temperature ratings:

1. Hydronic applications:

a. Typical hydronic applications:

(1) Minimum: 35 degrees F (2 degrees C).

(2) Maximum: 200 degrees F (93 degrees C).

C. Ambient actuator temperature range: -4 degrees F to 122 degrees F (-20 degrees C to 50 degrees C).

D. Fluid pressure range: Provide control valves with at least the following pressure ratings:

1. Hydronic applications: Meet or exceed the following requirements in addition to individual valve specification requirements:

a. Rated for operation at the maximum anticipated pressure of the controlled fluid while at the maximum expected temperature of the controlled fluid.

E. Valve leakage: ANSI/FCI 70-2, Class IV (Less than 0.1% or rated capacity).

F. Valve characteristic:

1. Modulating two-way valves: Equal percentage characteristic unless otherwise noted.
2. Three-way valves: Linear characteristic.

G. Normal position: Valves with spring return actuators shall have the following fail positions when no energy is provided to the actuator unless otherwise indicated.

1. Chilled water system valves:

a. Air system coils: Closed.

2. Heating water system valves:

a. Air system coils: Open.

2.3 BALL-STYLE CONTROL VALVES

A. General:

1. Construct the valves to be serviceable from the top.
2. Provide with replaceable seats, ball, and shaft packing.

B. Full-port ball valves NPS 2 (DN 50) and smaller:

1. Style:

a. Two-way: Single port.

2. Body material: Cast bronze, forged brass, or forged brass with nickel plating, unless otherwise indicated.
3. Pressure rating: Meeting or exceeding the following requirements:

a. ANSI Class 150 or greater, and rated for operation at the maximum anticipated pressure of the controlled fluid while at the maximum expected temperature of the controlled fluid.

4. Temperature rating: Meeting requirements described in general valve requirements.
5. Connections: NPT Threaded.
6. Ball and stem: Stainless steel.

a. Modulating applications: Characterized.
b. Isolation and two-position applications: Full port.

7. Ball seat: Reinforced PTFE.
8. Stem seal: PTFE V-ring.

C. Full-port ball valves NPS 2.5 (DN 65) and larger:

1. Style:

a. Two-way: Single port.

2. Body material: Brass, steel, or cast iron, unless otherwise indicated.
3. Pressure rating: Meeting or exceeding the following requirements:

a. ANSI Class 150 or greater, and rated for operation at the maximum anticipated pressure of the controlled fluid while at the maximum expected temperature of the controlled fluid.

4. Temperature rating: Meeting requirements described in general valve requirements.
5. Connections: Flanged, suitable for mating to ASME B16.5, Class 150 flanges.
6. Ball and stem: Stainless steel.
7. Ball seat: Reinforced PTFE or graphite.

a. Modulating applications: Characterized.
b. Isolation and two-position applications: Full port.

8. Stem seal: PTFE V-ring.

2.4 HIGH PERFORMANCE BUTTERFLY-STYLE CONTROL VALVES

A. General:

1. Replaceable seat, disc, and shaft bushings.

B. High performance butterfly valves:

1. Style:

a. Two-way: Single port.

2. Performance:

    a. Bi-directional bubble tight shutoff at 250 psig (1724 kPa).
    b. Comply with MSS SP-68.

3. Body material: Full lug, cast iron ASTM A126, Class B, ductile iron ASTM A536 or cast steel, unless otherwise indicated.
4. Pressure rating: Meeting or exceeding the following requirements:

    a. Class 150 or greater, and rated for operation at the maximum anticipated pressure of the controlled fluid while at the maximum expected temperature of the controlled fluid.

5. Temperature rating: Meeting requirements described in general valve requirements.
6. Connections: Flanged, suitable for mating to ASME B16.5, Class 150 flanges.
7. Disc: Type 316 stainless steel.
8. Shaft: Type 316 or 17-4 PH stainless steel.
9. Seat: Reinforced PTFE with retaining ring.
10. Shaft Bushings: Reinforced PTFE or stainless steel.
11. For three-way butterfly valves, provide two valves mated to a fabricated tee with interconnecting mechanical linkage.

2.5 ELECTRIC VALVE ACTUATORS

A. General:

1. Torque: Sized to provide power to operate the valve, and for full shutoff against the following:

    a. Pump shut-off pressure for hydronic systems.
    b. Operating pressure for steam systems.

2. Speed: Maximum opening and closing time:

    a. Comfort conditioning applications: 90- to 120-seconds.
    b. Modular chiller minimum flow bypass valves: 30-seconds, or in accordance with the chiller manufacturer’s recommendations, whichever is faster.
    c. Emergency isolation or other specific applications: speed as appropriate for application or as noted on drawings.

3. Provide position indicator and graduated scale.
4. Valve attachment: Provide an actuator designed to be directly coupled to valve shaft without the need for connecting linkages, unless otherwise required for the application.
5. Temperature and humidity rating: Suitable for the application.
6. Fail-Safe: Where indicated, provide spring return to drive valve to an end position (open or close) on loss of power.

B. Electric valve actuators:

1. Power: Low voltage or line voltage, electric or electronic motor type.

2. Field Adjustment:

    a. Spring return actuators: Switchable from fail open to fail closed in the field.
    b. Gear type actuators: External manual adjustment mechanism to allow manual positioning when the actuator is not powered.

3. Two-position actuators: Single direction, spring return type.
4. Modulating actuators: Capable of stopping at all points and starting in either direction from any point in range, suitable for 0 to 10 V dc, 2 to 10 V dc, or 4 to 20 mA signals.
5. Position Feedback:

    a. Where indicated, equip two-position actuators with end switches for remote monitoring of open and closed position.
    b. Where indicated, equip modulating actuators with a position feedback through current or voltage signal for remote monitoring.

6. Integral overload protection: Provide protection against overload throughout the entire operating range in both directions.
7. Enclosure:

    a. NEMA Type 2 for indoor and protected applications.
    b. NEMA Type 4 or Type 4X for outdoor and unprotected applications.
    c. Provide with heater for applications in exterior or unconditioned locations.

PART 3 - EXECUTION

3.1 INSTALLING CONTROL VALVES

A. Provide valves to be readily accessible for operation and maintenance, and with ample clearance. Provide access doors for valves in inaccessible locations.

B. Valves installed above ceilings shall not be greater than 36 inches (915 mm) above acoustical tile ceilings or 24 inches (610 mm) above gypsum board ceilings.

C. Identify valves as specified in Section 230500, Common Work Results for HVAC.

D. Provide valves in compliance with the control valve application schedule.

E. Provide valves with actuators, as indicated on drawings and as required by control sequences.

F. See section 232113 for installation of hydronic system control valves.

G. Provide two-way or three-way valves as required on the drawings.

3.2 CONTROL VALVE APPLICATION SCHEDULE

Valve Type	Ball			High Performance Butterfly
Actuator	Modulating, fail in place	Modulating, spring return, & position indication	Two-position, spring return, & position indication	Two-position, spring return, & position indication
Isolation and Other Two-position Applications – NPS 4 (DN 100) and Smaller			X	
Hydronic Isolation and Other Two-position Applications – NPS 5 (DN 125) and Larger			X	X
Air-Handling Unit and Dedicated Outdoor Air Unit Coils		X		
VAV Terminal Units	X			

END OF SECTION 230908

SECTION 230913 - INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Control devices and accessories.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Duct-mounted smoke detectors: See Division 28 for product data.

1.3 RELATED SECTIONS

A. Cutting and patching: Section 230101.

B. UL label, demonstration, training, and equipment installation: Section 230500.

C. Automatic temperature control system: Sections 230901 through 230923.

D. Hydronic piping: Section 232113.

E. Occupancy sensors: Division 26.

1.4 REFERENCES

A. NSF 61: Drinking Water System Components – Health Effects

B. UL 508: Standard for Industrial Control Equipment

1.5 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance.

B. Operation and maintenance data: Include operating and maintenance data for each control device in the project Operation and Maintenance Manual as specified in Division 01 with supplemental requirements as specified in Section 230101.

1.6 MAINTENANCE

A. Provide two sets of manufacturer’s special tools for operating tamperproof fasteners, marked to identify their use. Deliver to the Owner’s storage area as directed and obtain a signed transmittal.

B. Provide all keys to enclosures, thermostat guards and equipment marked to identify their use. Deliver to the Owner's storage area as directed and obtain a signed transmittal.

PART 2 - PRODUCTS

2.1 CONTROL DEVICES, GENERAL

A. Instruments with temperature or pressure set points shall be provided with a means of adjustment over a reasonable range.

B. Adjustable temperature control devices shall be graduated and calibrated in degrees F. Markings such as WARMER and COOLER are not acceptable unless specifically required on the drawings.

C. Devices mounted outdoors shall be weathertight construction or mounted in weathertight enclosure or inside weathertight units.

2.2 TEMPERATURE DEVICES

A. Aquastat:

1. Description: Surface-mounted thermostat and switch for two-position control based on pipe temperature. Provide with vapor-filled copper element for immersion or strap-on application, visible temperature scale, set-point adjustment screw, and suitable NEMA rated enclosure.
2. Performance:

    a. Operating temperature range: 65 to 200 degrees F (18 to 3 degrees C), adjustable.
    b. Temperature differential deadband: 5 to 30 degrees F (3 to 17 degrees C), adjustable.
    c. Enclosure ambient temperature rating: 150 degrees F (66 degrees C).
    d. Sensing Element Pressure Rating: 200 psig (1379 kPa).
    e. Voltage: 120-V AC.
    f. Current: 8 FLA.
    g. Switch Type: SPDT.

3. Basis of design: Honeywell.

B. Freezestat:

1. Sensing element: Liquid filled flexible capillary with a minimum length of 20 feet (6 meters). Responding to lowest temperature in any 1-foot (30 mm) portion of the sensing element.
2. Two-position single pole double throw contacts with manual reset.
3. Manual set point adjustment with a temperature set point range of 15F to 55F (-9C to 13C), with stop limit minimum to 34F (2C), manually adjustable with screwdriver.
4. Basis of design: Honeywell.

C. Room temperature sensor:

1. Temperature sensing element mounted under a bright white, non-yellowing, plastic cover.
2. Provide mounting plate compatible with the mounting surface shape and electrical box used.
3. Concealed wiring connection.
4. Provide with the following:

    a. Manual set point adjustment (provide in office and conference rooms only): Manual set point adjustment shall allow for modification of the temperature by the occupant. Set point adjustment may be locked out, overridden or limited as to time or temperature through software by an authorized operator.

5. Provide room temperature sensors coordinated with the requirements of associated controllers. The sensor may be either RTD or thermistor type with transmitter providing the following minimum performance requirements are met:

    a. Accuracy: ± 0.5 degree F (0.3 degrees C)
    b. Operating range: 35 to 115 degrees F (2 to 46 degrees C)
    c. Set point adjustment range: 55 to 95 degrees F (2 to 30 degrees C)
    d. Calibration adjustments: None required.
    e. Installation: Up to 100 feet from controller.
    f. Set point modes: Independent Heating, Cooling, Night Setback-Heating, Night Setback-Cooling.

D. Air system insertion temperature sensor:

1. Nickel RTD temperature sensor with transmitter, sensing air temperature, with single-point sensing element in rigid stainless steel sheath within air stream.
2. Temperature range: -40 to 250 degrees F (-40 to 121 degrees C).
3. Accuracy: ± 0.5 degrees F (0.3 degrees C) at 70 degrees F (21.1 degrees C).
4. Provide insertion length to achieve sensing at middle of air path, up to 18 inches (457 mm).
5. Enclosure: Junction box, with gasket for attachment to duct or equipment, with removable cover; NEMA Type 1 for indoor applications and Type 4 for outdoor applications.
6. Basis of design: ACI Duct Series.

E. Air system averaging temperature sensor:

1. Nickel RTD temperature sensor with transmitter, sensing air temperature, with flexible copper sensing element in air stream and mounting clips.
2. Temperature range: -40 to 240 degrees F (-40 to 115 degrees C).
3. Accuracy: ± 0.075% of reading.
4. Enclosure: Junction box, with gasket for attachment to duct or equipment, with removable cover; NEMA Type 1 for indoor applications and Type 4 for outdoor applications.
5. Basis of design: Minco.

2.3 PRESSURE DEVICES

A. Air static pressure sensors:

1. Duct static pressure sensor/transmitter: Glass-on-silicon capacitance type with integral sensing tip, and temperature compensation.

    a. Range: Field selectable for any of the following:

        (1) 0 to 1.25 inches w.g.
        (2) 0 to 2.5 inches w.g.
        (3) 0 to 5 inches w.g.

    b. Output: 4-20 mA, 0 to 5-V DC, or 0 to 10-V DC
    c. Accuracy: ± 1%.
    d. Enclosure: NEMA 4.
    e. Basis of design: MAMAC.

B. Filter differential pressure devices:

1. Filter differential pressure switch (exterior applications): Fast-acting diaphragm type automatic reset switch with pipe connections for extended pressure sensing elements, and screw type set point adjustment. Switch shall be single pole, double throw. Contacts shall be used for an alarm input to the building automation system. Rated for 15 amps at 120-V AC to 480-V AC. Provide NEMA Type 4 enclosure.

    a. Repeatability: ± 3%.
    b. Range: Select a range approximately 2 times device set point, suitable for application with pressure limit beyond expected fluid pressure during operation. Able to withstand surge pressures possible to be produced by system fans.
    c. Operating conditions: -30 to 180 degrees F (-34 to 82 degrees C).
    d. Basis of design: Dwyer.

2. Filter differential pressure sensor/transmitter with digital gauge and switch (interior applications): Differential pressure controller and gauge with integrated single-pole, double-throw control relay switches; pipe connections for extended pressure sensing elements; programmable set point adjustment via keypad; and digital LCD display. Relay contacts shall be used for an alarm input to the building automation system. Low-voltage analogue signal output for differential pressure measurement by the building automation system. Output contacts rated for 1 amp at 30-V DC.

    a. Range: Select a range approximately 2 times device set point, suitable for application with pressure limit beyond expected fluid pressure during operation. Able to withstand surge pressures possible to be produced by system fans.
    b. Output: 4-20 mA.
    c. Accuracy:

        (1) ± 1.5% for gauges with a range up to 0.25 inches w.g.
        (2) ± 0.5% for gauges with a range up to 5 inches w.g.

    d. Operating conditions: 32 to 140 degrees F (0 to 60 degrees C).
    e. Basis of design: Dwyer.

C. Air pressure high-limit or low-limit pressure switch: Duct-mounted or unit-mounted, fast acting diaphragm type manual reset switches with pipe connections for extended pressure sensing elements, and screw type set point adjustment. Two switches shall each be single pole, double throw. One set of contacts shall be used for control function. The second set of contacts shall be used for an alarm input to the building automation system. Rated for 4 amps at 120-V to 250-V AC. Provide NEMA 250 Type 1 enclosure for dry indoor installations and NEMA 250 Type 4 enclosure for wet and outdoor installations.

1. Repeatability: ± 4%.
2. Range: Select the range to be approximately 2 times device set point, suitable for application with high limit or low limit beyond expected fluid pressure during operation. Able to withstand surge pressures possible to be produced by system fans.
3. Operating conditions: -30 to 180 degrees F (-34 to 82 degrees C).
4. Basis of design: Dwyer.

2.4 HUMIDITY AND ENTHALPY DEVICES

A. Duct-mounted humidity and temperature sensor/transmitter: Factory calibrated, configurable humidity parameters including relative humidity, dew point, enthalpy, and wet bulb temperature.

1. Accuracy:

a. Relative humidity: ± 1.5% between 0 and 90% RH.
b. Temperature: ± 0.2 degrees F (0.1 degrees C) at 68 degrees F (20 degrees C).

2. Range: 0 to 100% RH.
3. Outputs: 4-20 mA or 0 to 10-V DC for relative humidity and temperature.
4. Metal housing, IPP66 or NEMA 4, integral sensor probe, for mounting to duct or casing.
5. Basis of design: Vaisala.

B. Outside air humidity and temperature sensor/transmitter:

1. Accuracy:

a. Relative humidity: ± 3% between 0 and 90% RH.
b. Temperature: ± 0.4 degrees F (0.2 degrees C).

2. Humidity Range: 0 to 100% RH.
3. Temperature Range: -40 to 140 degrees F (-40 to 60 degrees C)
4. Outputs: 4-20 mA for relative humidity and temperature.
5. Enclosure: IP65.
6. Basis of design: Vaisala.

2.5 FLOW MEASUREMENT DEVICES

A. Thermal dispersion duct and plenum airflow measuring station:

1. Sensors:

a. Mounting brackets: Constructed of aluminum or stainless steel and shall hold one or more sensor probes as required to achieve specified accuracy.
b. Sensor probes: Constructed of anodized aluminum alloy tubes and holding one or more sensor nodes as required to achieve specified accuracy.
c. Sensor nodes: Provided with two bead-in-glass, hermetically sealed thermistors potted in a marine grade waterproof epoxy.
d. Wiring: Sensor probes shall be individually wired to the transmitter with wiring protected from the elements and suitable for direct exposure to water, UV exposure, and exposure to temperatures ranging from -20° F to 160° F (-28.9° C to 71° C).

2. Transmitter:

a. Microprocessor-based.
b. Automatic zeroing.
c. Adjustable for altitudes other than sea level.
d. Capable of determining airflow rate and temperature average of all connected sensor nodes in an array.
e. Capable of providing a high and/or low airflow alarm.
f. Capable of identifying a sensor node and ignoring any node in a fault condition.
g. Display: LCD, alpha-numeric 16 character, displaying airflow rate and alarm status.
h. Output: Two field selectable (0 to 10-V DC or 4-20 mA) analog output signals (one for airflow and one for temperature or alarm) and one Ethernet BACnet connection. Network communications shall provide: the average airflow rate, temperature, Hi-Lo airflow set point alarm, system status alarm, individual sensor node airflow rates and individual sensor node temperatures.
i. Provide a Bluetooth interface with Android or iOS devices and free Android or iOS software for real-time airflow and temperature monitoring.
j. The transmitter shall be powered by 24-V AC or 24-V DC.

3. Performance: Airflow monitoring station shall be calibrated to measure the variable airflow from 10% of design airflow to 100% design flow, maintaining an accuracy of ± 3% of reading, between -40 and 158 degrees F (-40 to 70 degrees C). The station shall compensate for outdoor air temperature fluctuations that affect mass flow rate of air.
4. Airflow straightener: Provide for duct-mounted AMS as recommended by the AMS manufacturer. Framed, 1.5-inch-thick aluminum honeycomb, 3/8-inch cells, less than 0.02-inch w.g. air pressure drop at 1,000 fpm, effect equal to adding 4 diameters of straight duct.
5. Basis of design:

a. Ebtron Gold.
b. Ruskin.

B. Thermal dispersion fan inlet airflow measuring station:

1. Sensors:

a. Sensor mounting brackets: Constructed of aluminum or stainless steel, and shall hold two or more sensor nodes per fan inlet as required to achieve specified accuracy.
b. Sensor nodes: Provided with two bead-in-glass, hermetically sealed thermistors potted in a marine grade waterproof epoxy.
c. The fan inlet airflow traverse probes shall not significantly impact fan performance or contribute to fan generated noise levels.

d. Wiring: Sensor probes shall be individually wired to the transmitter with wiring protected from the elements and suitable for direct exposure to water, UV exposure, and exposure to temperatures ranging from -20° F to 160° F (-28.9° C to 71° C).

2. Transmitter:

a. Microprocessor-based.
b. Automatic zeroing.
c. Adjustable for altitudes other than sea level.
d. Capable of determining airflow rate and temperature average of connected sensor nodes.
e. Capable of providing a high and/or low airflow alarm.
f. Capable of identifying a sensor node and ignoring any node in a fault condition.
g. Display: LCD, alpha-numeric 16 character, displaying airflow rate and alarm status.
h. Output: Two field selectable (0 to 10-V DC or 4-20 mA) analog output signals (one for airflow and one for temperature or alarm) and one Ethernet BACnet connection. Network communications shall provide: the average airflow rate, temperature, Hi-Lo airflow set point alarm, system status alarm, individual sensor node airflow rates and individual sensor node temperatures.
i. Provide a Bluetooth interface with Android or iOS devices and free Android or iOS software for real-time airflow and temperature monitoring.
j. The transmitter shall be powered by 24-V AC or 24-V DC.

3. Performance: Airflow monitoring station shall be calibrated to measure the variable airflow from 10% of design airflow to 100% design flow, maintaining an accuracy of ± 3 to 10% of reading, between -20 and 120 degrees F (-29 to 49 degrees C). The station shall compensate for outdoor air temperature fluctuations that affect mass flow rate of air.
4. Basis of design:

a. Ebtron.
b. Ruskin.

2.6 DAMPER POSITION SWITCHES

A. Damper position switch:

1. Mechanical switch mounted to a bracket connected to the damper frame, with linking rod or bar and blade clip to connect the switch to the blade. Device shall contain two SPST or SPDT switches, one to indicate the damper is open, and one to indicate it is closed.
2. Basis of design: Ruskin or TAMCO.

2.7 CURRENT DEVICES

A. Current switch:

1. Switch for motor loads not associated with a variable frequency drive:

a. Split-core or solid core current switch with adjustable trip range.
b. Suitable for use with electronically commutated motors.
c. Provide with LED visual indication of output status.

d. Temperature range: 5 to 140 degrees F (-15 to 60 degrees C).
e. Humidity range 10 to 90% RH
f. Normally open:

(1) Normally open switch closes when current flows to the monitored load is on.
(2) Sensor shall induce power for its operation from the monitored load.
(3) Trip range: A range of 0.5 to 175 amperes is available within the series.

g. Basis of design: Veris Industries Hawkeye.

2. Switch for loads with a variable frequency drive:

a. Split-core or solid core current switch with adjustable microprocessor managed trip range. The normal range or current draw for each frequency band shall be learned by the microprocessor from motor operation and stored in non-volatile memory.
b. Provide with LED visual indication of output status.
c. Temperature range: 5 to 140 degrees F (-15 to 60 degrees C).
d. Humidity range 10 to 90% RH
e. Normally open:

(1) Normally open switch closes when current flows to the monitored load is on.
(2) Sensor shall induce power for its operation from the monitored load.
(3) Trip range: 0.5 to 175 amperes.

f. Basis of design: Veris Industries Hawkeye.

B. Current sensing transducer:

1. Split-core current sensing transducer.
2. Transducer produces a 4-20 mA signal in proportion to current draw of the monitored load.
3. Suitable for use with electronically commutated motors.
4. Sensor shall induce power for its operation from the monitored load.
5. Accuracy ±2% of full scale from 10% to 100% of selected range.
6. Response time: 2 seconds.
7. Temperature range: 5 to 140 degrees F (-15 to 60 degrees C).
8. Humidity range 10 to 90% RH.
9. Basis of design: Veris Industries Hawkeye.

2.8 GAS SENSING DEVICES

A. Carbon dioxide sensor/transmitter:

1. Single beam dual wavelength NDIR sensor.
2. Factory calibrated.

a. Accuracy: ± 20 ppm plus 2% of reading.
b. Range: 0 to 2000 ppm with analog output.
c. Operating conditions: 23 to 113degrees F (-5 to 45 degrees C), 0 to 85% RH.
d. Drift: ± 100 ppm over a five-year period, maximum.
e. Output: 0 to 10-V DC or 4-20 mA.

f. Calibration kit: Portable, including nitrogen gas, tubing, regulator, and case, with manufacturer's instructions for performing calibration. Provide one kit for the project.
g. Wall mounted applications: NEMA Type 1 ABS plastic housing with integral sensor ready for mounting to wall plate or junction box.
h. Duct mounted applications: NEMA Type 4 ABS plastic housing with integral sensor and insertion probe ready for mounting on duct.
i. Basis of design: Vaisala.

B. Outside air carbon dioxide sensor/transmitter:

1. Factory calibrated.

a. Accuracy: ± 40 ppm
b. Range: 0 to 3000 ppm with analog output.
c. Operating conditions: -40 to 158 degrees F (-40 to 60 degrees C), 0 to 100% RH.
d. Drift: ± 60 ppm per year, maximum.
e. Output: 0 to 10-V DC or 4-20 mA.
f. Calibration kit: Portable, including nitrogen gas, tubing, regulator, and case, with manufacturer's instructions for performing calibration. Provide one kit for the project.
g. Enclosure: IP65.
h. Provide with sunshade.
i. Basis of design: Vaisala.

2.9 OCCUPANCY DEVICES

A. Utilize an auxiliary contact on lighting control system occupancy sensors.

2.10 EMERGENCY FAN DISCONNECT SWITCH DEVICES

A. Emergency fan disconnect switch (push button type):

1. Switch: Octagonal push button switch, red with molded, raised-letter identification. Switch reset shall be accomplished by rotating the button. Operation of the switch shall de-energize air-handling units where indicated in sequences of operation. Provide a recessed junction box for the switch in finished locations.
2. False alarm protector: Tamperproof clear polycarbonate shield in a frame that fits over the emergency switch. When the shield is lifted to gain access, a warning horn shall sound. Include 9-V DC battery.
3. Nameplate: White letters on black background with the following text "AHU EMERGENCY DISCONNECT SWITCH."
4. Provide independent output contacts for fire alarm system monitoring.
5. Basis of design: Safety Technology International.

2.11 ACCESSORIES AND AUXILIARY CONTROLS

A. Guard for wall-mounted thermostats, sensors, or other control devices: Size selected to suit device to be protected, designed for vertical or horizontal mounting.

1. For locations in finished spaces: Double-wall cover, steel with manufacturer's standard white enamel finish, with wall plate, base, lock, and two keys.
2. For locations in unfinished spaces: Cast aluminum with openings on front and all sides, designed for direct wall mounting.
3. Fasteners: Tamperproof. Include 2 sets of special tools as required in Part 1 above.
4. Basis of design: Kele.

B. Nameplate: Plastic, as specified in Section 230500, Common Work Results for HVAC, minimum size 0.75 inch by 2.5 inches, minimum letter size 0.1875 inch, identifying equipment and use.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Provide wiring between control devices, equipment, and controllers as required by sequences of operation and as scheduled on the Control Point Schedule.

B. Configure control devices to accomplish sequences of operation.

C. Calibrate control devices.

D. Coordinate with the Owner to establish set points for control devices.

E. Provide accessories and auxiliary controls, including but not limited to relays, switches, and pushbuttons required for the successful operation of this system. Identify each switch and pushbutton with a nameplate.

F. Provide control devices in accessible locations. Provide access doors for devices installed behind non-removal ceilings, walls, ducts or equipment. Document locations of remote devices on record drawings.

G. Provide mounting brackets where devices are mounted on insulated ducts or equipment to permit continuous required insulation thickness.

H. Provide insulated base plates for devices mounted on exterior walls.

I. Provide wall-mounted devices with mounting plates or junction boxes securely attached to the wall. Provide recessed junction boxes in finished spaces. Provide surface-mounted junction boxes in unfinished spaces. Securely anchor wall-mounted devices with tamperproof screws.

J. Mounting height from floor to top of control for wall-mounted devices with human interface in public areas shall be 48 inches (1220 mm), as required for accessibility to persons using wheelchairs.

K. Provide guards for wall-mounted devices where noted and where devices are subject to damage. Mount guard, or guard base, to wall with at least four tamperproof screws, entirely independent of device and its wall plate, cover, and electrical box.

L. Provide solar shields to protect control devices sensing outdoor air conditions from direct and reflected solar radiation. Control devices may be located behind OA intake louvers but ahead of any control dampers.

M. Provide components and connective piping and tubing with pressure and temperature ratings that meet or exceed the service pressure and temperature of the associated system.

3.2 INSTALLING TEMPERATURE DEVICES

A. Aquastat:

1. Remove insulation from section of pipe where aquastat is to be installed.
2. Fasten aquastat to pipe with adjustable pipe strap.
3. Manually adjust the set point of the aquastat.
4. Replace insulation up to the sensor and maintain vapor barriers on chilled water pipes and other pipes that may product condensation.

B. Freezestat:

1. Provide a removable galvanized frame with 1-inch square mesh wire and attach freeze stat capillary tubing to mesh.
2. Where capillary tubing passes through duct or unit casing, provide split flange fitting to seal hole and protect the capillary tubing in the duct or casing.
3. Provide more than one freezestat where the size of the duct or unit casing requires more than one to achieve adequate coverage and provide wiring to produce the required safety and alarm functionality. Provide coverage not be less than 1 linear foot of capillary tube per 1 square foot of coil surface.
4. Mount freezestat head or control unit in an accessible location that is temperature conditioned above 40 degrees.
5. Use one switch terminal of freezestat to accomplish safety functions required in the control sequence.
6. Use the second switch terminal of the freezestat to communicate an alarm to the building automation system.
7. Manually adjust the set point of the freezestat.

C. Room temperature sensor:

1. Provide manual override on temperature sensors as noted in sequence of operation.
2. Coordinate the location of all room temperature sensors with light switches and architectural cabinetry/furniture.
3. Provide setpoint capability appropriate for the use.

D. Outside air temperature sensor:

1. Provide in a location that is accessible and safe from damage, and where measurement is not influenced by adjacent equipment or exhaust air streams.
2. Locate on a north facing vertical surface where possible.
3. Provide a radiation shield.
4. Provide transmitter in an accessible location.

E. Air system insertion temperature sensor:

1. Provide insertion sensors to measure air temperatures in ducts or equipment in applications where air condition is uniform such as return air applications and unit supply air and coil discharge locations downstream of supply fans.
2. Provide with the sensors in ducts and air-handling unit casings with sensitive portion of the element installed as close as possible to the center of a duct cross section and located to sense near average temperature. Do not exceed 24 inches (610 mm) in sensor length.
3. Provide return-air sensor in location that senses return-air temperature without influence from outdoor or mixed air.
4. Rigidly support sensor from the duct or air-handling unit casing and seal penetration airtight.
5. Provide transmitter in an accessible location.

F. Air system averaging temperature sensor:

1. Provide averaging sensors to measure air temperatures in ducts or equipment in applications where air condition is not uniform and may be stratified such as mixed air and coil discharge applications that condition mixed air prior to it being fully mixed via a supply fan.
2. Provide transmitter in an accessible location. Rigidly support the transmitter from the duct or air-handling unit casing and seal penetration airtight.
3. Provide a removable galvanized frame with 1-inch square mesh wire and attach averaging element to mesh.
4. Where averaging element passes through duct or unit casing, provide split flange fitting to seal hole and protect the capillary tubing in the duct or casing.
5. Provide more than one sensor where the size of the duct or unit casing requires more than one to achieve adequate coverage and provide wiring to produce the required sensing functionality from the group of sensors.

3.3 INSTALLING PRESSURE DEVICES

A. Air static pressure sensors:

1. Duct static pressure sensors/transmitter:

a. Rigidly support duct mounted sensors from the duct and seal penetration airtight.
b. Provide transmitter in an accessible location.
c. Provide mounting brackets where required to permit continuous insulation.

B. Filter differential pressure device

1. Provide air-pressure sensors for each switch or sensor/transmitter connection. Provide sensors in an accessible location for inspection and replacement.
2. Provide tubing from sensors to switch or sensor/transmitter connections.
3. Adjust switch or relay set point to a pressure corresponding to end of filter life and within the pressure limits of the filter and holding frame being protected. Refer to submittal data for anticipated final filter pressure drop and confirm set point with Owner’s desired maintenance schedule. Refer to filter manufacturer’s literature for filter pressure ratings.
4. Provide differential pressure switch for exterior applications.
5. Provide differential pressure sensor/transmitter with digital gauge for interior applications.

C. Air pressure high-limit or low-limit pressure switch:

1. Provide low-limit suction or high-limit discharge switches where required by sequences of operation.
2. Provide air-pressure sensors for each switch connection. Provide sensors in an accessible location for inspection and replacement.
3. Provide tubing from sensors to switch connections.
4. Adjust switch set point to a pressure beyond normal unit operation, but within the pressure limits of the unit and/or ductwork being protected. Refer to duct construction schedule for duct pressure limits. Refer to manufacturer's literature for unit pressure ratings.

3.4 INSTALLING HUMIDITY AND ENTHALPY DEVICES

A. Duct-mounted humidity and temperature sensor/transmitter:

1. Rigidly support duct mounted sensors from the duct and seal penetration airtight.
2. Provide transmitter in an accessible location.
3. Provide mounting brackets where required to permit continuous insulation.

B. Outside air relative humidity and temperature sensor/transmitter:

1. Provide in a location that is accessible and safe from damage, and where measurement is not influenced by adjacent equipment or exhaust air streams.
2. Locate on a north facing vertical surface where possible.
3. Provide a radiation shield.
4. Provide transmitter in an accessible location.

3.5 INSTALLING FLOW MEASUREMENT DEVICES

A. Airflow measuring stations and devices:

1. Provide according to the manufacturer's recommendations.
2. Field calibrate vs. balancing information to maximize accuracy.

3.6 INSTALLING DAMPER POSITION SWITCHES

A. Damper position switch: Connect to damper frame and damper blade per the manufacturer's recommendations. Integrate with hard-wired safety circuits and building automation system as indicated in control sequences. Position switch installation on a damper shaft is not acceptable.

3.7 INSTALLING CURRENT DEVICES

A. Current switch:

1. Provide current switches where indicated to monitor the status of loads and determine if they are on when commanded on.

2. Calibrate device trip settings for loads that are not affiliated with variable frequency drives during testing and balancing so device is able to sense belt of shaft breakage.
3. Provide separate current transformer and associated wiring for loads with current greater than device rating.
4. Loop wiring through device for loads with current less than device rating.
5. Electronically commutated motors: Calibrate device trip settings by determining passive current draw when motor is connected to power source but shaft is not rotating, and adjusting the trip setting to be higher than the passive current. Loop wires to increase the measured current if the passive current is below the device trip setting.

B. Current sensing transducer:

1. Provide current sensing transducers where indicated to monitor the current draw of loads.
2. Field select device range to best match equipment that will be monitored.
3. Calibrate and scale signal output so BAS displays the load for the user in kW or HP.
4. Provide separate current transformer and associated wiring for loads with current greater than device rating.
5. Loop wiring through device for loads with current less than device rating.
6. Field-determine appropriate range of current draw during normal operation and configure an alarm in the building automation system when operation is outside of the range.
7. Field calibrate each current sensing relay using a NIST certified electrical amperage meter.

3.8 INSTALLING GAS SENSING DEVICES

A. Carbon dioxide sensor/transmitter:

1. Provide transmitter in an accessible location.
2. Where a wall-mounted temperature sensor and carbon dioxide sensor are both required, a single device satisfying both specifications may be provided.
3. Rigidly support duct mounted sensors from the duct and seal penetration airtight.
4. Provide mounting brackets where required to permit continuous insulation.

B. Outside air carbon dioxide sensor/transmitter:

1. Provide in a location that is accessible and safe from damage, and where measurement is not influenced by adjacent equipment or exhaust air streams.
2. Locate on a north facing vertical surface where possible.
3. Provide a radiation shield.
4. Provide transmitter in an accessible location.

3.9 INSTALLING OCCUPANCY DEVICES

A. Utilize a lighting control system occupancy sensors auxiliary contact for HVAC system control.

3.10 INSTALLING EMERGENCY FAN DISCONNECT SWITCH

A. Emergency fan disconnect switch: Provide switch and accessories where indicated on drawings, and where required by sequences of operation, in locations approved by the Authority Having Jurisdiction. Connect switch to building automation system. Provide controls to shut down associated air-handling systems as indicated in sequences of operation.

3.11 INSTALLING ACCESSORIES AND AUXILIARY CONTROLS

A. Guard for wall-mounted thermostats, sensors, or other control devices: Provide where indicated on drawings and where required to protect devices from damage.

B. Nameplate: Provide as specified in Section 230500, Common Work Results for HVAC, where required to identify special-purpose instruments or where the function of the item is not obvious, such as timers and switches. Nameplates shall be mounted with vandal-proof screws on the wall immediately below the item.

3.12 RENOVATION PROCEDURES

A. Where new devices and guards are mounted at existing device locations, mount on 14-gauge minimum steel plates, 4 inches x 6 inches (100 mm x 150 mm) minimum, over existing device locations and securely anchored into the wall. Coordinate plate colors with the Architect.

B. Where control devices are removed and not replaced, seal ends of tubing or wiring and push back into wall.

1. On glazed surfaces, provide blank cover plates.
2. On other surfaces, patch to match existing surfaces.

C. Patch existing surfaces in accordance with requirements of Division 01 and Section 230101.

3.13 DEMONSTRATION AND TRAINING

A. Provide demonstration and training as specified in Section 230500.

B. Instruct Owner’s personnel in use of calibration kit to perform annual calibration of carbon dioxide sensors.

END OF SECTION 230913

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SECTION 230923 - DIRECT DIGITAL BUILDING SYSTEMS CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Direct digital building control (DDC) system.

B. Network communications.

C. DDC panels.

D. System software.

E. Application-specific controllers.

F. Operator I/O devices.

1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Controls for air terminal units specified in Section 233600, including application specific controller and damper operator. Furnish controls to the terminal unit manufacturer for factory installation, see Section 233600.

1.3 RELATED SECTIONS

A. Coordination, installer qualifications, and acceptable manufacturers: Section 230901.

B. Automatic temperature control system: Sections 230901 through 230923.

C. Air terminal units: Section 233600.

D. Control sequences: Shown on drawings.

1.4 SUBMITTALS

A. Product data:

1. Hardware: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

   a. DDC panels.
   b. Application-specific controllers.
   c. Operator I/O devices.

2. Software: For each type of software, include a description, characteristics, and performance. Include the following:

    a. System software.
    b. Operator workstation software.

B. Shop drawings:

1. Wiring diagrams. Differentiate between factory-installed and field-installed wiring.

C. Installer qualifications: Submit as required in Section 230901, Automatic Temperature Control System. Include, in addition to other requirements, the location of the support facility from which warranty and service will be provided, and a list of the names, titles, and training of the individuals who will be responsible for the work of this project.

D. Certifications:

1. Data sheet or copy of government approval form showing that the system complies with FCC Regulations, Part 15, Section 15.
2. Results of functional and diagnostic field tests and calibrations, specified in Part 3. Submit copies of the installing technician's checklist showing that the system has been completely set up and is ready to operate.
3. Submit Compliance Inspection Checklist, initialed and dated, showing satisfactory completion of the installation tests specified in Part 3.

E. Operation and maintenance data: Include operating and maintenance data for the following in the project Operation and Maintenance Manual as specified in Division 01 with supplemental requirements as specified in Section 230101:

1. As-built versions of submittal Product Data.
2. As-built versions of submittal Shop Drawings.
3. Names, addresses, email addresses, and 24-hour telephone numbers of Installer and service representatives for DDC system and products.
4. Operator's manual with procedures for operating control systems including logging on and off, handling alarms, producing point reports, trending data, overriding computer control, and changing set points and variables.
5. Backup copy of graphic files, programs, and databases on electronic media.
6. List of recommended spare parts with part numbers and suppliers.
7. Complete original-issue documentation, installation, and maintenance information for furnished third-party hardware including computer equipment and sensors.
8. Complete original-issue copies of furnished software, including operating systems, custom programming language, operator workstation software, and graphics software.
9. Recommended preventive maintenance procedures for system components, including schedule of tasks such as inspection, cleaning, and calibration; time between tasks; and task descriptions.
10. Owner training materials.

1.5 WARRANTY AND SERVICE

A. General requirements: Provide all services, materials and equipment necessary for the successful operation and maintenance of the entire DDC system for the period of the general project correction period required by General Conditions, Division 01, and Section 230101. Provide parts, software, and labor required for the work. Schedule maintenance and adjustments to minimize effects on facility operations.

B. The adjustment and repair of the system includes computer equipment, software updates, transmission equipment, and sensors and control devices. Provide the manufacturer's required adjustments and other work necessary to maintain system operation.

C. Personnel: Provide qualified personnel to accomplish work promptly and satisfactorily. Notify Owner in writing of the name of the designated service representative, and of changes in personnel.

D. Schedule of work: Schedule major inspections in June and December and minor inspections in March and September. Minor inspections shall include visual checks and operational tests of each item of equipment. Major inspections shall include all work described for minor inspections and the following work:

1. Clean equipment, including interior and exterior surfaces.
2. Perform signal, voltage, and system isolation checks of system workstations and peripherals.
3. Check and calibrate each field device. Check all analog points and digital points.
4. Run diagnostics and correct diagnosed problems.
5. Resolve and correct other observable problems.

E. Emergency service: Qualified personnel shall be available to provide service to the complete system. Furnish owner with a telephone number where service representative can be reached at all times. Service personnel shall be at the site within 8 hours after receiving a request for service, and shall restore the control system to proper operating condition within 24 hours.

F. Operation: Performance of scheduled adjustments and repair shall verify operation of the system as demonstrated by the initial performance test.

G. System modifications: Make recommendations for system modification in writing to Owner. Do not make any system modifications, including operating parameters and control settings, without prior written approval of Owner. Modifications to the system shall be incorporated into the operations and maintenance manuals and other documentation.

H. Software: During the project correction period, provide all software updates and verify operation in the system in a timely manner. Instruct the system operators, and incorporate updates into the operations and maintenance manuals and software documentation. At the end of the correction period, continue to notify Owner of software revisions.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT DESCRIPTION

A. The DDC system shall integrate multiple building functions including equipment supervision and control, alarm management, energy management, and historical data collection.

B. The building control system shall include the following:

1. Network DDC panels
2. Network application-specific controllers (ASCs)
3. Portable operator's terminals
4. Personal computer operator workstation(s)

C. The system shall be modular and shall permit expansion of both capacity and functionality through the addition of sensors, actuators, DDC panels, application-specific controllers, and operator devices.

D. System architectural design shall eliminate dependence upon any single device for alarm reporting and control execution. Each DDC panel shall operate independently by performing its own specified control, alarm management, operator I/O, and data collection. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

E. Without depending on a control processing device, DDC panels shall be able to:

1. Access any data from or send control commands and alarm reports directly to any other DDC panels or combination of panels on the network.
2. Send alarm reports to multiple operator workstations.

2.2 NETWORKING COMMUNICATIONS

A. The DDC system shall network operator workstations.

1. A high performance peer-to-peer network.
2. An application-specific local area network (LAN).

B. Peer-to-peer network level:

1. Operator workstations and DDC panels shall directly reside on a network such that communications shall be executed directly between DDC panels, directly between workstations, and between DDC panels and workstations on a peer-to-peer basis.
2. Inherent in the system's design shall be the ability to expand or modify the network either via a LAN, or auto-dial telephone line modem connections, or via a combination of the two networking schemes.

3. All operator devices, either network-resident or connected via modems, shall have the ability to access all point status and application report data or execute control functions for any and all other devices via the peer-to-peer network. Access to data shall be based on logical identification of building equipment. No hardware or software limits shall be imposed on the number of devices with global access to the network data.
4. Network design shall include the following provisions:

    a. Provide high-speed data transfer rates for alarm reporting, quick report generation from multiple controllers and upload/download efficiency between network devices. An alarm occurring at any DDC panel shall display at one or more workstations or alarm printers within 5 seconds.
    b. Support of any combination of DDC panels and operator workstations directly connected to the peer-to-peer network. The network shall support a minimum of 32 devices.
    c. Message and alarm buffering to prevent information from being lost.
    d. Error detection, correction, and retransmission to guarantee data integrity.
    e. Synchronization of real-time clocks, to include automatic daylight savings time updating among all DDC panels.
    f. Commonly available, multiple source, networking components and protocols shall be used to allow the DDC system to coexist with other networking applications such as office automation. ETHERNET and ARCNET are acceptable technologies.
    g. Use of an industry standard IEEE 802.x protocol. Communications must be of a deterministic nature to assure calculable performance under worst-case network loading.

C. Application-specific local area network (LAN):

1. This level communication shall support a family of application-specific controllers and shall communicate bidirectionally with the peer-to-peer network through DDC panels for transmission of global data.
2. Application-specific controllers shall be arranged on the LANs in a functional relationship with DDC panels. For example, a VAV terminal unit controller shall be on a LAN from the DDC panel that is controlling its corresponding AHU.
3. A maximum of 32 application-specific controllers may be configured on each LAN.

D. Communication capability:

1. Automatic communications shall allow DDC panels to communicate with remote operator stations and remote terminals, as indicated in the sequence of operations.
2. DDC panels shall automatically communicate with workstations to report alarms or other significant events.
3. Operators at the workstation shall be able to perform all control functions, all report functions, and all database generation and modification functions as described for workstations connected via the network. Routines shall automatically answer communications from remote DDC panels. The fact that communications are taking place with remote DDC panels shall be invisible to an operator.

2.3 DDC PANEL

A. Microprocessor-based panels with a minimum word size of 16 bits: Multi-tasking, multi-user, real-time digital control processors consisting of modular hardware with plug-in enclosed processors, communication controllers, power supplies and input/output point modules. Each DDC panel shall be capable of operating as a stand-alone controller, performing its specified control functions independently of other controllers in the network. Controller size shall be sufficient to fully meet the requirements of this specification and the point list on the drawings.

B. Each DDC controller shall have sufficient memory, a minimum of 1 megabyte, to support its own operating system and databases, including:

1. Control processes
2. Energy management applications
3. Alarm management applications
4. Historical and trend data for points specified
5. Maintenance support applications
6. Custom processes
7. Operator I/O
8. Communications
9. Manual override monitoring

C. Each DDC panel shall support:

1. Monitoring of the following types of inputs, without the addition of equipment outside the DDC panel:

a. Analog inputs

(1) 4-20 mA
(2) 0-10 Vdc
(3) Thermistors
(4) 1000-ohm RTDs

b. Digital inputs

(1) Dry contact closure
(2) Pulse accumulator
(3) Voltage sensing

2. Direct control of electronic actuators and control devices. Each DDC panel shall be capable of providing the following control outputs without the addition of equipment outside the DDC panel:

a. Digital outputs

(1) Contact closure (motor starters, sizes 1-4)

b. Analog outputs

(1) 0-20 psi

(2) 4-20 mA
(3) 0-10 Vdc

D. Additional space for future point connections, each DDC panel: Minimum 10 percent.

1. Provide sufficient internal memory for the specified control sequences with at least 25 percent of the total memory available for future use.

E. Each DDC panel shall have at least two RS-232C serial data communication ports for operation of operator I/O devices.

F. Each DDC panel shall have point discrete, on-board, limited access Hand/Off/Auto operator override switches for digital control type points and gradual switches for analog control type points. These override switches shall be operable whether the panel processor is operational or not. DDC panels shall monitor the status of all overrides and remotely report each override control operation.

G. DDC panels shall provide local LED status indication for each digital input and output for constant, up-to-date verification of all point conditions without the need for an operator I/O device. Graduated intensity LEDs or analog indication of value shall also be provided for each analog output. Status indication shall be visible without opening the panel door.

H. Each DDC panel shall continuously perform self-diagnostics, communication diagnosis, and diagnosis of all panel components, and provide both local and remote annunciation of detected component failures, low battery conditions, or repeated failure to establish communication.

I. Provide isolation at each peer-to-peer network termination and each field point termination, to suppress induced voltage transients, meeting requirements of IEEE C62.41.

J. In the event of the loss of normal power, each DDC panel shall shut down in an orderly process which shall prevent the loss of database or operating system software. Provide nonvolatile memory for critical controller configuration data and battery backup sufficient to support the real-time clock and volatile memory for a minimum of 72 hours.

1. Upon restoration of normal power, the DDC panel shall automatically resume full operation without manual intervention.
2. Should DDC panel memory be lost for any reason, reloading the DDC panel shall be possible via the local RS-232C port, via telephone line dial-in, or from an operator workstation.

K. Provide a DDC panel for each AHU or other HVAC system as indicated on the drawings. It is intended that each unique system be provided with its own point-resident DDC panel.

2.4 SYSTEM SOFTWARE

A. General:

1. Provide all necessary software to form a complete control system as described in this specification.
2. The software programs specified in this section shall be integral in DDC panels and shall not be dependent upon any higher-level computer for execution.

B. Control software:

1. The DDC panels shall have the ability to perform the following pre-tested control algorithms:

    a. Two-position control
    b. Proportional control
    c. Proportional plus integral control
    d. Proportional, integral, plus derivative control
    e. Control loop tuning

2. Include a provision for limiting the number of times each piece of equipment may be cycled within any one-hour period.
3. Shall protect against excessive demand during start-up periods by automatically introducing time delays between successive start commands to heavy electrical loads.
4. Upon the resumption of normal power, the control software shall analyze the status of controlled equipment, compare it with normal occupancy scheduling, and turn equipment on or off as necessary to resume normal operations.

C. DDC panels shall be able to perform any or all of the following energy management routines:

1. Time-of-day scheduling
2. Calendar-based scheduling
3. Holiday scheduling
4. Temporary schedule overrides
5. Start-stop time optimization
6. Automatic Daylight Savings Time switchover
7. Night setback control
8. Enthalpy switchover (economizer)
9. Peak demand limiting
10. Temperature-compensated duty cycling
11. Fan speed/CFM control
12. Heating/cooling interlock
13. Cold deck reset
14. Hot deck reset
15. Hot water reset
16. Chilled water reset
17. Condenser water reset

D. DDC panels shall be able to execute custom, job-specific processes defined by the user, to automatically perform calculations and special control routines.

1. It shall be possible to use any of the following in a custom process:

    a. Any system measured point data or status
    b. Any calculated data
    c. Any results from other processes
    d. User-defined constants
    e. Arithmetic functions (+, -, *, /,square root, exp, etc.)
    f. Boolean logic operators (and/or, exclusive or, etc.)
    g. On-delay/off-delay/one-shot timers

2. Custom processes may be triggered based on any combination of the following:

    a. Time interval
    b. Time of day
    c. Date
    d. Other processes
    e. Time programming
    f. Events (e.g., point alarms)

3. The custom control programming feature shall be documented in English.

E. Alarm management shall monitor and direct alarm information to operator devices. Each DDC panel shall perform distributed, independent alarm analysis and filtering to minimize operator interruptions due to noncritical alarms, minimize network traffic, and prevent alarms from being lost. At no time shall the DDC panel's ability to report alarms be affected by operation of a PC workstation or local I/O device, or by communications among panels on the network.

1. All alarm or point change reports shall include the point's English language description and the time and date of occurrence.
2. The user shall be able to define the specific system response to alarm at each point. Alarms shall be prioritized. Each DDC panel shall automatically inhibit the reporting of selected alarms during system shutdown and start-up. Users shall have the ability to manually inhibit alarm reporting for each point.
3. Alarm reports and messages shall be directed to a user-defined list of operator devices.
4. In addition to the point's descriptor and the time and date, the user shall be able to print, display, or store an alarm message to more fully describe the alarm condition or direct operator response.
5. Operator-selected alarms shall initiate a call to a remote operator device.

F. A variety of historical data collection utilities shall manually or automatically sample, store, and display system data for points as specified in the I/O summary.

1. DDC panels shall store and report point history data for selected analog and digital inputs and outputs. Methods of collection shall be either by a predefined time interval or upon a predefined change of value.
2. DDC panels shall provide high resolution sampling for verification of control loop performance. Operator-initiated automatic and manual loop tuning algorithms shall be provided for operator-selected PID control loops as identified in the point I/O summary. Provide capability to view or print trend and tuning reports.

G. DDC panels shall automatically accumulate and store run-time hours for digital input and output points as specified in the point I/O summary.

H. DDC panels shall automatically sample, calculate, and store consumption totals on a daily, weekly or monthly basis for user-selected analog and digital pulse input type points as specified in the point I/O summary.

I. DDC panels shall have the ability to count events such as the number of times a pump or fan system is cycled on and off. Event totalization shall be performed on a daily, weekly, or monthly basis for points as specified in the point I/O summary.

2.5 APPLICATION-SPECIFIC CONTROLLERS (ASC)

A. Each DDC panel shall be able to extend its performance and capacity through the use of remote application-specific controllers (ASCs).

B. Each ASC shall operate as a stand-alone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each ASC shall be a microprocessor-based, multi-tasking, real-time digital control processor.

C. Terminal equipment controllers:

1. System shall control each piece of equipment through direct connection to a DDC or ASC. Terminal equipment shall include, but not be limited to, the following:

    a. Variable-air-volume (VAV) terminal units
    b. Constant-air-volume (CAV) terminal units
    c. Unit conditioners (Unit heaters)

2. Controllers shall include all point inputs and outputs necessary to perform the specified control sequences. As a minimum, 50 percent of the point outputs (except for unit ventilator controllers) shall be of the universal type, either modulating or two-position. Terminal equipment controllers utilizing proprietary control signals and actuators shall not be acceptable. Provide DDC panels or ASCs with industry standard outputs for control of terminal equipment.
3. Each controller shall perform its primary control function independent of other DDC panel LAN communication, or if LAN communication is interrupted. The controller shall receive its real-time data from the DDC panel time clock and shall ensure LAN continuity. Each controller shall include algorithms incorporating proportional, integral, and derivative (PID) gains for all applications. All PID gains and biases shall be field-adjustable by the user via terminals as specified herein.
4. Provide each terminal equipment controller with sufficient memory to accommodate point databases, operating programs, local alarming and local trending. All databases and programs shall be stored in nonvolatile EEPROM, EPROM and PROM, or minimum of 72-hour battery backup shall be provided. The controllers shall be able to return to full normal operation without user intervention after a power failure of unlimited duration. Operating programs shall be field-selectable for specific applications. Specific applications may be modified to meet the user's exact control strategy requirements, allowing for additional system flexibility. Controllers that require factory changes of applications are not acceptable.
5. Variable-air-volume (VAV) terminal controllers shall include an integral damper actuator. The controller shall support the following types of pressure independent terminal units as a minimum.

    a. VAV cooling only
    b. VAV with hot water heating coil

6. Constant-air-volume (CAV) terminal controllers shall include an integral damper actuator. The controller shall support the following types of pressure independent terminal units as a minimum.

a. CAV cooling only
b. CAV with hot water heating coil

7. Unit conditioner controllers shall support the following types of terminal units as a minimum:

a. Unit heaters

(1) Unit heaters may be of the following types:

(a) 2-pipe heating

2.6 PERSONAL COMPUTER OPERATOR WORKSTATION

A. Provide personal computer operator workstations for command entry, information management, network alarm management, and database management functions. All real-time control functions shall be resident in the DDC panels.

1. Provide workstation(s) of equal capability located at _____.
2. Workstation shall consist of a flat panel color monitor, personal computer with minimum 3 GB RAM, 160-GB hard drive and controller, mouse, 16 x DVD +/ RW, 56.0 Kb modem, and 101-key enhanced keyboard. Personal computer shall have a minimum 2.5 GHZ Intel Pentium Dual Core processor or equivalent by AMD, 10/100/1000 Network Interface with RJ-45 ethernet port.
3. The display provided for system operation shall have a diagonal screen measurement of no less than 19 inches and a minimum display resolution of no less than 1440 x 900 pixels. Separate controls shall be provided for color, contrasts and brightness. The screen shall be nonreflective.

B. Provide a laser printer with 600 by 600 dpi resolution at each workstation location for recording alarms, operator transactions, and systems reports.

2.7 PORTABLE OPERATOR'S TERMINAL (POT)

A. Provide portable operator terminals with a minimum LCD display of 80 characters by 25 lines and a full-featured keyboard. The POT shall be handheld and plug directly into individual distributed control panels as described below. Provide a user-friendly, English-language-prompted interface, not codes requiring look-up charts.

B. Functions of the POT connected at any DDC controller:

1. Access all DDC panels on the network.
2. Backup and restore DDC controller data bases for all system panels, not just the DDC Controller connected to.
3. Display all point, selected point and alarm point summaries.
4. Display trending and totalization information.
5. Add, modify, or delete any existing or new system point.
6. Command, change setpoint, enable or disable any system point.

7. Program and load custom control sequences as well as standard energy management programs.

C. Functions of the portable operator's terminal connected to any application-specific controller:

1. Provide connection capability at either the ASC or a related room sensor to access controller information.
2. Provide status, setup, and control reports.
3. Modify, select, and store controller data base.
4. Command, change setpoint, enable or disable any controller point.

2.8 OPERATOR WORKSTATION SOFTWARE

A. Basic interface description:

1. Operator workstation interface software shall use English-language prompting, English-language point identification, and industry standard PC application software. The software shall provide, as a minimum, the following functions.

a. Graphical viewing and control of environment.
b. Scheduling and override of building operations.
c. Collection and analysis of historical data.
d. Definition and construction of dynamic color graphic displays.
e. Editing, programming, storage, and downloading of controller databases.

2. Provide a graphical user interface which shall use a mouse or similar pointing device and "point and click" approach to menu selection. Users shall be able to start and stop equipment or change setpoints from graphical displays with the pointing device.

a. Provide that all operations can also be performed using the keyboard as a backup interface device.
b. Provide at least 10 special function keys to perform often-used operations.

3. The software shall provide multi-tasking that allows the user to run several applications simultaneously. The mouse shall be used to quickly select and switch between multiple applications. This shall be accomplished through the use of Microsoft Windows or similar industry standard software that supports concurrent viewing and controlling of systems operations.
4. Multiple-level password access protection shall be provided to allow the user manager to limit workstation control, display, and data base manipulation capabilities.
5. Software shall allow the operator to perform commands including, but not limited to, the following:

a. Start up or shut down selected equipment
b. Adjust setpoints
c. Add/modify/delete time programming
d. Enable/disable process execution
e. Lock/unlock alarm reporting for points
f. Enable/disable totalization for points
g. Enable/disable trending for points

h. Override PID loop setpoints
i. Enter temporary override schedules
j. Define holiday schedules
k. Change time/date
l. Automatic daylight savings time adjustments
m. Enter/modify analog alarm limits
n. Enter/modify analog warning limits
o. View limits
p. Enable/disable demand limiting for each meter
q. Enable/disable duty cycle for each load

6. Reports shall be generated and directed to either CRT displays, printers, or disk. As a minimum, the system shall allow the user to easily obtain the following types of reports:

a. A general listing of all points in the network
b. List of all points currently in alarm
c. List of all points currently in override status
d. List of all disabled points
e. List of all points currently locked out
f. DDC controller trend overflow warning
g. List all weekly schedules
h. List of holiday programming
i. List of limits and deadbands

B. Scheduling:

1. Provide a graphical spreadsheet-type format for time-of-day scheduling and overrides of building operations. Provide the following spreadsheet graphic types as a minimum:

a. Weekly schedules
b. Zone schedules
c. Monthly calendars

2. Weekly schedules shall be provided for each building zone or piece of equipment with a specific occupancy schedule. Each schedule shall include columns for each day of the week as well as holiday and special day columns for alternate scheduling on user-defined days. Equipment scheduling shall be accomplished by simply inserting occupied and unoccupied times into appropriate information blocks on the graphic. In addition, temporary overrides and associated times may be inserted into blocks for modified operating schedules. After overrides have been executed, the original schedule will automatically be restored.
3. Provide zone schedule for each building zone. Each schedule shall include all commandable points residing within the zone. Each point may have a unique schedule of operation relative to the zone's occupancy schedule, allowing for sequential starting and control of equipment within the zone. Scheduling and rescheduling of points may be accomplished easily via the zone schedule graphic.
4. Monthly calendars for a 24-month period shall allow scheduling of holidays and special days in advance. Holidays and special days shall be user-selected with the pointing device and shall automatically reschedule equipment operation as previously defined on the weekly schedules.

C. Collection and analysis of historical data:

1. Trending capabilities shall allow the user to easily monitor and preserve records of system activity over an extended period of time. Any system point may be trended automatically at time-based intervals or changes of value, both of which shall be user-definable. Trend data may be stored on hard disk for future diagnostics and reporting.
2. Trend data report graphics shall allow the user to view all trended point data. Reports may be customized to include individual points or predefined groups of at least 6 points. Provide additional functionality to allow any trended data to be transferred easily to an off-the-shelf spreadsheet package. This shall allow the user to perform custom calculations such as energy use, equipment efficiency, and energy costs and shall allow for generation of these reports on high-quality plots, graphs, and charts.

D. Dynamic color graphic displays:

1. Color graphic floor plan displays and system schematics for each piece of mechanical equipment, including air-handling units, chilled water systems and hot water boiler systems, shall be provided as indicated in the point I/O summary to optimize system performance analysis and speed alarm recognition.
2. The operator interface shall allow users to access the various system schematics and floor plans via a graphical penetration scheme, menu selection, or text-based commands.
3. Dynamic temperature values, humidity values, flow values, and status indication shall be shown in their actual respective locations and shall automatically update to represent current conditions without operator intervention.
4. The environment of the PC operator workstation shall allow the user to simultaneously view several graphics at a time to analyze total building operation or to allow the display of a graphic associated with an alarm to be viewed without interrupting work in progress.
5. Graphic generation software shall allow the user to add, modify, or delete system graphic displays.

E. System configuration and definition:

1. All temperature and equipment control strategies and energy management routines shall be definable by the operator. System definition and modification procedures shall not interfere with normal system operation and control.
2. The system shall be provided complete with all equipment and documentation necessary to allow an operator to independently perform the following functions:

    a. Add/delete/modify DDC panel
    b. Add/delete/modify operator workstations
    c. Add/delete/modify application-specific controllers
    d. Add/delete/modify any points type and all associated parameters and tuning constants
    e. Add/delete/modify alarm reporting definition for points
    f. Add/delete/modify control loops
    g. Add/delete/modify energy management applications
    h. Add/delete/modify time and calendar-based programming
    i. Add/delete/modify totalization for points
    j. Add/delete/modify historical data trending for points
    k. Add/delete/modify custom control processes
    l. Add/delete/modify all graphic displays, symbols and cross-reference to point data
    m. Add/delete/modify dial-up telecommunication definition

n. Add/delete/modify all operator passwords
o. Add/delete/modify alarm messages

F. Additional workstation software:

1. Automatic communications shall include the following features as a minimum:

a. Manual communication from the workstation to remote networks shall be accomplishable using only a mouse to select and request the desired remote connection.
b. Alarms shall automatically communicate with the workstation for display at the terminal and for hard-copy printout at the associated event printer.
c. Alarms shall, at the operator's option, communicate with a stand-alone printer to provide for real-time alarm printouts even when the workstation is off-line (such as when it is being used to run operator-selected third party software).
d. Trend data shall be scheduled for automatic updating to the workstation at operator-selected times. The operator shall also have the option of manually collecting trend data at any time.

PART 3 - EXECUTION

3.1 HARDWARE AND SOFTWARE INSTALLATION

A. Install the control system in accordance with manufacturer's instructions, complete and operating as shown and specified.

B. See drawings for the level of controller required for each type system control.

3.2 TESTS

A. Installer shall test, calibrate, and adjust the new and refurbished parts of the system and perform final field test. Engineer shall witness tests.

B. Final field test:

1. Sensors: Cross-check each sensor by comparing the reading at the sensor to a standard traceable to the National Institute of Standards and Technology (NIST).
2. Control points: Cross-check each control point by comparing the control command to the field-controlled device.
3. Verify that systems are operable from local controls in the specified failure mode upon panel failure or loss of power.
4. Submit test results as required in "Submittals" in Part 1 above.

C. Compliance inspection: Schedule compliance inspection only after installer has conducted all the test operations required above and successfully completed them, as substantiated by the required submittals. Conduct the compliance inspection with the Owner's designated representative and the Engineer. Conduct each activity described on the "Compliance Inspection Checklist" attached at the end of this Section. When each activity is satisfactorily completed, the Owner's representative (user) and the Engineer (A/E) will initial and date the line provided on the checklist.

1. If any item on the checklist cannot be complied with, submit a written explanation.
2. Complete the checklist and submit as required in "Submittals" in Part 1.

3.3 OPERATING INSTRUCTIONS

A. Coordinate instruction period with requirements of Section 230500.

B. Provide competent instructors to give full instruction to designated personnel in the adjustment, operation, and maintenance of the system installed, rather than a general training course. Instructors shall be thoroughly familiar with all aspects of the subject matter they are to teach. Training shall be held during normal work hours of 8:00 a.m. to 4:30 p.m. weekdays as follows:

C. Provide two 8-hour days of training for Owner's operating personnel. Training shall include:

1. Explanation of drawings, operations, and maintenance manuals.
2. Walk-through of the job to locate control components.
3. Operator workstation and peripherals.
4. DDC panel and ASC operation/function.
5. Operator control functions including graphic generation and field panel programming.
6. Operation of portable operator's terminal.
7. Explanation of adjustment, calibration, and replacement procedures.

D. Provide 4 hours of additional training quarterly for a period of one year from final completion of the project.

E. The Owner may require personnel to have more comprehensive understanding of the hardware and software. Additional training shall be available from the installer, after completion of the work of the project. Provide description of available local and factory customer training.

END OF SECTION 230923
Compliance Inspection Checklist follows Section

COMPLIANCE INSPECTION CHECKLIST

Project: _____

_____

_____

_____

1. Manually generate an alarm at a remote DDC panel to demonstrate the capability of the workstation and alarm printer to receive alarms within 5 seconds.

   User_____ Date_____ A/E_____ Date_____

2. Disconnect an operator workstation in the central control room and manually generate an alarm at a remote DDC panel to demonstrate the capability of the system printer to receive alarms when the workstation is disconnected from the system.

   User_____ Date_____ A/E_____ Date_____

3. Disconnect one DDC panel from the network to demonstrate that a single device failure shall not disrupt or halt peer-to-peer communication. Panel to be disconnected shall be selected by the Engineer.

   User_____ Date_____ A/E_____ Date_____

4. At a DDC panel of the Engineer's choice, display on the portable operator's terminal:

   a. At least one temperature setpoint and at least one status condition, (for example, on or off for a system or piece of equipment attached to that panel), as well as for points at another DDC panel on the network.
   b. The diagnostic results as specified for a system or piece of equipment attached to that panel as well as for a system or piece of equipment attached to another DDC panel.
   c. The ability to add a new point to the DDC panel with the POT and have it automatically uploaded to the workstation to modify that panel's stored database.

   User_____ Date_____ A/E_____ Date_____

5. At an ASC of the Engineer's choice, disconnect the LAN connection to demonstrate its lack of reliance on a DDC panel to maintain full control functionality.

   User_____ Date_____ A/E_____ Date_____

END OF CHECKLIST

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SECTION 232113 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Pipe

B. Fittings

C. Dielectric fittings.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Control valves: Section 230908.

1.3 RELATED SECTIONS

A. Piping installation, and testing: Section 230500.

B. Pipe cleaning and water treatment: Section 232500.

C. Control valves: Section 230908.

D. Instrumentation and control devices: Section 230913.

1.4 REFERENCES

A. Steel piping and fittings:

1. ASME B 16.3: Malleable Iron Threaded Fittings
2. ASME B 16.9: Factory-Made Wrought Steel Butt Welding Fittings
3. ASME B 16.39: Malleable Iron Threaded Pipe Unions: Classes 150, 250, and 300
4. ASTM A 53/ A 53M: Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
5. ASTM A 536: Standard Specification for Ductile Iron Castings

B. Copper piping and fittings:

1. ASME B 16.18: Cast Copper Alloy Solder Joint Pressure Fittings
2. ASME B 16.22: Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
3. ASTM B 75/ B75M: Standard Specification for Seamless Copper Tube
4. ASTM B 88: Standard Specification for Seamless Copper Water Tube
5. ASTM B 584: Standard Specification for Copper Alloy Sand Castings for General Applications

C. Flanges:

1. ASME B 16.5: Pipe Flanges and Flanged Fittings, NPS 1/2 to NPS 24

1.5 SUBMITTALS

A. Product data:

1. For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

a. Pipe.
b. Fittings.
c. Dielectric fittings.

2. Submit a single manufacturer for each product. Submittals that include multiple manufacturers for a single product are not acceptable.

B. Product application schedule: Provide a schedule of hydronic system types, pipe size ranges, and associated piping material and fitting types for use on each system.

1.6 QUALITY ASSURANCE

A. Pipe shall be certified by the manufacturer to meet referenced standards and shall bear a label, directly on the pipe, indicating compliance.

B. Date stamp all castings used for coupling housings for quality assurance and traceability.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Dielectric fittings:

1. Anvil International
2. Elster Perfection Corporation
3. Precision Plumbing Products, Inc.
4. Sioux Chief Manufacturing Company, Inc.
5. Victaulic Company of America

2.2 PIPE

A. Steel: Black steel, ASTM A 53, Grade B, Type E (electric resistance welded), Schedule 40.

B. Copper: ASTM B 88, Type L hard drawn.

2.3 FITTINGS

A. General requirements for fittings:

1. Elbows in piping NPS 4 (DN 100) and larger shall be long radius type.

B. Welded and flanged fittings for steel pipe:

1. Welded fittings:

a. Steel, 150 psi (1030 kPa), ASME B16.9,
b. Basis of design: Bonney Forge, Hackney Ladish, Inc., Penn Machine, The Phoenix Forge Group, Taylor Forge, or Weldbend Corporation.

2. Companion flanges: ASME B16.5, Class 150, welding neck or slip-on type.
3. Gaskets for flanged joints: Cross-laminated long fiber composition suitable for the service, temperature, pressure and liquid with which they come in contact.

C. Threaded fittings for steel pipe:

1. Malleable iron, Class 150, ASME B16.3.

D. Unions for steel pipe:

1. Malleable iron, Class 150, ASME B16.39, ground bronze seats, threaded ends.

E. Cast or wrought fittings for copper pipe:

1. Fittings for plain end copper pipe: Solder joint, cast brass, ASME B16.18; or wrought copper, ASME B16.22.

F. Unions for copper pipe: Either of the following:

1. Brass, Class 150 minimum, metal-to-metal seating, solder-joint ends.
2. Wrought copper, Class 150 minimum, metal-to-metal seating, ASME B16.22, solder-joint ends.

2.4 DIELECTRIC FITTINGS

A. Dielectric nipples:

1. General: Completely isolate dissimilar metals so that electric current is below 1 percent of the galvanic current which would exist with metal-to-metal contact. Gaskets approved for the medium carried by the piping system.
2. Dielectric nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain or threaded ends; and 300-psig (2070-kPa) minimum working pressure at 225 degrees F (107 degrees C).

PART 3 - EXECUTION

3.1 GENERAL

A. Provide piping as indicated on the drawings and in accordance with provisions of Section 230500, Common Work Results for HVAC, and the piping installation schedule at the end of the Section.

B. Provide piping for accessories, equipment, and non-potable fill and drain piping connected to systems with the same piping as is specified for the system unless otherwise indicated.

C. Branches connections at least two nominal pipe sizes less than the main may be made with "Weldolets" or "Thredolets" installed with full size opening in larger pipe and in accordance with manufacturer's printed instructions.

D. Provide boiler trim piping connections to low water cutoffs with crosses instead of tees and elbows. Plug the unused openings of crosses to serve as cleanouts. Provide boiler blowdown piping with shut off valve to discharge into drain.

E. Instrumentation and control devices:

1. Install control valves furnished under Section 230908, Control Valves.

3.2 DIELECTRIC FITTINGS

A. Provide dielectric nipples between copper and steel piping or equipment connections.

B. Provide dielectric flanges with isolation sleeves for bolts and isolation washers on each side of flanged connection at flanged points of connection between ferrous piping and copper piping.

3.3 SCHEDULES

HEATING AND COOLING PIPE INSTALLATION SCHEDULE
(Contractor has option where more than one x appears on a line)

	A	B	C	D
Heating water	X	X	X	X
Chilled water	X	X	X	X

A. Steel pipe with threaded fittings; NPS 2 (DN 50) and smaller.
B. Steel pipe with welded or flanged fittings; NPS 2.5 (DN 65) and larger.

C. Copper pipe with cast or wrought fittings; NPS 2 (DN 50) and smaller.
D. Copper pipe with cast or wrought fittings; NPS 2.5 (DN 65) and larger.

END OF SECTION 232113

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SECTION 232115 - PREFABRICATED INSULATED PIPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Insulated piping for underground installation, factory-designed and completely prefabricated.

B. Systems:

1. Heating water supply and return
2. Chilled water supply and return

1.2 RELATED SECTIONS

A. General information and piping materials and methods: Section 230500.

B. Underground warning tape: Division 31.

C. Piping: Section 232113.

D. Trenching: Division 31.

1.3 SYSTEM DESCRIPTION

A. Install system with steel pipe for chilled and heating water supply and return. Contractor shall confirm and match material of existing to remain piping at connection point.

1.4 SUBMITTALS

A. Product data: For each type of prefabricated insulated steam piping and accessory:

1. Include a description, characteristics, materials, composition, finishes, and performance.
2. Include piping, insulation, and jacket materials.
3. Submit a single manufacturer for each product. Submittals that include multiple manufacturers for a single product are not acceptable.

B. Shop drawings: Provide shop drawings at a scale no smaller than 0.25 inch equals 1 foot (1:50), showing layout of piping system and identifying pipe segments and fittings.

C. Certificates:

1. Qualifications of manufacturer's factory-trained technician.
2. Supervising technician's certificate that system has been installed in accordance with manufacturer's recommendations.

1.5 QUALITY ASSURANCE

A. System shall be installed under the supervision of the manufacturer's qualified factory-trained technician.

B. Pipe shall be certified by the manufacturer to meet referenced standards and shall bear a label, directly on the pipe, indicating compliance.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store fitting insulation materials at temperatures between 50 and 70 degrees F (28 and 39 degrees C) until the time of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-design product: Subject to compliance with requirements, provide system manufactured by Perma-Pipe Xtru-therm, no substitutions allowed.

2.2 MATERIALS

A. General: Steel pipe and fitting materials shall comply with requirements of Sections 230500 and 232113.

B. Steel pipe and fittings: ASTM A 53, Grade B, Type E (electric resistance welded), Schedule 40 black steel; with welded fittings.

C. Insulation: Rigid polyurethane, no less than 90 percent closed cell.

1. Density: 1.9 to 2.1 lbs per cubic foot.
2. k Factor: 0.14.
3. Thickness: Nominal 1.5 to 1 inch, manufacturer's standard to meet published tables of heat transfer data.

D. Jacket: ASTM D 1784, PVC, Type I, Grade 1, 0.06 inches thick.

2.3 PREFABRICATED SYSTEM WITH STEEL CARRIER PIPE

A. Factory-designed and completely prefabricated system, including insulated, jacketed pipe and fittings, and accessories.

B. Insulation ends shall be protected with factory-applied moisture barrier.

C. Factory-provided fittings and accessories shall be provided factory-insulated and -jacketed, and sealed for shipment and handling.

D. Manufacturer's standard compatible sealing materials.

PART 3 - EXECUTION

3.1 PREPARATION

A. Piping adjoining the pre-insulated piping shall be anchored at or near the point of connection.

3.2 INSTALLATION

A. Install pre-insulated piping under the supervision of the manufacturer's qualified representative, in accordance with manufacturer's recommendations.

B. Where insulated lengths are cut, seal.

C. Install in trench as indicated on the drawings, on a bed of sand, giving uniform support along entire length.

D. Connect steel piping by butt welding as specified in Section 230500, Common Work Results for HVAC.

E. Immediately after piping is installed in the trench, partially backfill in the middle of each unit, leaving joints exposed for testing.

F. Hydrostatically test piping as required in Section 230500, Common Work Results for HVAC.

G. After tests are successfully completed with no leaks, insulate connections and fittings as required, and hand place and hand tamp backfill in 4-inch layers to at least 12 inches above the top of the insulation. Complete backfilling as specified in Division 31. Do not use tracked or wheeled vehicles for compacting.

H. Submit certificate of manufacturer's representative as required in the article "Submittals" above.

END OF SECTION 232115

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SECTION 232500 - HVAC WATER TREATMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flushing and cleaning of piping systems.

1.2 RELATED SECTIONS

A. Cleaning and disinfecting domestic water system: Division 22.

1.3 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Chemicals and concentrations proposed for system cleaning.

B. Certifications:

1. Names and qualifications of staff proposed to be assigned to the project.
2. List of at least five projects meeting the requirements described in the article "Quality Assurance" below, each with name, address, and telephone number of contact person who can confirm satisfactory installation and operation of the system.
3. Certification that piping systems have been flushed and cleaned according to specifications.

C. Test reports required below for service visits. Submit one copy of each report directly to the Owner, and one to the Architect.

1.4 QUALITY ASSURANCE

A. Water treatment subcontractor shall supervise the cleaning of the piping systems and submit a certificate of compliance with the specification.

1.5 QUALIFICATIONS OF WATER TREATMENT SUBCONTRACTOR

A. Contractor shall engage and the Engineer shall approve an independent water treatment subcontractor, who shall provide the water treatments specified in this section.

B. Is located in the Baltimore/Washington, DC, metropolitan area.

C. Is regularly engaged in providing and servicing systems of similar type and capacity to that installed on this project.

D. Has a record of at least five projects similar to this project in type and size, which have been in place and operating satisfactorily for at least 5 years.

E. Offers 24-hour emergency service.

F. Maintains locally an adequate stock of parts and supplies to service this system and equipment.

G. Have service contracts available.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 FLUSHING AND CLEANING PIPING SYSTEMS

A. Flushing of new piping segments and loops:

1. Do not allow flushing water for new piping to travel through HVAC equipment. Isolate equipment by closing isolation valves and opening bypass valves or by leaving piping disconnected from equipment.
2. Flush new piping after new piping has been completed and prior to connection to existing building systems.
3. Flush new piping segments and loops as the work progresses.
4. Provide a domestic water connection to the new piping at the same size as the largest diameter pipe being flushed or one size smaller, up to a maximum requirement of NPS 1.5 (DN 40).
5. Provide temporary domestic water and drain piping as needed. Remove when flushing is complete.
6. Drain water from the segment or loop low point to a safe location and replace the water at the same rate.
7. Continue until drain water is free from sediment, scale, rust and other foreign substances.
8. Pressure-test new piping, and repair leaks.
9. Clean the piping segment as described below.

B. Chemical cleaning of new piping segments and loops:

1. Do not allow cleaning water for new piping to travel through HVAC equipment. Isolate equipment by closing isolation valves and opening bypass valves or by leaving piping disconnected from equipment.
2. Clean new piping after new piping has been completed and flushed and prior to connection to existing building systems.
3. Clean new piping in segments as work progresses.
4. Fill new piping with a solution of detergent and dispersant to remove dirt, oil, and grease.
5. Provide a temporary circulation pump and temporary power. Remove when cleaning is complete.

6. [Provide temporary piping to create or complete piping loops for steam and steam condensate systems. Provide temporary piping to bypass condensate transfer pumps. Remove temporary piping when cleaning is complete.]
7. Circulate for at least 48 hours.
8. Provide temporary domestic water and drain piping and a temporary source of domestic water as needed. Remove when cleaning is complete.
9. Drain water from the segment or loop low point to a safe location and replace the water at the same rate.
10. Continue until drain water is clean and chemicals are removed.
11. Test drain water and verify pH is the same as the pH of makeup water.
12. Connect piping to equipment and existing building systems.

END OF SECTION 232500

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SECTION 233113 - METAL DUCTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. HVAC metal supply, return, and exhaust ductwork and plenums in pressure classes from -2 to +10 inches w.g. (-500 to +2490 Pa).

B. Shop-fabricated or factory-fabricated ducts and fittings:

1. Single-wall round duct.
2. Double-wall round and flat oval duct.
3. Rectangular double-wall duct.

C. Joint and sealing materials.

D. Air duct leakage testing.

E. Cleaning of existing duct systems.

1.2 RELATED SECTIONS

A. Duct identification: Section 230500.

B. Firestopping: Division 7.

C. Balancing: Section 230593.

D. Insulation: Section 230713.

E. Duct support: Section 233114.

F. Duct accessories: Section 233300.

G. Flexible ducts: Section 233346.

1.3 REFERENCES

A. ACGIH-01: American Conference of Governmental Industrial Hygienists

1. Industrial Ventilation: A Manual of Recommended Practice.

B. ASHRAE

1. ASHRAE Handbook of Fundamentals.

C. ASTM

1. ASTM C 423: Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
2. ASTM C 1071: Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material).
3. ASTM D 1330: Rubber Sheet Gaskets.
4. ASTM E2336: Standard Test Methods for Fire Resistive Grease Duct Enclosure Systems
5. ASTM G 21: Determining Resistance of Synthetic Polymeric Materials to Fungi.
6. ASTM G 22: Determining Resistance of Synthetic Polymeric Materials to Bacteria.

D. SMACNA

1. HVAC DCS: SMACNA HVAC Duct Construction Standards, Metal and Flexible.
2. RIDCS: SMACNA Round Industrial Duct Construction Standards.
3. HVAC Air Duct Leakage Test Manual.

E. UL 181: Factory-Made Air Ducts and Air Connectors.

1.4 DEFINITIONS

A. Seam: Joining of two longitudinal (parallel to the direction of airflow) edges of duct surface material. All other duct surface connections are joints.

B. Joints: Transverse joints (perpendicular to the direction of airflow); branch and subbranch intersections; duct collar tap-ins; louver and air terminal connections to ducts; access door and access panel frames and jambs; duct, plenum, and casing abutments to building structures.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

A. The duct system design, as indicated, has been used to select and size air moving and distribution equipment and other components of the air system. Do not change the layout or configuration of the duct system except as specifically approved in writing. Accompany requests for modifications with calculations showing that the proposed design will provide the original design results without increasing system total pressure.

1.6 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Acoustical duct lining, adhesive, and sealants.
2. Factory-fabricated ducts and fittings.
3. Joint and sealing materials.

B. Product application schedules:

1. Schedule of duct systems with applicable pressure classes and leakage classes.

2. Schedule of sealing methods for each type of seam and joint.

C. Shop drawings:

1. Fabrication, assembly, and installation for each duct system: Indicate duct dimensions, sheet metal thickness, reinforcement spacing, and seam and joint construction; and components and attachments to other work.
2. Calculations required as specified in the article “System Performance Requirements” above.
3. Include layout drawings for the entire ductwork system, drawn at the same scale as the contract drawings, except no smaller than 0.125 inch equals one foot.

D. Test reports: Air Duct Leakage Test Summary: Submit data on forms as indicated in the SMACNA HVAC Duct Leakage Test Manual. (See sample form at end of section.)

1.7 QUALITY ASSURANCE

A. Specified and scheduled duct construction exceeds SMACNA requirements. Comply with specifications and schedules, and for materials or methods not specified or scheduled, comply with SMACNA HVAC DCS and RIDCS.

B. Comply with NFPA 90A and 90B.

C. Where shop-fabricated ductwork and fittings are permitted, products shall meet or exceed the quality of material, quality of construction, and performance of the basis of design factory-fabricated product.

D. Where shop-fabricated ductwork and fittings are proposed, contractor shall provide a listing of ten comparable projects completed within the last five years using shop-fabricated ductwork and fittings of the type proposed as evidence of quality and performance.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Basis-of-design products: Subject to compliance with requirements, provide specified or noted products, or comparable product by one of the following:

1. Factory-fabricated ducts and fittings:

a. Eastern Sheet Metal
b. Hamlin Sheet Metal
c. LaPine Metal Products
d. Linx Industries
e. McGill Airflow Corp.
f. MKT Metal Manufacturing
g. Phoenix Metals
h. Semco Mfg. Inc.
i. SPIRAmir

2. Manufactured joint connectors:

    a. Ductmate Industries

B. Special use ducts and fittings: Scheduled manufacturers and named products are intended to set a standard for materials, quality of construction, and performance.

2.2 MATERIALS

A. Metal sheets:

1. Galvanized steel sheets: Lock-forming quality, ASTM A 653/A 653M, coating designation G90 (Z275).

B. Tie rods: Galvanized steel, minimum diameter 0.25 inch (6 mm) for ducts up to 36 inches (900 mm); 0.375 inch (9 mm) for ducts over 36 inches (900 mm).

2.3 SHOP-FABRICATED OR FACTORY-FABRICATED DUCTS AND FITTINGS

A. Single-wall, rectangular duct and fittings:

1. Fabricate according to SMACNA HVAC DCS.

B. Single-wall, flat lock longitudinal-seam round duct and fittings:

1. Fabricate according to SMACNA HVAC DCS.
2. Seam: Flat lock; snap-lock seam not permitted.

C. Single-wall, spiral round duct and fittings for concealed applications: Provide the following construction unless otherwise indicated for special applications,

1. Material: Galvanized steel.
2. Seams: Spiral lock seam.
3. Joint basis of design: Round fittings, McGill Airflow “Uni-Seal” fittings, lap and riveted/screwed and sealed.
4. Fittings for branch connections shall be conical type.
5. Centerline radius of elbows shall be 1.5 times the diameter.
6. Duct access door basis of design: Type AR-W.
7. Basis of Design: McGill Airflow “Uni-Seal” spiral duct with “Uni-form” fittings.

D. Single-wall, spiral round duct and fittings:

1. Material: Galvanized steel.
2. Seams: Spiral lock seam.
3. Joints:

    a. Basis of Design: Round fittings, McGill Airflow “Uni-Seal” fittings.
    b. Basis of Design: McGill Airflow “”Uni-gasket” fittings.

4. Fittings for branch connections shall be conical type.
5. Centerline radius of elbows shall be 1.5 times the diameter.
6. Duct access door basis of design: Type AR-W.
7. Basis of Design: McGill Airflow "Uni-Seal" spiral duct with "Uni-form" fittings.

Single-Wall Round Duct Minimum Metal Thickness	
Duct Element	Steel Gauge
Ducts up to 14 inches diameter	26
Ducts 15 through 26 inch diameter	24

E. Double-wall, insulated, spiral round and flat oval duct and fittings:

1. Walls: galvanized steel, inner duct perforated.
2. Construction: Spiral lock seam.
3. Insulation: Fiberglass, coated to prevent particles from penetrating the fiberglass, resistance to microbial growth of fungi in accordance with ASTM G 21 and bacteria in accordance with ASTM G 22, maximum 1.5 pounds per cubic foot density, 1 inch thick.
4. Dimensions indicated on the drawings are outside duct dimensions.
5. Basis of Design: McGill Airflow Corporation "Acousti-K27."

F. Double-wall, insulated rectangular ducts and fittings:

1. Dimensions indicated on the drawings are the outside dimensions of the duct.
2. Thermal conductivity: 0.26 at 75 degrees F (0.037 at 24 degrees C) mean temperature.
3. Outer shell: Galvanized steel, 22 gauge, Pittsburgh lock construction, with "TDC" end connectors.
4. Insulation: Fiberglass, coated to prevent particles from penetrating the fiberglass, resistance to microbial growth of fungi in accordance with ASTM G 21 and bacteria in accordance with ASTM G 22, maximum 1.5 pounds per cubic foot density, 1 inch thick.
5. Inner liner: Perforated galvanized steel sheet, 22 gauge, Pittsburgh lock construction.
6. End connections: Manufactured joint connectors.
7. Basis of Design: McGill Airflow "Rectangular-k27"

2.4 JOINT AND SEALING MATERIALS

A. Flexible joint material for connections to vibrating equipment: Specified in Section 233300, Duct Accessories.

B. Duct joint and seam sealants: UL classified, fire-resistive, conforming to NFPA 90A and 90B, high pressure type (up to 10 inches (2490 Pa) SMACNA pressure class), the following products are the basis of design:

1. Indoor application: Hardcast "Iron Grip" (IG-601) brush-on water-based vinyl acrylic sealing mastic.
2. Outdoor application:

a. Hardcast “Versa-Grip” (VG-102) brush-on indoor/outdoor water-based polyester/synthetic resin sealant with UV inhibitors.
b. Hardcast “Aluma-Grip” (AFT-701) pressure sensitive sealant on a roll. Two-mil (0.05-mm) aluminum foil backing, peel-off release liner, 33-mil (0.8-mm) modified elastomeric butyl sealant (100 percent solids). To be used outdoors only.

3. Silicone sealant (clear): Dow Corning 795, ASTM C920, Type S, Grade NS, Class 25, single component, indoor/outdoor application, UV resistive.
4. Flange gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

PART 3 - EXECUTION

3.1 COORDINATION

A. Before fabricating ductwork, make field measurements and coordinate layout of ductwork shown on the drawings with building components and work of other trades. Resolve conflicts and obtain written approval for deviations before fabrication or buying ductwork.

B. Provide for and install control dampers, manual volume dampers, backdraft dampers, smoke dampers, thermometers, coils, sound attenuators, duct accessories and similar equipment furnished under this or other sections of the specifications.

C. Coordination with other work:

1. Wall, partition, ceiling, and floor penetrations:

a. Penetrations with fire dampers, smoke dampers, or fire/smoke dampers: Connect ductwork to the damper in accordance with the damper listing after the damper installation is complete. Do not install the ductwork through the wall.
b. Penetrations with fire dampers, smoke dampers, or fire/smoke dampers:

(1) Fill void between the architectural element and the duct with mineral wool.
(2) Provide metal trim angles around the perimeter of the rectangular duct.
(3) Provide a slip on flange around the perimeter of round or flat oval ducts.

2. Exterior wall penetrations: Flash ducts passing through exterior walls as detailed on the drawings.
3. Louvers: Slope ductwork down toward the louver. Provide connections as indicated below:

a. Ductwork connection full size of louver: Provide angles, flanges, or damper collars as required to connect the ductwork to the louver.
b. Ductwork connections smaller than the full size of the louver: Blank off any unused portion of the louver with double-wall insulated metal panels with metal faces constructed of the same material as the connecting duct, and 1.5 inch (38 mm) thick minimum fiberglass insulation. Seal edges of panel insulation with sheet metal channels. Connect ductwork to insulated metal panel with using angles or flanges.
c. Damper connection to louver: Provide metal angle or channel frames as required for mounting ATC dampers and manual dampers to louvers.

4. Electrical panels and equipment:

    a. Do not install ductwork over electrical panels and equipment unless otherwise indicated.
    b. Where ductwork must be installed over electrical panels and equipment, provide aluminum sheet metal drain troughs under piping with drains piped to a safe location.

5. Accessories with frames: Where ATC dampers and other accessories with frames are mounted in ductwork, connect ductwork to frames in a manner to provide 100 percent free area for air passage. Seal ductwork connections to frames with gaskets or duct sealant. Secure connections with pop rivets or sheet metal screws spaced no more than 3 inches (75 mm) on centers around both sides of entire frame.
6. Fire suppression systems: Coordinate with fire suppression system sprinkler systems where required in dust collecting, paint spray booth exhaust, and Type I kitchen hood exhaust systems.

D. Remove, add, and modify existing hangers and supports to coordinate with new work and support existing to remain elements.

3.2 INSTALLING METAL DUCTWORK

A. Dimensions indicated on drawings are outer dimensions of ducts. Dimensions indicated for double-wall ducts are outer dimensions of outer wall.

B. Construct ductwork using the Duct Construction Schedule on the drawings. Schedule includes duct system pressure class requirements, minimum sheet metal gauges, leakage allowances, and maximum reinforcement spacing. These requirements exceed the requirements of SMACNA HVAC DCS. Engineered duct systems using metal gauges or reinforcing less than required in the schedules on the drawings are not acceptable.

C. Material: Construct ductwork of galvanized steel, except where another material is noted on drawings or specified.

D. Joints: Provide one of the following duct joints, except where other criteria are noted on the drawings or specified. Snap-lock or flat-lock seams are not acceptable.

1. Joint connections constructed in accordance with SMACNA HVAC DCS,
2. Manufactured duct connection system basis of design: Ductmate Industries “Ductmate,” selected to assure compliance with leakage factors indicated on the drawings.

E. Where specific materials and seam and joint construction are specified for a specific application, all ductwork carrying any concentration of air for that application, no matter how dilute, shall be constructed according to the requirements of the application.

F. Provide duct systems complete with built-in accessories as specified herein, in other sections of the specifications, as indicated on the drawings, and, where not otherwise indicated, in accordance with SMACNA HVAC DCS.

G. Thoroughly clean duct and duct fittings before they are installed, and keep them clean until the acceptance of the completed work. Use a duct cap cover on all unfinished ends to prevent moisture, dirt particles, dust, and debris from entering the installed ductwork during construction.

H. Install metal ductwork neat in appearance. Interior surfaces shall be smooth and free of obstructions. Duct lines shall be true and smooth.

I. Except in systems with minimum velocity standards, contractor has the option to eliminate reducing transitions and extend ductwork full size, providing space is available and conflict with work of other trades does not occur. Systems with minimum velocity standards include the following:

1. Type 1 kitchen hood exhaust
2. Laundry dryer exhaust
3. Fume hood exhaust
4. Paint spray booth exhaust
5. Dust collecting
6. Welding exhaust.

J. Make bends and turns in ductwork using offsets and curved or square elbows as indicated on the drawings. Provide full radius elbows (centerline radius equals 1.5 times duct width). Provide turning vanes in square elbows. Make 90-degree branch duct connections using 45-degree entry fittings unless otherwise indicated.

K. Generally, it is intended that horizontal ductwork be a minimum of 10 inches (255 mm) above suspended ceiling (where applicable) to allow removal of ceiling panels and ceiling-mounted light fixtures and devices. Coordinate duct installation to achieve that clearance wherever possible.

L. Unless otherwise indicated, exposed ductwork shall be mounted as high as possible.

M. Brace large ductwork connected to fans and air-handling units with metal angles to prevent vibration and duct damage, and to reduce noise.

N. Construct gravity duct systems (nonfan-powered), such as pressure relief ducts and transfer ducts, in accordance with SMACNA HVAC DCS minimum one inch pressure class unless otherwise scheduled.

O. Cross break or bead ducts of dimensions of 12 inches (305 mm) and over in pressure classes under 2 inches (500 Pa).

P. Where ducts will be exposed, remove labels and clean surfaces. Where required, prepare surface for painting.

Q. Single-wall plenums, casings, and access doors: Construct in accordance with SMACNA HVAC DCS.

R. Install control dampers furnished under Section 230907, Control Dampers.

3.3 INSTALLING ROUND AND FLAT OVAL DUCT

A. Provide round and flat oval single-wall and double-wall ductwork where indicated on plans.

B. Assemble spiral round and flat oval ducts and fittings using duct sealant and sheet metal screws as recommended by the manufacturer.

C. Single-wall ductwork:

1. Exposed: Spiral round duct and fittings unless otherwise indicated.
2. Pressure class 3.0 inches w.g. or greater: Spiral round duct and fittings unless otherwise indicated.
3. Serving other than a single diffusers: Spiral round duct and fittings unless otherwise indicated.
4. Concealed, pressure class of 2.0 inches w.g. or less and serving a single air outlet: Longitudinal-seam duct and fittings.

D. Double-wall ductwork: Provide insulated spiral round duct and fittings with perforated inner liner and solid outer wall.

3.4 SEALING DUCTWORK

A. Seal all longitudinal and transverse joints, seams, and connections with the following exceptions:

1. Sealant may be omitted from welded joints and seams provided duct leakage is within the required tolerance.
2. Sealant may be omitted from locking-type joints and seams (other than snap-lock and button-lock) in ductwork with a pressure class below 2 inches of water column (500 Pa) where permitted by code requirements and provided duct leakage is within the required tolerance.

B. Sealing leakage performance: Seal ductwork to meet duct leakage factors scheduled on the drawings.

C. Sealing procedures:

1. Prior to sealing, ductwork shall be clean and dry, free of oil or grease.
2. Apply sealant in accordance with the manufacturer’s recommendations.
3. Allow time for sealant to dry or cure, in accordance with manufacturer’s recommendations, before leak testing.

D. Sealant material:

1. Galvanized steel ductwork: Brush-on or pressure sensitive sealant, as applicable.

3.5 AIR DUCT LEAKAGE TESTS

A. Continuously examine ductwork during construction to ascertain that it is sealed properly.

B. General test procedures:

1. Leakage test procedures shall be in accordance with SMACNA Leakage Test Manual.

2. After installation and prior to insulating, test all ductwork for air leakage. Ducts to be tested, test pressures, and leakage factors (maximum volume of leakage per 100 square foot (9.3 square meter) of duct surface area) shall be as scheduled on the drawings.
3. The ductwork quantity to be tested exceeds SMACNA leakage test manual recommendations.
4. Conduct tests before any equipment is connected that would be subject to damage from the test pressure. Provide temporary blank-offs or caps.
5. Notify parties whose presence is necessary for the test; and in all cases, the Architect and testing and balancing subcontractor in writing at least two normal work days prior to the actual test.
6. While system is under test pressure, survey joints for audible leaks. Mark leakage points, shut down blower, and make repairs. Retest after duct sealant has dried or cured.
7. If test duct sections exceed the allotted leakage levels, locate sources of leakage, make repairs and repeat test procedures until acceptable leakage levels are demonstrated.

3.6 CLEANING EXISTING SYSTEMS

A. Use service openings, as required, for physical and mechanical entry and for inspection.

1. Use existing service openings where possible.
2. Create new openings to comply with duct cleaning standards as required to accomplish proper cleaning.
3. Disconnect flexible ducts as needed for cleaning and inspection.
4. Remove and reinstall ceiling sections to gain access during the cleaning process.

B. Mark position of dampers and air-directional mechanical devices before cleaning, and restore to their marked position on completion.

C. Particulate collection and odor control:

1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron size (or larger) particles.
2. When venting vacuuming system to the outside, use filtration to contain debris removed from HVAC system, and locate exhaust down wind and away from air intakes, doors, and other points of entry into building.

D. Clean the following metal duct systems by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Return-air ducts, dampers, and actuators.
3. Supply-air ducts, dampers, actuators, and turning vanes.
4. Dedicated exhaust and ventilation ductwork and components.

E. Mechanical cleaning methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.

3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Provide operative drainage system for washdown procedures.
6. Biocidal agents and coatings: Apply biocidal agents if fungus is present. Apply biocidal agents according to manufacturer's instructions after removal of surface deposits and debris.

F. Cleanliness verification:

1. Verify cleanliness after mechanical cleaning and before application of treatment, including biocidal agents and protective coatings.
2. Visually inspect metal ducts for contaminants.
3. Where contaminants are discovered, re-clean and reinspect ducts.

END OF SECTION 233113
Leakage test form follows Section

PROJECT NAME _____ PROJECT NO. _____ PAGE _____ OF _____

AIR DUCT LEAKAGE TEST SUMMARY

AIR SYSTEM _____ LEAKAGE CLASS (GL) _____

FAN CFM (Q) _____ SPECIFIED TEST PRESSURE (Pt) _____

DUCT CONSTRUCTION PRESSURE CLASS (P_c) _____

DESIGN DATA				FIELD TEST DATA RECORD							
SUBJECT DUCT	SURFACE AREA (FT^2)	ALLOWABLE LEAKAGE		DIAMETER		PRESSURE "W.G."		DATE	PERFORMED BY	WITNESSED BY	ACTUAL CFM
		FACTOR (CFM/100 FT^2)	CFM (TEST SECTION)	ORIFICE	TUBE	DUCT	ACROSS ORIFICE				
TOTAL SYSTEM											
TEST SECTION(S)											

SECTION 233114 - HANGERS AND SUPPORTS FOR DUCTWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Duct hangers and supports.

B. Trapeze duct hangers.

C. Metal framing systems.

D. Fasteners.

1.2 RELATED SECTIONS

A. HVAC Duct Insulation: Section 230713.

1.3 REFERENCES

A. ASTM International

1. ASTM A 307: Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
2. ASTM A 492: Standard Specification for Stainless Steel Rope Wire
3. ASTM A 603: Standard Specification for Metallic-Coated Steel Structural Wire Rope
4. ASTM F 3125: Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated

B. American Welding Society

1. AWS-D.1.1: Structural Welding – Steel

C. Metal Framing Manufacturer’s Association

1. MFMA-4: Metal Framing Standards Publication
2. MFMA-103: Guidelines for the Use of Metal Framing

D. Manufacturer’s Standardization Society

1. MSS SP-58: Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation.

E. SMACNA

1. HVAC Duct Construction Standards - Metal and Flexible

1.4 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Hangers and supports.
2. Fasteners.

B. Product application schedule: Include the following:

1. Provide a schedule of building attachment types and associated attachment hardware.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Metal framing systems:

1. Anvil International
2. PHD Manufacturing, Inc.
3. PHP Systems/Design
4. Unistrut

2.2 HANGERS AND SUPPORTS

A. General: Comply with requirements of SMACNA's HVAC Duct Construction Standards - Metal and Flexible.

B. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

C. Threaded rod: Continuously threaded, size and spacing in compliance with SMACNA's HVAC Duct Construction Standards - Metal and Flexible.

1. Zinc-plated or galvanized carbon steel for indoor applications.
2. Stainless steel for outdoor and corrosive applications.

D. Nuts and washers: Provide the same material used for threaded rods.

E. Straps: Match duct material, size and spacing in compliance with SMACNA's HVAC Duct Construction Standards - Metal and Flexible.

F. Steel cables:

1. Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A603.
2. Cable End Connections: Galvanized-steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

G. Metal framing systems:

1. Description: Shop- or field-fabricated, duct-support assembly made of channels, nuts, bolts, structural connections, accessories, fittings, and other manufactured components including brackets and braces required to resist lateral loads.
2. Standard: Comply with MFMA-4 for factory-fabricated components for field assembly.
3. Channels: Continuous slotted steel channel with inturned lips, width selected for applicable load criteria.
4. Channel Nuts: Formed or stamped nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
5. Zinc-plated or galvanized carbon steel for indoor applications.
6. Stainless steel for outdoor and corrosive applications.

H. Duct attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

I. Guying and bracing materials:

1. Provide galvanized steel cable and guying tensioners and/or galvanized steel angle to provide any required guying and bracing where forces on exterior ductwork are beyond the capability of the associated metal framing system and its attachment to structure.

2.3 FASTENERS

A. Mechanical expansion anchors:

1. Self-drilling type expansion shields or machine bolt drop-in anchors for drilled holes. Fasteners to floor slabs shall be vibration and shock resistant. Load applied to fasteners shall not exceed 25 percent of manufacturer's stated load capacity in 3500 psi (24,000 kPa) concrete. Provide zinc-coated anchors for indoor applications and stainless-steel anchors for outdoor applications.
2. Basis of design: ITT Phillips Anchors "Red Head."

B. Bolts, nuts, and washers: ASTM A 307, or ASTM F 3125 where high strength is required.

PART 3 - EXECUTION

3.1 GENERAL

A. Comply with SMACNA's HVAC Duct Construction Standards - Metal and Flexible.

B. Provide hangers, supports, fasteners, and attachments as required to properly support ductwork from the building structure.

C. Provide support complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

D. Hanger Spacing: Comply with SMACNA's HVAC Duct Construction Standards - Metal and Flexible for maximum hanger spacing. Provide hangers and supports within 24 inches (610 mm) of each elbow and within 48 inches (1220 mm) of each branch intersection.

E. Where required, provide structural steel shapes or metal framing system channels and hardware to transfer load from a support location to multiple locations in the structure to get support from an appropriate location or to increase the strength of the connection to the structure.

F. Support horizontal rectangular ductwork from above with trapeze hangers and threaded rod or straps where possible, unless otherwise indicated.

1. Ducts 54 inches (1370 mm) wide and under:

a. Support with trapeze hangers or straps.
b. Strap hangers, where used, shall extend down sides of ducts, and attach to underside with at least two sheet metal screws per strap.

2. Ducts over 54 inches (1370 mm) wide: Support with trapeze hangers.

G. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum interval of 16 feet (5 m).

H. Fabricate wall-mounted and floor-mounted supports using metal framing systems or structural steel where required.

I. Trim threaded rods with a maximum excess length of 1 inch (25 mm). Provide protective rubber red end caps on the ends of threaded rods exposed and within 8 feet (2.4 meters) of the floor, roof, or grade below.

J. Install lateral bracing to prevent swaying.

K. Install supports so that duct loads not be transmitted to connected equipment.

L. Provide trapeze hangers where required to hang ductwork using threaded rod.

1. Weld steel according to AWS D-1.1.
2. Hang with threaded rods.
3. Design trapeze angers and supports based on supported load plus a 50 percent minimum safety factor.

M. Where ductwork is exposed, hang ductwork as follows:

1. Rectangular ductwork:

a. Provide trapeze support.
b. Provide straps where duct dimensions allow.

2. Oval ductwork: Hang according to the manufacturer’s recommendations with one of the following methods.

a. Hang with steel cable.

3. Round ductwork: Hang according to the manufacturer's recommendations with one of the following methods.

a. Hang with steel cable.

N. Ductwork supported from a roof structure:

1. Provide support from rails using a method indicated below:

a. Support with a metal framing system, trapeze supports, and supplemental materials mounted to equipment support rails.

O. Remove, add, and modify existing hangers and supports to coordinate with new work and support existing to remain elements.

3.2 BUILDING ATTACHMENTS

A. Attaching to structural walls:

1. Provide a minimum of two 0.375 inch (9.5 mm) minimum screw-type fasteners for attaching brackets and a minimum of three 0.5 inch (13 mm) minimum bolt-type fasteners for attaching structural supports.

B. Attaching to structural steel beams, channels, or angles:

1. Secure threaded rods to MSS SP-58 Type 20 adjustable beam clamps that are clamped to the bottom flange of steel beams.
2. Secure threaded rods to MSS SP-58 Type 23 beam clamps for beams with maximum flange thickness of 0.75 inch (19 mm).

C. Attaching to concrete slabs and composite slabs:

1. Obtain approval from the structural engineer and confirm allowable loads prior to supporting ductwork from concrete slabs or composite slabs. Where approved, provide one of the following as required:

a. Mechanical expansion anchors and steel bolts or rods.
b. Screws designed for attachment to concrete.
c. Powder actuated fasteners.

D. Attaching to steel decks:

1. Obtain approval from the structural engineer and confirm allowable loads prior to supporting ductwork from steel decks. Where approved, provide screws in the lower plane of corrugated steel decks.

END OF SECTION 233114

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SECTION 233300 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flexible connections.

B. Screens.

C. Manufactured units:

1. Volume extractors.
2. Air turning vanes.
3. Spin-in fittings.

D. Duct access doors.

E. Sound attenuators.

F. Dampers.

G. Constant airflow regulators.

H. Fire dampers.

I. Combination fire/smoke dampers

J. Smoke dampers.

K. Duct clamps.

1.2 RELATED SECTIONS

A. Access doors: Division 08.

B. Diffusers, registers, and grilles: Section 233713.

C. Damper actuators: Automatic temperature control sections.

1.3 REFERENCES

A. AMCA 210: Laboratory Methods of Testing Fans for Rating.

B. ASTM E 477: Test for Measurement of Acoustical and Airflow Performance of Duct Liner Materials and Prefabricated Silencers.

C. ASTM E 2016: Standard Specification for Industrial Woven Wire Cloth.

D. NFPA 90A: Installation of Air Conditioning and Ventilating System.

E. NFPA 90B: Installation of Warm Air Heating and Air-Conditioning Systems.

F. NFPA 701: Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

G. SMACNA-05: Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems.

H. SMACNA HVAC DCS: HVAC Duct Construction Standards, Metal and Flexible.

I. UL 555: Fire Dampers.

J. UL 555C: Ceiling Dampers.

K. UL 555S: Smoke Dampers.

1.4 SUBMITTALS

A. Product data: Each type of duct accessory, included the following:

1. Include rated capacities, operating characteristics, materials, finishes, and furnished specialties and accessories.
2. Include manufacturer's written installation instructions for each type of fire damper, combination fire/smoke damper, and smoke damper.

B. Shop drawings: Detail equipment assemblies and indicate dimensions, loadings, required clearances, method of field assembly, components, locations, and size of each field connection. Detail these accessories:

1. Special fittings and manual and automatic volume damper installations.
2. Fire, combination fire/smoke, and smoke damper installations, including sleeves and duct access doors.

C. Certifications: Certified test data for dynamic insertion loss; sound power levels; airflow performance data, and static pressure loss.

D. Operation and maintenance data: Include operating and maintenance data for the following in the project Operation and Maintenance Manual as specified in Division 01 with supplemental requirements as specified in Section 230101.

1. Dampers.
2. Constant airflow regulators.
3. Fire dampers.
4. Fire/smoke dampers
5. Smoke dampers.

1.5 QUALITY ASSURANCE

A. Work of this section shall comply with NFPA 90A and 90B, and SMACNA HVAC DCS.

1.6 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents and location of intended use. Deliver and store in a location directed by the Owner, or as indicated below.

1. Fusible links: One extra link for every four fire dampers installed in the project, with a minimum of two of each type. Store in the fire sprinkler cabinet, unless otherwise directed.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Products specified by naming one manufacturer and particular product, with no provision for other options: No options or substitutions allowed.

2.2 FLEXIBLE CONNECTIONS

A. Flexible joint fabric: Woven glass fabric with coating, complying with NFPA 701 for fire retardance and NFPA 90A for use in duct systems.

1. For use indoors:

a. Coated with polychloroprene (DuPont "Neoprene"), 30 ounces per square yard (850 g per 0.8 square meter).
b. Basis of design: Ventfabrics "Ventglas."

2. For use outdoors:

a. Coated with DuPont weather-, sunlight- and ozone-resistant "Hypalon," 26 ounces per square yard (732 g per 0.8 square meter).
b. Basis of design: Ventfabrics "Ventlon,"

2.3 SCREENS

A. Bird screen: ASTM E 2016, general industrial-use wire cloth, Grade C, medium light or heavier, nominal 0.5-inch (13-mm) mesh and 0.063-inch (1.6-mm) wire diameter, aluminum or stainless steel.

1. Frame: Removable, rewirable, of same material and finish as the duct or accessory to which it is installed.

2.4 MANUFACTURED UNITS

A. Volume extractors: Hart & Cooley "Vectrol" Type AVLR, with the Young Regulator Co. No. 429 FD end bearing and No. 443-B 3/8-inch operator; or Type VLK, with worm-driven mechanism accessible through face of diffuser or grille with an 18-inch-long removable key operator.

B. Air turning vanes: Double vane type, constructed in accordance with SMACNA HVAC DCS, from the same material as the duct.

C. Spin-in fittings in accordance with SMACNA HVAC DCS are acceptable for a round take-off connection from a rectangular duct, provided they meet the duct pressure classification.

2.5 DUCT ACCESS DOORS

A. Duct access doors for rectangular ducts:

1. Construction: Comply with SMACNA construction standards as a minimum.
2. Door and frame material:

    a. Galvanized steel duct applications: 24-gauge minimum galvanized steel.
    b. Aluminum duct applications: 20-gauge minimum aluminum.
    c. Stainless steel duct applications: 24-gauge minimum stainless steel.

3. Size:

    a. Duct dimension is 18 inches (457 mm) or more: Minimum 16 inches by 16 inches (406 mm by 406 mm).
    b. Duct dimension is less than 18 inches (457 mm): 16 inches (406 mm) by duct size.

4. Continuous piano hinge; number of cam latches to suit door size. Double-pan insulated doors, one inch (25 mm) thick with one inch (25 mm) thick minimum 3.5-pound (56 kg per cubic meter) density fiberglass insulation and compressed into the pan.
5. Perimeter gaskets sealing frame to duct and door to frame, neoprene or foam rubber.
6. As an option, provide round access doors, complete with safety holding cable, 12 inches (305 mm) diameter minimum.
7. Access doors to fire protection devices shall comply with NFPA 90A.
8. Basis of design:

    a. Square or rectangular access doors: Air Balance, Inc., Model FSA or equal by Ruskin, Inc., Airstream Products Company, Inc., or Commercial Acoustics.
    b. Round access doors: Ventfabrics "Ventlok Twist-In."

B. Duct access doors for round and oval ducts:

1. Sandwich style access door, insulated or uninsulated to match ductwork, metal material to match ductwork interior and exterior, rated for operation at pressures up to positive 20 inches w.g. (5,000 Pa) and down to negative 10 inches w.g. (2,500 Pa), threaded fasteners with rotating handles to draw inner and outer pieces of the door together.

2.6 SOUND ATTENUATORS

A. Manufactured by Dynasonic Systems, Inc., Semco, Ruskin Sound Control, Vibro-Acoustics, Commercial Acoustics Division of Metal Form Manufacturing, Aerosonics, or Price; sizes and types shown and scheduled on the drawings. Field fabrication will not be permitted.

B. Materials: The entire attenuator shall be incombustible, moisture-resistant, and odorless.

1. Outer casings: 22 gauge steel, seams lock-formed. Provide galvanized steel where connected to galvanized ductwork, and provide stainless steel elsewhere.
2. Interior baffles: 24 gauge perforated steel. Provide galvanized steel where connected to galvanized ductwork, and provide stainless steel elsewhere.
3. Acoustical filler material: Fiberglass, packed under compression to 4.5 pound density.

C. Units for duct mounting: Outer casing seams mastic-filled; casings leakproof to a pressure differential of 8 inches w.g. (2,000 Pa). Measure static pressure loss in accordance with ANSI/AMCA 210.

D. Acoustical performance for duct-mounted units: Only tests made at an independent testing laboratory will be considered, and the test data must include acoustical performance and generated noise levels at various airflow velocities. Acoustical and pressure drop performance as scheduled on the drawings.

1. Insertion loss: Measured by the "Duct to Reverberation Room" method with airflow.
2. Generated noise: Measured in accordance with ASHRAE 36B Test Method.

E. The same test sample shall have been used for both acoustic and aerodynamic measurement.

2.7 DAMPERS

A. Manual volume dampers:

1. 13 inches (330 mm) and larger in height:

a. Balanced multi-louver, opposed blade with maximum blade width of 8 inches (205 mm), rated for a 1500 feet per minute (7.6 meters per second) minimum duct velocity.
b. Bearing: Corrosion resistant, molded synthetic sleeve type bearing.
c. Control shaft: 0.375-inch (9.5-mm) square minimum.
d. Regulator: Locking type, provide with 2-inch-high (50 mm) minimum base for mounting on externally insulated duct. Where duct insulation is thicker than 2 inches (50 mm), provided a taller base coordinated with the duct insulation.
e. Basis of design:

(1) Damper: Ruskin Model MD 35.
(2) Regulator: Young Regulator Co. Model No. 443B.

2. 12 inches (305 mm) or less in height:

    a. Constructed from 16-gauge metal with hemmed edges, 0.125-inch (3-mm) maximum gap between duct and damper all around.
    b. Control shaft: 0.375-inch (9.5-mm) square minimum.
    c. Regulator: Locking type, provide with 2-inch-high (50 mm) minimum base for mounting on externally insulated duct. Where duct insulation is thicker than 2 inches (50 mm), provided a taller base coordinated with the duct insulation.
    d. End bearing: Fastens to the outside of the duct with screws and prevents air leakage by encasing the rod and bearing with a metal cover and neoprene gasket.
    e. Basis of design:

        (1) Regulator: Young Regulator Co. Model No. 443B.
        (2) End bearing: Young Regulator Co. Model No. 429 FD.

B. Remote cable operated damper control.

1. Slot diffuser type control: Remote damper controller mounts inside the plenum of a slot diffuser. Control system shall provide up to 35 inch-pounds of push/pull torque:

    a. Controller: 14-gauge galvanized-steel rack and pinion controller with positive lock graduations.
    b. Cable: Tensile strength of 265,000 pounds:

        (1) Inner wire: Type 302 stainless-steel wire 0.054 inches in diameter, comply with AMS 5688 J and ASTM A 313.
        (2) Outer wire: 3/16 galvanized steel.

    c. Mounting bracket: 18-gauge galvanized-steel with heat-treated steel self-clinching pem fastener.
    d. Damper cable control: Provide external-mounted damper controller with cable and adjustable lever arm operation, suitable for commercial grade damper.
    e. Basis of design: Young Regulator.

2. Concealed ceiling type control: Remote damper controller with access through a 2.5-inch hole in the ceiling concealed with a cover plate. Control system shall provide up to 35 inch-pounds of push/pull torque:

    a. Finish: Cover plate finish to be selected by Architect.
    b. Controller: 14-gauge galvanized-steel rack and pinion controller with positive lock graduations.
    c. Cable: Tensile strength of 265,000 pounds:

        (1) Inner wire: Type 302 stainless-steel wire 0.054 inches in diameter, comply with AMS 5688 J and ASTM-313-98.
        (2) Outer wire: 3/16 galvanized steel.

    d. Mounting cup and cover plate: 301 zinc cup mounted to ceiling framing member with 3-inch zinc plated cover to be held in by 3/4-inch stainless-steel screws.
    e. Damper cable control: Provide external-mounted damper controller with cable and adjustable lever arm operation, suitable for commercial grade damper.

f. Basis of design: Young Regulator.

2.8 CONSTANT AIRFLOW REGULATORS

A. Adjustable constant airflow regulators with modulating orifices for round duct: Constructed of ABS plastic material to be flame retardant according to UL 94V-0 and safety listed and labeled for heat and visible smoke release according to UL 2043. Perform in the pressure range of 0.2 to 0.8 in. w.g. (50 to 200 Pa) with diameter sizes of 4, 5, 6, 8, and 10 inches to control airflow within 10 percent of rated flow. Field adjustable airflow.

B. Basis of design: American Aldes Model CAR-IIA or Young Regulator Company Model CVR.

2.9 FIRE DAMPERS - CURTAIN STYLE

A. Listed and labeled according to UL 555 for use in dynamic systems.

B. Type for use where a 1.5-hour fire rating is required, and Type for use where a 3-hour fire rating is required.

C. Ratings:

1. Rated for operation at 4,000 feet per minute (20.3 meters per second) and 4” w.g. (995 Pa) static pressure.
2. Fire resistance in accordance with UL 555 for no less than 1.5 hours in barriers rated for 2 hours or less, and no less than 3 hours in barriers rated for more than 2 hours.

D. Blades: Folding, with 100-percent interlocking joints to form a continuous steel curtain when closed. Provide joints with 180 degrees of free movement.

E. Sleeve: Furnish each damper complete with a galvanized steel factory sleeve of length and gauge required for satisfactory installation. Sleeves, angles, and methods of fastening shall meet requirements of manufacturer’s UL-approved installation instructions.

F. Actuator: Constant-force, stainless-steel spring.

G. Fusible links: Replaceable, 165 degrees F (74 degrees C) rated.

H. Frame types:

1. Dampers in rated partitions between non-ducted transfer grilles, or dampers terminating at a ducted wall grille or register: Type A frame, installed within or behind grille or register, access by removal of grille or register.
2. Dampers connected to supply air ductwork: 100 percent free opening, Type C frame with welded-seam housing.
3. Dampers connected to return air or exhaust air ducts: 90 percent free opening, Type B frame with welded-seam housing.

I. Basis of design:

1. 1.5-hour fire rating: Ruskin DIBD2 Series.
2. 3-hour fire rating: Ruskin DIBD23 Series.

2.10 FIRE DAMPERS – MULTIBLADE STYLE

A. Listed and labeled according to UL 555 for use in dynamic systems.

B. Type for use where a 1.5-hour fire rating is required, and Type for use where a 3-hour fire rating is required.

C. Ratings:

1. Rated for operation at 4,000 feet per minute (20.3 meters per second) and 8” w.g. (995 Pa) static pressure.
2. Fire resistance in accordance with UL 555 for no less than 1.5 hours in barriers rated for 2 hours or less, and no less than 3 hours in barriers rated for more than 2 hours.

D. Blades: Double-skin airfoil-shaped blades, with a pressure loss of not more than 0.1 inches w.g. (25 Pa) in full-open position at damper-face velocity of 2,000 feet per minute (10.2 meters per second) for a 36-inch by 36-inch (914 mm x 914 mm) damper.

E. Sleeve: Furnish each damper complete with a galvanized steel factory sleeve of length and gauge required for satisfactory installation. Sleeves, angles, and methods of fastening shall meet requirements of manufacturer’s UL-approved installation instructions.

F. Actuator: Constant-force, stainless-steel spring.

G. Fusible links: Replaceable, adjustable linkage, 165 degrees F (74 degrees C) rated.

H. Basis of design:

1. 1.5-hour fire rating: Ruskin DFD60 Series.
2. 3-hour fire rating: Ruskin DFD60-3 Series.

2.11 COMBINATION FIRE/SMOKE DAMPERS

A. Listed and labeled in accordance with UL 555S and UL 555.

B. Type for use where a 1.5-hour fire rating is required, and Type for use where a 3-hour fire rating is required.

C. Ratings:

1. Rated for operation at 4,000 feet per minute (20.3 meters per second) and 8” w.g. (1,990 Pa) static pressure.
2. Fire resistance in accordance with UL 555 for no less than 1.5 hours in barriers rated for 2 hours or less, and no less than 3 hours in barriers rated for more than 2 hours.

3. Leakage in accordance with UL Standard 555S no higher than Leakage Class I, 8 cfm per square foot maximum at four inches w.g., (40.6 liters per second per square meter maximum at 1 kPa).

D. Blades: Double-skin airfoil-shaped blades, with a pressure loss of not more than 0.1 inches w.g. (25 Pa) in full-open position at damper-face velocity of 2,000 feet per minute (10.2 meters per second) for a 36-inch by 36-inch (914 mm x 914 mm) damper.

E. Sleeve: Furnish each damper complete with a galvanized steel factory sleeve of length and gauge required for satisfactory installation. Sleeves, angles, and methods of fastening shall meet requirements of manufacturer's UL-approved installation instructions.

F. Actuator: Elevated temperature category B (250 degrees F (121 degrees C)) electric actuator, factory-installed on exterior of sleeve.

1. Type: Spring-return fail-closed that will close damper upon power or pressure interruption.
2. Voltage: Coordinate with available power.
3. Position Indication: Provide with internal switches and contacts to indicate whether damper is open or closed.

G. Basis of design:

1. 1.5-hour fire rating: Ruskin FSD60 Series
2. 3-hour fire rating: FSD60-3 Series.

2.12 SMOKE DAMPERS

A. Listed and labeled in accordance with UL 555S.

B. Low-leakage type.

C. Ratings:

1. Rated for operation at 4,000 feet per minute (20.3 meters per second) and 8" w.g. (1,990 Pa) static pressure.
2. Leakage in accordance with UL Standard 555S no higher than Leakage Class I, 8 cfm per square foot maximum at four inches w.g., (40.6 liters per second per square meter maximum at 1 kPa).

D. Blades: Double-skin airfoil-shaped blades, with a pressure loss of not more than 0.1 inches w.g. (25 Pa) in full-open position at damper-face velocity of 2,000 feet per minute (10.2 meters per second) for a 36-inch by 36-inch (914 mm x 914 mm) damper.

E. Sleeve: Furnish each damper complete with a galvanized steel factory sleeve of length and gauge required for satisfactory installation. Sleeves, angles, and methods of fastening shall meet requirements of manufacturer's UL-approved installation instructions.

F. Actuator: Elevated temperature category B (250 degrees F (121 degrees C)) electric actuator, factory-installed on exterior of sleeve.

1. Type: Spring-return fail-closed that will close damper upon power or pressure interruption.
2. Voltage: Coordinate with available power.
3. Position Indication: Provide with internal switches and contacts to indicate whether damper is open or closed.

G. Basis of design: Ruskin Model SD60.

2.13 DUCT CLAMPS

A. Duct clamps for flexible duct and flexible fabric connections: Positive locking drawbands able to conform to any shape. Fabricate from a single piece of stainless steel, with hex screw and worm gear.

B. Nonmetallic duct clamps for flexible duct connections:

1. Heavy-duty adjustable nylon strap type for 12-inch (305-mm) diameter and smaller flexible ductwork, complying with UL 181.
2. Basis of design: HellermannTyton Corporation

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Duct accessories shall be mounted or installed properly in accordance with the manufacturer's instructions and as indicated on the drawings.

3.2 INSTALLING FLEXIBLE CONNECTIONS

A. Flexible connections: Install using flexible joint fabric where duct connects to motor-driven equipment, and in other locations shown on drawings. Securely clamp flexible connection to duct and collar with duct clamps, providing 1 inch (25 mm) slack. Stitch seams with fiberglass thread.

1. Nonmetallic clamps: Install in accordance with manufacturer’s recommendations, using manufacturer's special tools.
2. Flexible connections are not required where duct connects to air-handling equipment with internally isolated fans.

3.3 INSTALLING SCREENS

A. Install bird screens in outdoor air and exhaust air connections.

B. Install bird screen at open ended duct terminations and where indicated on mechanical drawings.

3.4 INSTALLING MANUFACTURED UNITS

A. Install necessary devices to balance the air flow to produce air quantities at outlets as indicated on the drawings.

B. Install turning vanes in 90-degree square elbows.

C. Install spin-in fittings as indicated on the drawings. Mechanically fasten to duct main with screws or rivets. Where connecting to lined ductwork, provide fittings with sleeve designed for installing with liner.

3.5 INSTALLING DUCT ACCESS DOORS

A. Install duct access doors in ductwork for access to fire dampers, combination fire/smoke dampers, smoke dampers, ATC dampers, duct coils, control devices, and any other devices, equipment, or components requiring maintenance, service, or adjustment and located inside ducts or adjacent equipment.

B. Provide OSHA-approved labels on doors enclosing fire protection devices. Labels shall have lettering at least 1/2 inch (13 mm) high describing the protection device enclosed.

3.6 INSTALLING SOUND ATTENUATORS

A. Where multiple units are used, seal joints after making connections. Provide steel bands around multiple units. Install duct-mounted units with transitions where required, and pressure test and insulate with ductwork.

3.7 INSTALLING DAMPERS

A. Install dampers at locations indicated on drawings and where required to properly balance the systems and to deliver the air quantities indicated. Each damper shall have substantial operators of proper size with locking facilities.

3.8 INSTALLING FIRE DAMPERS

A. Fire dampers are an integral part of the rated barrier being penetrated. Install sleeves and dampers before beginning installation of the duct system being connected. Do not begin connecting ducts until rated assembly, including installed dampers, has been completed.

B. Install fire dampers where indicated and in accordance with the applicable requirements of the following:

1. Details on drawings.
2. NFPA requirements.
3. Local building code.
4. Manufacturer's UL-approved installation instructions.
5. SMACNA-05.

C. Install fire dampers in sleeves. Coordinate with other trades to properly frame openings so that damper and sleeve assembly can be secured in partition or floor.

1. Do not use dampers and sleeves as a lintel for supporting the wall above the damper. Provide separate steel angles on both sides of wall or floor slab to hold damper and sleeve firmly in place.
2. Sleeve thickness and retaining angle size are contingent on type of duct connection, duct size and damper manufacturer’s requirements. See SMACNA recommendations and NFPA requirements.

D. After damper installation is complete and required ductwork connected, test operation of damper by releasing holding mechanism to see that damper operates freely and properly and closes tight. Make adjustments if required and reset holding mechanism.

E. Provide concrete curbs for damper penetrations in mechanical room floors.

3.9 INSTALLING COMBINATION FIRE/SMOKE DAMPERS

A. Fire and smoke dampers are an integral part of the barrier being penetrated. Install sleeves and dampers before beginning installation of the duct system being connected. Do not begin connecting ducts until rated assembly, including installed dampers, has been completed.

B. Install fire and smoke dampers where indicated and in accordance with the applicable requirements of the following:

1. Details on drawings.
2. NFPA requirements.
3. Local building code.
4. Manufacturer's UL-approved installation instructions.
5. SMACNA-05.

C. Install fire and smoke dampers in sleeves. Coordinate with other trades to properly frame openings so that damper and sleeve assembly can be secured in partition or floor.

1. Do not use dampers and sleeves as a lintel for supporting the wall above the damper. Provide separate steel angles on both sides of wall or floor slab to hold damper and sleeve firmly in place.
2. Sleeve thickness and retaining angle size are contingent on type of duct connection, duct size and damper manufacturer’s requirements. See SMACNA recommendations and NFPA requirements.

D. Coordinate with available power. Provide transformer and wiring as required.

E. Coordinate with installation of fire alarm system for connection to damper actuation.

F. Coordinate with installation of building automation system for connection to damper position switches

G. After damper installation is complete and required ductwork connected, test operation of damper by releasing holding mechanism to see that damper operates freely and properly and closes tight. Make adjustments if required and reset holding mechanism.

H. Provide concrete curbs for damper penetrations in mechanical room floors.

3.10 INSTALLING SMOKE DAMPERS IN BARRIERS

A. Smoke dampers are an integral part of the barrier being penetrated. Install sleeves and dampers before beginning installation of the duct system being connected. Do not begin connecting ducts until rated assembly, including installed dampers, has been completed.

B. Install smoke dampers where indicated and in accordance with the applicable requirements of the following:

1. Details on drawings.
2. NFPA requirements.
3. Local building code.
4. Manufacturer's UL-approved installation instructions.
5. SMACNA-05.

C. Install smoke dampers in sleeves. Coordinate with other trades to properly frame openings so that damper and sleeve assembly can be secured in partition or floor.

1. Do not use dampers and sleeves as a lintel for supporting the wall above the damper. Provide separate steel angles on both sides of wall or floor slab to hold damper and sleeve firmly in place.
2. Sleeve thickness and retaining angle size are contingent on type of duct connection, duct size and damper manufacturer’s requirements. See SMACNA recommendations and NFPA requirements.

D. Coordinate with available power. Provide transformer and wiring as required.

E. Coordinate with installation of fire alarm system for connection to damper actuation.

F. Coordinate with installation of building automation system for connection to damper position switches

G. After damper installation is complete and required ductwork connected, test operation of damper by releasing holding mechanism to see that damper operates freely and properly and closes tight. Make adjustments if required and reset holding mechanism.

H. Provide concrete curbs for damper penetrations in mechanical room floors.

3.11 INSTALLING SMOKE DAMPERS IN DUCTWORK AND AIR-HANDLING UNITS

A. Install smoke dampers where indicated and in accordance with the applicable requirements of the following:

1. Details on drawings.
2. NFPA requirements.
3. Local building code.
4. Manufacturer's UL-approved installation instructions.
5. SMACNA-05.

B. Coordinate with available power. Provide transformer and wiring as required.

C. Coordinate with installation of fire alarm system and building automation system for connection to damper actuation.

D. Coordinate with installation of building automation system for connection to damper position switches

E. After damper installation is complete and required ductwork connected, test operation of damper by releasing holding mechanism to see that damper operates freely and properly and closes tight. Make adjustments if required and reset holding mechanism.

3.12 INSTALLING CONTROL DAMPERS

A. Install control dampers per manufacturer’s recommendations.

B. Coordinate location of damper operator to provide clear service access for operator.

C. After damper installation is complete and required ductwork connected, test operation of damper to see that damper operates freely and properly and closes tight. Make adjustments if required.

END OF SECTION 233300

SECTION 233346 - FLEXIBLE DUCTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Insulated flexible ducts.

1.2 REFERENCES

A. UL 181: Factory-Made Air Ducts and Air Connectors.

B. NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems

1.3 SUBMITTALS

A. Product data: For each type of product, include a description, characteristics, materials, composition, finishes, and performance. Include the following:

1. Insulated flexible ducts.
2. Flexible duct connectors.

PART 2 - PRODUCTS

2.1 INSULATED FLEXIBLE DUCTS

A. Insulated flexible duct: UL 181, Class 1, factory pre-insulated, complying with NFPA 90A.

1. Core: Non-metallic airtight polyester supported by galvanized steel wire helix.
2. Insulation: Fiberglass, R-6 (RSI-1.06) minimum.
3. Vapor barrier: Aluminized and reinforced.
4. Pressure Rating: 10 inches w.g. (2,500 Pa) positive and 1 inch w.g. (250 Pa) negative up to an 18 inch (457 mm) diameter.
5. Maximum Air Velocity: 4,000 feet per minute (20 meters per second)
6. Temperature Range: Minus 20 to plus 210 degrees F (Minus 29 to plus 99 degrees C).

B. Flexible duct connectors:

1. Clamps: Stainless-steel bands with cadmium-plated hex screw to tighten band with a worm-gear action, to suit duct size.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Before fabricating ductwork, make field measurements and coordinate layout of ductwork shown on the drawings with building components and work of other trades. Resolve conflicts and obtain written approval for deviations before fabrication.

B. Generally, it is intended that all horizontal ductwork be a minimum of 10 inches (255 mm) above suspended ceiling (where applicable) to allow for removal of ceiling panels and ceiling-mounted light fixtures and devices.

C. Provide insulated flexible ducts where shown on drawings:

1. Install ducts fully extended.
2. Do not bend ducts across sharp corners.
3. Lay out bends and turns with the longest practicable radius.
4. Bends of flexible ducting shall not have an inside radius less than one duct diameter.
5. Avoid contact with metal fixtures, water lines, pipes, or conduits.
6. Install flexible ducts in a direct line, without twists, or turns.
7. Lengths shall not exceed 5 feet (1.5 m).

D. Connections: Coat at least 3 inches inside the end of the flexible duct core with duct sealant, install over the rigid duct, and secure with a duct clamp. After replacing the insulation and vapor barrier, secure with another duct clamp.

E. Supporting flexible ducts:

1. Suspend flexible ducts with bands 1-1/2 inches (38 mm) wide or wider and spaced a maximum of 48 inches (1,200 mm) apart. Maximum centerline sag between supports shall not exceed 1/2 inch (13 mm) per 12 inches (300 mm).
2. Install extra supports at bends approximately one duct diameter from center line of the bend.
3. Ducts may rest on ceiling joists or truss supports. Spacing between supports shall not exceed the maximum spacing per manufacturer's written installation instructions.
4. Vertically installed ducts shall be stabilized by support straps at a maximum of 72 inches (1,800 mm) on center.

END OF SECTION 233346

SECTION 233600 - AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Single-duct variable-air-volume (VAV) and constant volume terminal units.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. The terminal unit manufacturer shall install air terminal unit controls as specified in Section 230923, Direct Digital Building System Control.

B. Provide the automatic temperature control subcontractor with a description of the terminal units and requirements for coordinating with the control system.

C. Provide wiring, tubing, and hardware components necessary to produce complete operational units, including control transformer, fan relay, inlet airflow sensor, and access to controls.

1.3 RELATED SECTIONS

A. UL label, demonstration, training, and equipment installation: Section 230500.

B. Balancing: Section 230593.

C. Controls system wiring: Sections 230902.

D. Terminal unit application specific controllers: Section 230923.

1.4 REFERENCES

A. AHRI 410: Forced-Circulation Air-Cooling and Air-Heating Coils

B. AHRI 880: Performance Rating of Air Terminals.

C. ASHRAE 62.1: Ventilation for Acceptable Indoor Air Quality

D. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials

E. NFPA 70: National Electric Code.

F. NFPA 90A: Installation of Air Conditioning and Ventilating Systems.

G. UL 181: Factory-made Air Ducts and Air Connectors.

1.5 PERFORMANCE REQUIREMENTS

A. Coordinate controls with the control manufacturer to affect specified unit performances and unit operation as required by the control sequences.

B. Coordinate with and assist balancing agency to perform tests specified in section, Testing and Balancing.

1.6 SUBMITTALS

A. Product data: For each type of air terminal unit, include the following:

1. Product description, rated capacities, operating characteristics, materials, finishes, and furnished specialties and accessories.
2. Unattenuated (raw) sound power levels for each size unit, at specified rating conditions, for both radiated and discharge sound. Submit sound data with no corrections or noise reduction factors applied, at the airflow rates scheduled on the drawings.

B. Product schedule: Provide an air terminal unit schedule with the following as a minimum:

1. Equipment identification tags.
2. Equipment model numbers, types, nominal sizes, and arrangements.
3. Unit electrical characteristics.
4. Operating conditions and flow.
5. Operating capacities at operating conditions and flow rates.
6. Motor types and electrical characteristics.
7. Furnished specialties and accessories.
8. Verification of compliance with any additional information scheduled on the drawings.

C. Shop drawings: Include the following for each type of air terminal unit:

1. Dimensioned plans, elevations, and sections of complete assembled units with accessories.
2. Required service clearances.
3. Weights, loads, and support and attachment details.
4. Details of equipment components and assemblies.
5. Details of and any required field wiring or field assembly.
6. Location and size of each field connection.
7. Diagrams for power, signal, and control wiring.

D. Certifications: Factory certification that sound data required for product data submittal have no corrections or noise reduction factors applied; or, if data do include such factors, guaranteeing that the equipment will meet any scheduled sound level requirements.

E. Operation and maintenance data: Include operating and maintenance data for each air terminal unit in the project Operation and Maintenance Manual as specified in Division 01 with supplemental requirements as specified in Section 230101.

1.7 QUALITY ASSURANCE

A. UL label: As specified in Section 230500, Common Work Results for HVAC.

B. Certify coil performance data in accordance with AHRI 410.

C. Terminal units shall be certified and listed in the current AHRI Directory of Certified Applied Air-Conditioning Products. Listed sound power levels shall show that units meet requirements scheduled on the drawings.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Scheduled units are the basis for design of the project. The following listed manufacturers also provide units of acceptable quality. If units by any of these manufacturers should be proposed, verify that they meet requirements specified in Division 01 and the article “Product Options” in Section 230101, and submit product data and shop drawings as specified in the article “Submittals” above.

B. Air terminal units:

1. Enviro-Tech (Johnson Controls).
2. Nailor Industries, Inc.
3. Titus.

C. Drawings show duct and pipe connections, and size and arrangement of unit, based on configuration of design basis unit. Do not propose another manufacturer’s unit, which cannot be made to fit in the space shown. Revise duct and pipe connections and other conditions as necessary to make another manufacturer’s unit meet the project requirements, without addition to the Contract Sum.

2.2 GENERAL REQUIREMENTS

A. Provide type, size, configuration, capacity, and current characteristics indicated on the drawings.

B. Units shall be factory-assembled, -piped, -wired, and -tested, and shipped in one piece, including automatic temperature controls.

C. Provide each fan-powered unit and each unit with electric heat with factory-installed means of disconnect in compliance with NFPA 70 (NEC) and applicable local codes. In the event a factory installed disconnect is not available provide an approved means of disconnect for field mounting.

D. Terminal units shall be pressure-independent.

E. Sound power levels: AHRI 880, certified and listed in AHRI Applied Products Directory, and not exceeding the levels scheduled at the end of this section.

F. Outer casing: Not less than 22 gauge galvanized steel; airtight, leakage no more than two percent at 3.0 inches w.g. (747 Pa).

G. Insulation:

1. Approvals: Insulation shall comply with the following:

a. Insulation shall comply with UL 181 for resistance to erosion, mold growth and humidity requirements in accordance with ASHRAE 62.1
b. Insulation shall have a flame spread less than 25; smoke spread less than 50 according to the requirements of ASTM E84 or UL 723 in compliance with NFPA 90A.

2. Thickness: Thickness required achieving a thermal resistance not less than R4.
3. Material:

a. Fiberglass adhered to the casing, with manufacturer's standard acrylic matte coating on surfaces and edges facing the air stream.

H. Internal access: Insulated and removable bottom panel for access to components requiring service, adjustment, or maintenance; with airtight seal.

I. Duct connections: Round or oval duct collar for primary air connection and a single rectangular flanged connection for discharge.

J. Wiring:

1. Single-point control power connection with control transformer. Coordinate with control power requirements in Section 230902, "Control System Wiring".

K. Air control valve (damper):

1. Minimum 22-gauge galvanized steel, bolted or welded to a continuous shaft which rotates in self-lubricating Delrin or bronze oilite bearings, closing against a closed-cell gasket.
2. Provide an opposed-blade configuration where multiple blades are used.
3. Blades shall not deflect at inlet pressures up to 6 inches w.g.
4. Leakage shall not exceed 2 percent of maximum inlet rated airflow at 3 inches w.g. inlet pressure.

L. Averaging velocity sensor:

1. Mount in the primary air inlet of the terminal unit.
2. Sensor shall provide a minimum of one air pickup point for each 2.5 inches of inlet diameter (single-point differential sensors are not acceptable).
3. Provide taps for field measuring and balancing.
4. Accuracy: ±5 percent over terminal unit operating range.

M. Heating element: Provide the following heating elements as scheduled:

1. Hydronic heating coil:

a. Test, rate, and certify coil performance in accordance with AHRI 410.

b. Aluminum fins bonded to copper tube by mechanical expansion.
c. Tested at no less than 300 psig (2068 kPa).
d. Removable for maintenance.

2.3 SOURCE QUALITY CONTROL

A. Factory test units to assure that they operate in accordance with the sequence specified.

B. Factory calibrate and adjust controls. Pre-set minimum and maximum airflow setpoints to the values scheduled on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment as indicated on the drawings. Comply with requirements in Section 230500.

B. Suspend from structure above.

C. Provide vibration isolation using neoprene washers or grommets at threaded rod connections to the unit or using neoprene vibration isolation hangers.

3.2 DEMONSTRATION AND TRAINING

A. Provide demonstration and training as specified in Section 230500.

END OF SECTION 233600

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SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Ceiling-mounted diffusers, registers, and grilles.

1.2 RELATED SECTIONS

A. Balancing: Section 230593.

1.3 REFERENCES

A. NFPA 90A: Standard for the Installation of Air-Conditioning and Ventilating Systems.

1.4 SUBMITTALS

A. Product data: For each type of diffuser, register, and grille, include the following:

1. Product description, rated capacities, operating characteristics, materials, finishes, and furnished specialties and accessories.
2. Frame style.
3. Mounting details.
4. Available materials and finishes.
5. Throw, static pressure drop, and noise ratings

B. Product schedule: Provide a diffuser, register, and grille schedule with the following as a minimum:

1. Location
2. Quantity
3. Type
4. Size
5. Function
6. Material
7. Finish

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Grilles, registers and diffusers:

1. Hart and Cooley Inc.
2. Krueger.
3. Metalaire.
4. Nailor Industries, Inc.
5. Price Company.
6. Titus Products.

2.2 DIFFUSERS, REGISTERS, AND GRILLES

A. Devices of one of the named manufacturers, with performance data, characteristics, features, and accessories of the model or type specified or indicated on the drawings. Model numbers specified below are Krueger except as noted otherwise.

B. See architectural drawings for type of walls and ceilings where diffusers, grilles, and registers are required. Coordinate margin and frame of each device with the substrate in which it will be installed. Where devices are installed in suspended ceilings, assure that they will fit correctly in the type of suspension supports shown or specified.

C. Materials and finish:

1. Construction:

a. Steel where mounted in ceilings.
b. Either aluminum or steel where mounted in walls near ceiling.
c. Heavy-duty steel where mounted in walls near floor.
d. Welded or mechanically fastened cores in diffusers located in gymnasium.

2. Aluminum devices shall be all aluminum construction, including dampers, where specifications call for aluminum or stainless steel ductwork.
3. Finish:

a. White enamel unless indicated otherwise.

D. Where narrow margin grilles and registers are specified or indicated on the drawings, they shall be provided with mounting frames except where mounted on ductwork.

2.3 SUPPLY DIFFUSERS

A. Throw length is based on performance data of the scheduled or specified manufacturer and model. Select units of other manufacturers whose performance data meet the required conditions. Throw direction of square and rectangular ceiling diffusers shall be four-way unless otherwise indicated on the drawings.

B. Square and rectangular ceiling diffusers: Square, rectangular, or round neck and removable core. Each unit shall have a straightening grid. The grids shall be set at right angles to one another. Basis of design: Krueger Series SH.

1. Frame Style 23 (panel diffuser): Diffusers mounted in nominal 24 by 24-inch (600 by 600-mm) or 24 by 48-inch (600 by 1200-mm) flat steel panels as indicated on the drawings, to lay into suspended ceiling grid of acoustical ceilings.
2. Frame Style 22 (surface mount): Diffuser with flat frame to mount at underside of plaster or gypsum wallboard ceilings.

2.4 SUPPLY GRILLES AND REGISTERS

A. For registers, provide opposed-blade dampers with linkage and adjustment through grille face with a screwdriver or Allen wrench. For plaster wall or ceiling construction, provide with plaster frames.

B. Ceiling-mounted:

1. Registers, individually adjustable curved air deflection blades, 1-, 2-, 3-, or 4-way air pattern as indicated on the drawings, minimum 1.25-inch (32-mm) overlap margin.
2. Basis of design: Krueger 5180-OBD (aluminum); 180-OBD (steel).

2.5 RETURN AND EXHAUST GRILLES AND REGISTERS

A. For registers, provide opposed-blade dampers with linkage and adjustment through grille face with a screwdriver or Allen wrench. For plaster wall or ceiling construction, provide with plaster frames.

B. Ceiling-mounted and wall-mounted near ceiling: Grilles and Registers, fixed horizontal face bars set at 35 to 45 degrees deflection, minimum 1.25-inch (32-mm) margin.

1. Basis of design:

a. Grilles: Krueger S-80H (steel); S-580H (aluminum).
b. Registers: Kruger S-80H-OBD (steel); S-580H-5OBD (aluminum).

PART 3 - EXECUTION

3.1 INSTALLING GRILLES, REGISTERS AND DIFFUSERS

A. Securely attach grilles, registers, and diffusers in place. Do not install the grilles and registers until duct interiors have been painted as specified in Section 230500, Common Work Results for HVAC.

B. Install all air control devices complete with the accessories specified, securely attached in position. Make operating devices accessible.

C. Adjust diffuser straightening grids to provide uniform air distribution above diffuser face.

D. Adjust supply register deflectors to provide uniform air distribution to the areas served.

END OF SECTION 233713

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SECTION 260101 - ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. General provisions and requirements for electrical work.

1.2 RELATED SECTIONS

A. Requirements of this section generally supplement requirements of Division 01.

1.3 REFERENCES

A. NFPA 10: Portable Fire Extinguishers.

B. NFPA 241: Safeguarding Construction, Alteration, and Demolition Operations.

1.4 SYSTEM DESCRIPTION

A. The full set of Contract Documents applies to work of Division 26.

B. Visit the site and study aspects of the project and working conditions, as required by General and Supplementary Conditions, Bidding and Contracting Requirements, Drawings, and Specifications. Verify field dimensions.

C. The work covered in technical sections includes the furnishing of labor, equipment and materials, and the performance of operations pertinent to the work described.

D. Except as required otherwise in Division 01, promptly obtain and pay for necessary signatures and paperwork, permits, fees and inspections required for work of this division by authorities having jurisdiction, including any utility connection or extension charge. No payment will be made until a copy of the permit is forwarded to the Owner.

E. Electrical work of this project includes, as a brief general description, the following:

1. Demolition of existing building lightning protection systems.
2. Provide a new lightning protection system with UL Master Label.
3. Replace existing lighting and lighting controls on floors 2, 4 through 6.
4. Secure existing cabling and raceways above replaced ceilings.
5. Correct grounding deficiencies in existing IT closets.

F. See Division 01 for requirements related to Owner's occupancy of the premises, limits on use of site, time restrictions on work, limits on utility outages or shutdowns, and phasing (sequencing) and scheduling.

1.5 PRODUCT OPTIONS

A. Except as modified by provisions of Bidding and Contracting Requirements and Division 01, these options apply to Division 26 specifications.

B. General: Where Contractor is permitted to use a product other than the specified item and model named as the basis of design, Contractor is responsible for coordination and additional costs as specified in article "Substitutions" below for substitutions.

C. Products specified by reference standards or by description only: Any product meeting those standards or description.

D. Products specified by naming one or more manufacturers, or model name or catalog reference number: Products specified establish a standard of quality, options to be included, and performance, and shall not be construed as limiting competition. Contractor may use products of any manufacturer, which meet the specifications.

E. Products specified by naming one manufacturer and particular product, with no provision for other options: No options or substitutions allowed.

1.6 SUBSTITUTIONS

A. Substitutions will be considered only as permitted or required by the Bidding and Contracting Requirements and Division 01. Except as modified by those requirements, the requirements below apply to Division 26 specifications.

B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed substitution with contract documents.

D. A request constitutes a representation that the Bidder or Contractor:

1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the substitution as for the specified product.
3. Will coordinate installation and make changes to other work which may be required for the work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution submittal procedure is specified in Bidding and Contracting Requirements and Division 01.

1.7 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be new and the best of their respective kinds, suitable for the conditions and duties imposed on them by the project, and of representative manufacturer. The description, characteristics and requirements of the materials to be used shall be in accordance with the specifications.

B. Equipment, construction and installation must meet requirements of local, state and federal governing codes.

C. Singular number: In cases where material, a device, or part of the equipment is referred to in the singular number in the specifications, it is intended that such reference shall apply to as many items of material, devices, or parts of the equipment as are required to complete the installation as shown on the drawings or required for proper operation of the system.

D. Terms have the following meanings:

1. Furnish: Supply item
2. Install: Mount and connect item
3. Provide: Furnish and install

E. Materials and equipment shall be installed and completed in a first class and workmanlike manner and in accordance with the best modern methods, practice and manufacturers' instructions. Any work which shall not present an orderly and neat or workmanlike appearance shall be removed and replaced with satisfactory work when so directed in writing by the Architect.

F. The specifications and drawings are intended to define the minimum requirements, as to quality of materials, construction, finish and overall workmanship.

G. General Conditions describe the correlation and intent of the Contract Documents. In case of discrepancies between the specifications and drawings, the specifications should be followed as to the general methods and principles and the drawings followed as to sizes, capacities and specifics for corresponding parts. If sizes are omitted, the Architect will determine sizes to be utilized.

H. In cases of doubt, uncertainty, or conflict as to the true meaning of the specifications or drawings, it is the responsibility of the Contractor to notify the Architect of said uncertainty, doubt, or conflict and obtain a decision as to the intent prior to initiating any work which may be affected by this decision.

1.8 COORDINATION

A. Should a situation develop during construction to prevent the proper installation of any equipment or item where shown on the drawings, call the situation to the attention of the Architect and await a written decision.

B. Plan and coordinate work to proceed in an orderly and continuous manner without undue delay, and in conformance with the project schedule. Submit samples, shop drawings, schedules, insurance policies and certificates, and the like in time to avoid delays in actual construction. Coordinate electrical work so that work of each trade is completed before other construction begins which would obstruct it.

C. Coordinate trades to ensure that proper clearances between work of the various trades allow access to items which require operation and maintenance.

D. Coordinate location and elevation of conduit, light fixtures, equipment, and appurtenances in such a manner that the finished installation is as indicated on drawings. In the event difficulties are encountered which prevent this, it is the Contractor's responsibility to bring this to the attention of the Architect prior to initiation of work. Correct improperly coordinated installation at no additional cost.

E. The Contractors' assistants shall include a competent electrical foreman, who shall be on the premises at all times to check, layout, coordinate and superintend the installation of work. The foreman shall establish basic requirements relative to the work before starting, and be responsible for the accuracy thereof.

1.9 SUBMITTALS

A. Manufacturers' and subcontractors' lists:

1. As specified in Division 01, submit a complete list of proposed manufacturers for equipment, materials and subcontractors used for the work of this division. Lists shall follow the sequence of the specifications. No considerations will be given for partial or incomplete lists. After review of lists, submit shop drawings and product data.

B. Shop drawings and product data:

1. Submit in accordance with the requirements of Division 01 or as established at the preconstruction conference, the required number of copies of Shop Drawings and Product Data for every item of equipment. Shop drawings or product data will not be considered until Manufacturers' Lists have been approved. Shop drawings and product data shall be submitted, as required by the General Conditions, with sufficient time for checking, return to Contractor, and resubmission as required before Contractor shall install any item.
2. Each item submitted shall be properly labeled, indicating the specific service for which the equipment or material is to be used, section and paragraph number of specification or drawing number to which it applies, Contractor's name and project name and number. Data submitted shall be specific and shall include product data and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents. Clearly identify each item within the data. Data of a general nature will not be accepted. Each sheet must clearly show the project name and number.

3. The review of a shop drawing or product data shall not be considered as a guarantee of the measurements or building conditions or that the shop drawings or product data have been checked to see that item submitted properly fits the building conditions. This review shall not relieve the Contractor of the responsibility for furnishing material or performing work as required by the contract documents, for correctness of dimensions and quantities, or for proper coordination of details and interfaces among trades.
4. Exclusively electrical items furnished as items associated with mechanical items but not specifically described in the mechanical item submission, shall be submitted as a separate submittal but shall be clearly marked as associated with the mechanical item by identified specification paragraph.
5. Product data sheets shall be 8.5-inches by 11-inches cut sheets for operating and maintenance manual.

C. Submit at least three copies of the results of every test required under any section in this division.

D. Specialist shall submit a list of at least three projects similar to this project in type, size, and quality, which have been in place and operating satisfactorily for at least five years.

1. Include project name, address, name and phone number of owner's representative, and project type and size.

E. After the work is completed, submit required certificates of approval from approved inspection agencies and authorities having jurisdiction over work of this division. Certificates of approval must be received by the Architect prior to final acceptance of the work.

1.10 SPECIALIST

A. The term "Specialist" as used in the specification shall mean an individual or firm of established reputation (or, if newly organized, whose personnel have previously established a reputation in the same field,) which is regularly engaged in, and which maintains a regular force of workers skilled in either (as applicable) manufacturing or fabricating items required by the contract, installing items required by the contract, or otherwise performing work required by the contract. Where the specification requires installation by a specialist, the term shall also be deemed to mean the manufacturer of the item, an individual or firm licensed by the manufacturer, or an individual or firm who will perform the work under the manufacturer's direct supervision.

1.11 CONTRACT CLOSEOUT SUBMITTALS

A. Project record documents:

1. Maintain on site one set of the following record documents; record actual revisions to the work of this division:

a. Contract Drawings.
b. Specifications.
c. Addenda.
d. Change Orders and other Modifications to the Contract.
e. Reviewed shop drawings, product data, and samples.

2. Maintain record documents separate from documents used for construction.
3. Record information concurrent with construction progress.
4. Specifications: Legibly mark and record in each section a description of actual products installed, including the following:

    a. Manufacturer's name and product model and number.
    b. Product options, substitutions, or alternates utilized.
    c. Changes made by addenda and modifications.

5. Record documents and shop drawings: Legibly mark each item to record actual construction, including:

    a. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
    b. Field changes of dimension and detail.
    c. Details not on original Contract Drawings.

6. Submit documents as specified in Division 01.

B. Operation and maintenance data:

1. Submit prior to final inspection as specified in Division 01. In addition to requirements specified in Division 01, submit operating and maintenance manuals for the work of this division as specified below.
2. Prepare covers with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," and title of project.
3. Internally subdivide the contents with permanent page dividers, logically organized as described below.
4. Contents: Prepare a Table of Contents, with each product or system description.
5. Part 1: Directory, listing names, addresses, and telephone numbers of electrical engineers; contractor; electrical subcontractors; and major electrical equipment suppliers.
6. Part 2: Operation and maintenance instructions, arranged by specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify the following:

    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component, including recommended spare parts list.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

7. Part 3: Project documents and certificates, including the following:

    a. Shop drawings and product data.
    b. Photocopies of certificates.
    c. Photocopies of warranties, guarantees, and bonds.
    d. Test reports: Copies of the results of tests required under sections of specifications.

e. Photocopies of each panelboard circuit directory or directories for each panelboard provided, including panel name, panel location, panel ratings, spare circuit breakers and spaces for additional circuit breakers.

8. Submit one copy in final form 15 days prior to final inspection. This copy will be returned after final inspection, with Engineer comments. Revise content of documents as required prior to final submittal.
9. Submit final within ten days after final inspection.
10. Submit operation and maintenance data in electronic format.

1.12 REGULATORY REQUIREMENTS

A. When these specifications call for materials or construction of a better quality or larger sizes than required by the following codes and standards, the provisions of the specifications shall take precedence.

B. Provide, without extra charge, any additional materials and labor which may be required for compliance with these codes and standards even though the work is not mentioned in these specifications or shown on the contract drawings.

C. Perform the work of this division in strict accordance with the following authorities. The latest revision of these codes accepted by the authority having jurisdiction as of the date of the contract documents shall apply.

1. The electrical, building, fire, and safety codes of the state and county or city in which the work is being performed.
2. The National Electric Code, NFPA 70 (NEC).
3. The National Fire Protection Association Code (NFPA).
4. International Building Code (IBC).
5. International Energy Conservation, Fire, and Electrical Codes (ICC).

1.13 REFERENCE STANDARDS

A. Perform the work of this division using the standards of the following organizations, as referred to in technical sections, as a minimum requirement for construction and testing. Unless specified otherwise in Bidding and Contract Documents or Division 01, the latest revision current as of the date of the contract documents shall apply.

1. Factory Mutual (FM)
2. American National Standards Institute (ANSI)
3. American Society for Testing and Materials (ASTM)
4. International Code Council (ICC)
5. Institute of Electrical and Electronics Engineers (IEEE)
6. National Electrical Code (NEC) (NFPA 70)
7. National Electrical Manufacturer’s Association (NEMA)
8. National Fire Protection Association (NFPA)
9. The Occupational Safety and Health Act (OSHA)
10. Underwriters Laboratory Inc. (UL)
11. American Association of State Highway and Transportation Officials (AASHTO)

12. American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)
13. Maryland Occupational Safety and Health Act (MOSHA)
14. Illuminating Engineering Society of North America (IESNA)

1.14 TEMPORARY STORAGE

A. Maintain upon premises, where directed, a storage area, and be responsible for contents within these areas. Provide security measures necessary for this area.

B. Area shall be maintained and shall be returned to original condition at the completion of the project.

C. Store electrical construction materials such as wire, raceways and boxes, devices, and equipment in buildings, enclosed trailers, or portable enclosed warehouses.

1. Materials and products subject to damage from moisture: Store in dry locations. If necessary, protect with protective wraps or covers.
2. Plastics and other materials and products subject to damage from heat or cold: Store at manufacturer's recommended temperatures.
3. Plastics and other materials and products subject to damage from sunlight: Protect from sunlight.

D. Electrical equipment such as motor controllers, panelboards and circuit breakers stored before installation and installed during construction: Provide clean, dry locations at manufacturer's recommended temperatures, and cover or wrap if required to protect from incidental damage.

1.15 PROTECTION

A. Control dust resulting from construction work to prevent its spread beyond the immediate work area, and to avoid creation of a nuisance.

1. Do not use water to control dust. Use drop cloths or other suitable barriers.
2. In areas where dirt or dust is produced as a result of the work, sweep daily, or more often as required.
3. Provide walk-off mats at entries and replace them at regular intervals.
4. Construct dust partitions, where indicated on the drawings or as required.
5. Protect areas occupied by Owner's personnel or equipment.
6. Seal off return air registers and other mechanical systems to prevent dust from entering.

B. Each trade and subcontractor is responsible for preventing damage and soiling of work performed by other trades or subcontractors. Each trade and subcontractor is responsible for providing temporary protection of its own work.

1. Protect work from spills, splatters, drippings, adhesives, bitumens, mortars, paints, plasters, and damage from welding or burning.
2. Protect finished work from damage, defacement, staining, or scratching.
3. Protect finishes from cleaning agents, or grinding and finishing equipment.
4. Protect adjacent and finished work from damage, using tape, masking, covers or coatings and protective enclosures.

5. Coordinate installations and temporarily remove items to avoid damage from finishing work.

C. Repair damage or soiling to the complete satisfaction of the Architect; replace any materials or work damaged to such an extent that they cannot be restored to their original condition, at no addition to the Contract sum.

D. Protect work stored in place and supplies stored in the building.

1. Store materials and products, subject to damage from moisture, in dry locations. If necessary, protect in wraps or covers.
2. Store plastics, other materials, and products subject to damage from heat or cold at manufacturer's recommended temperatures.

E. Protect electrical materials and products from weather events and accidents of construction.

F. Use of sidewalk or roadway areas outside of the property lines shall be with permission and approval of the local authorities having jurisdiction.

1.16 FIRE PROTECTION

A. As a minimum, provide hand-carried, portable, UL-rated extinguishers with each work crew working inside the building.

B. Select extinguishers in accordance with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

1.17 SECURITY REQUIREMENTS

A. Refer to Division 01 for Owner's Security Requirements.

1.18 PROJECT CONDITIONS

A. Drawings showing utilities in concealed locations are based on the best information available but are not represented as being precisely correct. Work of the contract includes digging, cutting, drilling, using nondestructive methods, and other methods of locating concealed utilities in the field, as well as patching and repairing as specified in "Cutting and Patching" below.

B. If, in the course of the work, workers encounter a material they suspect to present some hazard:

1. Promptly notify the Owner and Architect in writing.
2. Do not perform any work which would disturb the suspected material until written instructions have been received.

1.19 WARRANTY

A. Work and equipment provided as work of this division shall be fully warranted under the general project warranty. In addition, provide added special warranties as specified in individual sections.

B. During the correction period, the Contractor shall begin correcting any work found to be not in accordance with the requirements of the Contract Documents within 4-hours of receiving written notice from the Owner. Provide detailed schedule for completion of work within 24-hours of receiving written notice from the Owner and revise schedule based on any Owner comments generated. Except as otherwise required in General Conditions and Division 01, the correction period is one year after the date of substantial completion of the work. Work requiring correction shall promptly be repaired or completely replaced at no addition to the Contract Sum.

1. Service reports for warranty work shall be provided to the Owner.

C. When use of the permanent equipment has been permitted for temporary services during construction of the building, the warranty and correction periods shall nevertheless begin at the time of substantial completion, unless another date of acceptance has been agreed to by the Owner.

D. Special warranties are warranties required by individual specification sections, incidental product warranties, manufacturers' standard warranties, installer or subcontractor service agreements, and other individual warranties in addition to the general project warranty.

E. Provide copies of warranties as required for Operation and Maintenance Manual specified above, and by Division 01.

F. For items of work delayed beyond date of substantial completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

B. Cut walls, floors, partitions, roofs, and other appurtenances for the passage or accommodation of conduits. Close superfluous openings and remove debris caused by work of this division.

C. No cutting of any structure or finish shall be done until the condition requiring such cutting has been examined and approved by the Architect.

D. New or existing surfaces disturbed as a result of such cutting or otherwise damaged shall be restored to match original work and materials used for any patching or mending shall conform to the class of materials originally installed.

E. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

3.2 TEMPORARY FACILITIES

A. Temporary water facilities, electricity, telephone, toilet facilities, and temporary heat, shall be provided as specified in Division 01.

3.3 PROGRESS MEETINGS

A. Progress meetings shall be held as specified in Division 01, and also when and if the Contractor or Architect finds them necessary or advantageous to progress of work.

B. Contractor, those subcontractors and those material suppliers concerned with current progress or with the scheduling of future progress, Architect and Owner shall each be represented at these meetings by persons familiar with the details of work and authorized to conclude matters relating to work progress.

END OF SECTION 260101

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SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Requirements applicable to work of more than one section of Division 26.

B. Basic materials and equipment required for electrical work.

C. Date sensitive equipment.

D. Operating instructions.

E. Testing wiring systems.

1.2 RELATED SECTIONS

A. Project and special warranties: Division 01 and Section 260101.

B. Operation and Maintenance Manuals: Division 01 and Section 260101.

1.3 DEFINITIONS

A. Project correction period: A period after Substantial Completion of the work during which the Contractor shall correct every part of the work found to be not in accordance with the requirements of the contract documents, promptly after receipt of written notice.

B. Qualified testing agency: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual sections; and where required by authorities having jurisdiction, that is acceptable to authorities.

1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

1.4 DESIGN REQUIREMENTS

A. The drawings and system performances have been designed on the basis of using the particular manufacturers' products specified and scheduled on the drawings.

B. Products of other manufacturers that are listed under the article "Acceptable Manufacturers," or permitted as "equal," are permitted provided:

1. Product shall meet the specifications.
2. Contractor shall make, without addition to the contract sum, all adjustments for deviations so that the final installation is complete and functions as the design basis product is intended.

C. Do not propose products with dimensions or other characteristics different from the design basis product that make their use impractical or cause functional fit, access, or connection problems.

1.5 SUBMITTALS

A. Test reports: Show that tests specified in Part 3 below demonstrate the specified results.

1.6 QUALITY ASSURANCE

A. Provide materials and perform work in accordance with the electrical, building, fire, and safety codes and regulations of the state, county, or city in which the work is performed.

B. Electrical control panels, equipment, materials and devices provided or installed as work of Division 26 shall bear UL label, or, if UL label is not available, the item shall be tested and labeled by a qualified testing agency, acceptable to authorities having jurisdiction, and in accordance with NFPA 70. Provide testing, if required, without addition to the contract sum.

C. VOC content: Field-applied adhesives and sealants, limits per South Coast Air Quality Management District (SCAQMD), Rule No. 1168.

D. Products shall contain no urea-formaldehyde content.

PART 2 - PRODUCTS

2.1 GENERAL

A. Techniques, testing, and operating instructions specified in this section apply to products specified in other sections of Division 26.

B. Equipment that uses or processes date and time data in order to perform its function shall be warranted by the manufacturer to properly function and correctly use or process all time-related data for all dates and times which occur during a reasonable life expectancy of the equipment.

2.2 MATERIALS

A. Electrical equipment backing panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated in accordance with AWPA C27, in thickness indicated, not less than 0.5 inch (13 mm) nominal.

1. One side finished.

B. Wood-preservative-treated lumber: Treated by pressure process, AWPA C2, with chemicals acceptable to authorities having jurisdiction, and marked with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. Application: Treat items indicated on the drawings, and the following:

a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, or waterproofing.
b. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
c. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
d. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
e. Wood floor plates that are installed over concrete slabs-on-grade.

C. Aircraft cable: 0.25-inch (6-mm) steel wire rope, galvanized, construction 7 by 19 strands, minimum 7000 lbs (31138 N) breaking strength.

2.3 DATE-SENSITIVE EQUIPMENT

A. Date-sensitive equipment: Systems, equipment, or components which use or process date and time data in order to perform their functions.

B. Each item of date-sensitive equipment used in the project shall be warranted by the manufacturer to properly function and correctly use or process all time-related data for all dates and times which occur during a reasonable life expectancy of the equipment.

PART 3 - EXECUTION

3.1 GENERAL

A. Manufacturers' instructions: Except as modified by drawings or specifications, install products and equipment in accordance with manufacturers' instructions and recommendations applicable to the project conditions.

1. Immediately notify Architect if a difference or discrepancy is found between manufacturers' instructions and the drawings or specifications.

B. The contract drawings are diagrammatic, and do not indicate all fittings or offsets in conduit or all pull boxes, access panels, or other specialties required. Provide required fittings, offsets, access panels, and specialties to coordinate the work.

C. No conduit shall be run below the head of a window or door.

D. Equipment and conduits installed in areas without a suspended ceiling shall be as tight to structure as possible, but at least above a height of 6'-8", unless otherwise noted.

E. Items which require access for operation or maintenance shall be easily accessible. Do not cut or form hand holes for operation or maintenance of appliances through walls or ceilings.

3.2 INSTALLATION OF PRODUCTS AND EQUIPMENT

A. Install conduit exposed to view parallel with the lines of the building and as close to walls, columns, and ceilings as may be practical, maintaining adequate clearance for access at parts requiring servicing.

B. Install conduit a sufficient distance from other work to permit a clearance of not less than 0.5 inch (13 mm) between its finished covering and adjacent work.

C. Pull boxes and other appurtenances which require operation or maintenance shall be easily accessible. Do not cut or form handholes for operation or maintenance of appliances through walls or ceilings.

D. Install plywood backing panels with finished face exposed.

3.3 OPERATING INSTRUCTIONS (DEMONSTRATION)

A. Furnish the necessary technicians, skilled workers, and helpers to overview operation of the electrical systems and equipment of the entire project for one 8-hour day. Provide additional trainings and demonstrations as indicated in all Division 26 specifications.

B. Where specified in technical sections, provide longer periods required for specialized equipment.

C. Instruct the Owner or designated personnel in operation, maintenance, lubrication, and adjustment of systems and equipment.

1. Instructions by manufacturer's technical representative for each type of equipment shall include the performance of the recommended preventive maintenance procedures for that equipment.

D. The Operating and Maintenance Manual shall be available at the time of the instructions for use by instructors and Owner personnel.

E. Schedule the general and specialized instruction periods for a time agreed upon by the Owner and Architect.

3.4 TESTS

A. During the progress of the work and after completion, test the branch circuits and distribution system.

B. Results of the tests shall show that the wiring meets the requirements of this specification. Should any test indicate defect in materials or workmanship, immediately repair, or replace with new, the faulty installation, and retest the affected portions of the work.

C. Furnish equipment and instruments necessary for testing.

D. Immediately repair defects and retest until systems are operating correctly.

E. Submit test reports.

END OF SECTION 260500

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SECTION 260504 - ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Extent and location of demolition are shown on the drawings.

1.2 RELATED SECTIONS

A. Demolition: Division 02.

1.3 SUBMITTALS

A. Project record documents:

1. Record drawings.

1.4 DEFINITIONS

A. EPA: Environmental Protection Agency.

1.5 QUALITY ASSURANCE

A. Demolition shall be carried out as expeditiously as possible, in accordance with accepted practice and applicable building code provisions.

1.6 PROJECT CONDITIONS

A. If, in the course of the work, workers unexpectedly encounter a material not identified for special removal but which they suspect to be asbestos, to contain lead or PCBs, or to present some other hazard:

1. Promptly notify the Owner and Architect in writing.
2. Do not perform any work which would disturb the suspected material until written instructions have been received.

B. Protect adjacent materials indicated to remain. Install and maintain dust and noise barriers to keep dirt, dust, and noise from being transmitted to adjacent areas. Remove protection and barriers after demolition operations are complete.

C. Locate, identify, and protect mechanical and electrical services passing through demolition area and serving other areas outside the demolition limits. Maintain services to areas outside demolition limits. When services must be interrupted, install temporary services for affected areas.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect existing building and equipment that is to remain, particularly to prevent entry of either dust or water. Ensure weathertightness at all times. Keep materials on hand to patch and maintain protection.

3.2 DEMOLITION

A. Comply with demolition and disposal requirements of Division 02.

B. Perform removal work neatly with the least possible disturbance to the building.

C. Provide temporary barriers, danger signals, and appurtenances for protection of personnel and equipment during removal operations.

D. Demolish, remove, demount, and disconnect inactive and obsolete conduit, fittings and specialties, equipment, and fixtures.

1. Conduit and ducts embedded in floors, walls, and ceilings may be abandoned in place if they do not interfere with new installations. Cut back to at least one inch below finished surface.
2. Remove materials above accessible ceilings.
3. Disconnect and cap items to remain behind finished surfaces.
4. Patch and repair surface materials as required in Division 01 and Section 260101 article, “Cutting and Patching.”

E. Remove the anchors, bolts, and fasteners associated with conduit and equipment to be removed.

3.3 DISPOSAL

A. Dispose of equipment and materials removed, and rubbish and waste material, as work progresses. Do not allow demolition debris to accumulate on site. Remove products of demolition from the building daily.

END OF SECTION 260504

SECTION 260507 - FIRESTOPPING FOR ELECTRICAL WORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Through-penetration firestopping in fire-rated construction.

B. Through-penetration smoke-stopping in smoke partitions.

1.2 RELATED SECTIONS

A. LEED Certification: Division 01.

B. Conduit: Section 260533.

C. Cable tray: Division 27.

1.3 REFERENCES

A. Underwriters Laboratories

1. UL Fire Resistance Directory
2. UL 1479: Through Penetration Firestops.

B. American Society for Testing and Materials Standards:

1. ASTM E 814: Standard Test Method for Fire Tests of Through-Penetration Firestops.

1.4 DEFINITIONS

A. Assembly: Particular arrangement of materials specific to given type of construction described in referenced documents.

B. Barriers: Time-rated fire walls, smoke barrier walls, time-rated ceiling/floor assemblies and structural floors.

C. Firestopping: Methods and materials applied in penetrations and unprotected openings to limit spread of heat, fire, gasses and smoke.

D. Penetration: Opening or foreign materials passing through or into barrier or structural floor such that full thickness of rated materials is not obtained.

E. Sleeve: Metal fabrication or pipe section extending through thickness of barrier and used to permanently guard penetration. Sleeves are described as part of penetrating system in other sections and may or may not be required.

F. System: Specific products and applications, classified and numbered by the rating agency to close specific barrier penetrations.

1.5 SYSTEM DESCRIPTION

A. Design requirements:

1. Fire-rated construction: Maintain barrier and structural floor fire resistant ratings including resistance to cold smoke at all penetrations.
2. Smoke barrier construction: Maintain barrier and structural floor resistance to cold smoke at all penetrations.

1.6 SUBMITTALS

A. Product data: Manufacturer's specifications and technical data including the following:

1. Detailed specification of construction and fabrication.
2. Manufacturer's installation instructions.

B. Shop drawings: Submit firestop assemblies and devices for all openings and through penetrations in fire-rated construction. Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, plus the following specific requirements.

1. Details of each proposed assembly identifying intended products and applicable rating agency classification.
2. Manufacturer or manufacturer's representative shall provide qualified engineering judgments and drawings relating to conditions where rated assemblies do not exist.

C. Quality control submittals:

1. Statement of qualifications.

D. Certifications: Letters or forms showing acceptance by local authorities for systems without acceptance by a rating agency.

1.7 QUALITY ASSURANCE

A. Products and assemblies shall be tested and labeled by an independent, nationally recognized testing and labeling authority.

B. Comply with requirements for LEED certification specified in Division 01.

C. Installer's qualification: Firm experienced in installation or application of systems similar in complexity to those required for this project, plus the following:

1. Acceptable to or licensed by manufacturer, state, or local authority where applicable.
2. At least 2 years' experience with systems.
3. Successfully completed at least 5 projects of comparable scale, using these systems.

D. Local and state regulatory requirements: Obtain acceptance for proposed assemblies not conforming to specific rating agency classifications or rated assemblies.

E. Materials shall have been tested to provide fire rating at least equal to that of the construction in which they are to be installed.

F. VOC content: Field-applied adhesives and sealants, limits per South Coast Air Quality Management District (SCAQMD), Rule No. 1168.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packing and shipping:

1. Deliver products in original unopened packaging with legible manufacturer's identification.
2. Coordinate delivery with scheduled installation date, allow minimum storage at site.

B. Storage and protection: Store materials in a clean, dry, ventilated location. Protect from soiling, abuse, moisture and freezing when required. Follow manufacturer's instructions.

1.9 PROJECT CONDITIONS

A. Existing conditions:

1. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.
2. Proceed with installation only after penetrations of the substrate and supporting brackets have been installed.

B. Environmental requirements:

1. Furnish adequate ventilation if using solvent.
2. Furnish forced-air ventilation during installation if required by manufacturer.
3. Keep flammable materials away from sparks or flame.
4. Provide masking and drop cloths to prevent contamination of adjacent surfaces by firestopping materials.
5. Comply with manufacturing recommendations for temperature and humidity conditions before, during and after installation of firestopping.

1.10 WARRANTY

A. General project warranty and correction period, as required in general conditions and Division 01, requires repair or replacement of materials or systems which fail in joint adhesion, co-adhesion, abrasion resistance, weather resistance, extrusion resistance, migration resistance, stain resistance, or general durability or appear to deteriorate in any other manner not clearly specified by submitted manufacturer's data as an inherent quality of the material for the exposure indicated.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Acceptable manufacturers and products: Those listed in the UL Fire Resistance Directory for the UL System involved, or rated for the application by Warnock Hersey or by another acceptable rating agency.

2.2 THROUGH-PENETRATION FIRESTOPPING OF FIRE-RATED CONSTRUCTION

A. Systems or devices listed and labeled by a rating agency, and conforming to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance. The system shall be symmetrical for wall applications. Systems or devices shall be asbestos-free.

1. Additional requirements: Firestopping shall withstand the passage of cold smoke either as an inherent property of the system, or by the use of a separate product included as a part of the rated system or device, and designed to perform this function.
2. Additional requirements: Firestopping sealants shall be red in color to facilitate field verification of firestopping application.

2.3 MEMBRANE PENETRATIONS OF FIRE-RATED CONSTRUCTION

A. Systems for devices using UL listed electrical boxes within a fire-rated wall, listed and labeled by a rating agency, and conforming to the construction type, penetrant type, annular space requirements and fire rating involved in each separate instance. Systems shall be asbestos-free.

1. Additional requirements: Firestopping shall withstand the passage of cold smoke either as an inherent property of the system, or using a separate product included as a part of the rated system or device, and designed to perform this function.
2. Additional requirements: Firestopping sealants shall be red in color to facilitate field verification of firestopping application.

2.4 SMOKE-STOPPING AT SMOKE PARTITIONS

A. Through-penetration smoke-stopping: Any system complying with the requirements for through-penetration firestopping in fire-rated construction is acceptable, provided that the system includes the specified smoke seal or will provide a smoke seal. The length of time of the fire resistance may be disregarded.

2.5 PENETRATIONS BY CABLE TRAYS

A. Where cable trays penetrate fire-rated construction, provide firestopping materials that may be easily removed to allow installation and removal of cables from the tray. Provide materials similar to fire blocks, fire-stopping pillows, or fire-stopping bags.

2.6 ACCESSORIES

A. Fill, void or cavity materials and forming materials: Classified for firestopping use, or included in a rated firestopping assembly, by a rating agency.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.

1. Verify barrier penetrations are properly sized and in suitable condition for application of materials.
2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean surfaces to be in contact with penetration seal materials, of dirt, grease, oil, loose materials, rust, or other substances that may affect proper fitting, adhesion, or the required fire resistance.

3.3 INSTALLATION

A. Provide firestop devices or assemblies for every opening and penetration in floors or fire-rated construction.

B. Install penetration seal materials in accordance with printed instructions of the rating agency and in accordance with manufacturer’s instruction.

C. Ensure an effective smoke barrier in each sealed penetration. Install smoke stopping as specified for firestopping.

D. Protect materials from damage on surfaces subject to traffic.

E. Where large openings are created in walls or floors to permit installation of conduits, cables, cable tray, or other items, close unused portions of opening with firestopping material tested for the application.

3.4 FIELD QUALITY CONTROL

A. Examine penetration seals to ensure proper installation before concealing or enclosing them.

B. Keep areas of work accessible until inspection and acceptance by applicable authorities.

C. Before substantial completion, patch and repair firestopping cut or penetrated by other construction work.

3.5 ADJUSTING AND CLEANING

A. Clean up spills of liquid components.

B. Neatly cut and trim materials as required.

C. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

END OF SECTION 260507

SECTION 260519 - WIRES AND CABLES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Wires and cables rated 600 volts and less.

B. Type MC and Type MC luminary cables as permitted in Part 3.

C. Type AC-HCF and Type NM cables are not permitted.

1.2 RELATED SECTIONS

A. Conduits: Section 260533.

B. Lighting controls: Section 260923 and 260936

C. Lighting: Section 265100.

1.3 REFERENCES

A. ANSI/NEMA WC 70: Power Cables rated 2000 Volts or Less for Distribution of Electrical Energy.

B. ASTM B3: Standard Specification for Soft or Annealed Copper Wire.

C. ASTM B8: Standard Specification for Concentric-Lay-Stranded Copper Conductors.

D. UL 44: Standard for Thermoset-Insulated Wires and Cables.

E. UL 83: Standard for Thermoplastic-Insulated Wires and Cables.

F. Additional UL Standards as indicated.

1.4 SUBMITTALS

A. Product data:

1. Each type of wire and cable, including accessories.
2. Include copies of UL certifications showing compliance with requirements in “Quality Assurance” below.

1.5 QUALITY ASSURANCE

A. Electrical components, devices, and accessories: Listed and labeled as defined in NFPA 70 Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Products and installation shall comply with NFPA 70 and other applicable national, state, and local electrical codes.

1.6 DELIVERY, STORAGE, AND HANDLING

A. General requirements: Deliver, store, and handle wire and cable in accordance with the manufacturer's instructions.

1. Wire and cable shall be packaged in a manner that protects them during ordinary handling and shipping. Ship from manufacturer with ends temporarily sealed against moisture.
2. Protect wire and cable during storage (both onsite and offsite).

a. Store in a clean and dry location. Elevate from surfaces where water can accumulate, and cover cable rolls to protect against weather.

3. Handle wire and cable as recommended by the manufacturer. Do not pull from the center or periphery of the cable reel.
4. Damaged wire and cable shall be removed from the project site.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE (600 volts maximum)

A. Conductors: UL listed and NEMA WC 70 compliant; Copper, 98 percent conductivity, suitable for 600-volt duty; rated 90-degree Celsius temperature for wet/dry applications; solid bare annealed copper for No. 10 and smaller complying with ASTM B 3, and stranded for No. 8 and larger complying with ASTM B 8.

B. Conductor insulation:

1. Type THHN / THWN-2: Comply with UL 83; PVC insulation, nylon jacket.
2. Type XHHW-2: Comply with UL 44; stranded conductors XLPE insulation.

C. Conductor identification: Markings along outer braid denoting conductor size, voltage classification, type of insulation, and manufacturer's trade name, and color code. Identification shall extend to branch circuits and outlets. Use the color coding system tabulated below throughout the building's network of feeders and circuits, unless otherwise required by the authority having jurisdiction.

1. Colors on conductors No. 10 and smaller, or No. 6 and smaller for grounded and grounding conductors: Solid colored insulation.

2. Colors on conductors No. 8 and larger, or No. 4 and larger grounded and grounding conductors: Colored tape wrapped a minimum of 6 inches (150 mm) on either end of conductor.

COLOR CODE (600 volts maximum)				
VOLTAGE	NEUTRAL	PHASE		
		A	B	C
120 volts, 2-wire	White	Black, Red, or Blue depending on phase		
265 volts, 2-wire	Gray	Brown, Orange, or Yellow depending on phase		
208/120 volts wye, 3-phase, 4-wire	White	Black	Red	Blue
460/265 volts wye, 3-phase, 4-wire	Gray	Brown	Orange	Yellow

D. Wires used solely for grounding purposes shall be green, where insulated.

E. Control wiring shall be coded with colors different from those used to designate phase wires.

2.2 WIRING ACCESSORIES

A. Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service where installed.

B. Twist-on wire connectors (dry locations):

1. Color-keyed.
2. Basis of design: Ideal Industries, Inc., Wingnut®, 3M Company "Scotchlok", or King Innovation.

C. Twist-on wire connectors (damp and wet locations):

1. Connectors shall be listed under UL 486D.
2. Basis of design: Ideal Industries, Inc., UnderGround®, models 60, 64, or 66 as appropriate; King Innovation DryConn®; or 3M Company.

2.3 PLENUM CABLES

A. Plenum cable:

1. Insulated with material that is UL classified for low flame and smoke-spread characteristics, for use in plenum areas without conduit in accordance with the requirements of NFPA 70.
2. Communications cable: Type MPP or CMP in accordance with NFPA 70.
3. Insulator basis of design: Dupont “Teflon FEP”.

2.4 METAL-CLAD CABLE, TYPE MC

A. Cable: UL 83 and UL 1569 listed; 600-volt, single- or multi-circuit Type MC Cable, multi-conductor with ground conductor; steel interlocked armor.

B. Conductors: Solid copper No. 10 and smaller, and stranded copper No. 8 and larger; conforming to ASTM B 3 or B 8.

C. Conductor Insulation: Type THHN/THWN insulated single conductors including ground conductor.

D. Fittings:

1. UL 514B listed, steel or malleable iron fittings. Zinc die-cast fittings shall not be acceptable.
2. Basis of design: KonKore/Atkore International.

2.5 METAL-CLAD CABLE, TYPE MC LUMINARY CABLE

A. Cable: UL 66, UL 83, UL 1569, and UL 2556 listed; 600-volt, single- or multi-circuit Type MC luminary cable; multi-conductor with power conductors, control conductors, and ground conductor; steel interlocked armor.

1. Power conductors: Solid copper, Type THHN insulation, No. 10 and No. 12 AWG.
2. Control conductors: Solid copper, Type TFN insulation, twisted pair No. 16 AWG.

B. Fittings:

1. UL 514B listed, steel or malleable iron fittings. Zinc die-cast fittings shall not be acceptable.
2. Basis of design: KonKore/Atkore International.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Provide wire and cable indicated in accordance with national, state, and local electrical codes.

B. Conceal wire and cable in new construction and in locations with finished walls, ceilings, and floors unless otherwise noted on drawings.

C. Wire and cable serving systems over 100 volts shall be installed in raceways, except where otherwise noted on drawings.

D. Wire and cable serving systems rated below 100 volts shall be installed in raceways, except where otherwise noted in individual specification sections. Refer to paragraph “INSTALLING CABLE RATED BELOW 100 VOLTS” below for additional information.

3.2 INSTALLING INTERIOR WIRING

A. Sizes: Minimum sizes shall be as follows, unless a larger size is indicated on the drawings.

1. 120-volt branch circuits:

a. Homerun from first outlet to panel: No. 12 when run is 50 feet (15,000 mm) or less; No. 10 when run is between 50 feet (15,000 mm) and 100 feet (30,000 mm); No. 8 when run is more than 100 feet (30,000 mm).
b. First outlet to other outlets: No. 12.

2. Exit light and emergency lighting circuits: No. 10. Do not install in raceways, outlet boxes, or other locations with non-emergency wiring systems.
3. Other systems (over 100-volts): Minimum No. 12 unless specified or shown on drawings to be smaller.

B. Wiring methods and locations: Wires and cables shall be installed based on the following requirements, unless otherwise noted.

1. Feeders, exposed: Type THHN / THWN-2, single conductors in raceway.
2. Feeders, concealed in ceilings, walls, partitions, and crawlspaces: Type THHN / THWN-2, single conductors in raceway.
3. Feeders, concealed in concrete and below slab-on-grade: Type THHN / THWN-2, single conductors in raceway.
4. Branch circuits, concealed in ceilings, walls, and partitions:

a. Unless otherwise indicated, utilize Type THHN / THWN-2, single conductors in raceway.
b. Metal-clad cable, Type MC cable and MC luminary cable - Refer to section “INSTALLING MC CABLE” below for acceptable locations.

5. Branch circuits, exposed: Type THHN / THWN-2, single conductors in raceway.
6. Branch circuits, concealed in concrete and below slab-on-grade: Type THHN / THWN-2, single conductors in raceway
7. Feeders serving vertical risers: Type XHHW-2, single conductors in raceway.
8. All other applications: Provide Type THHN / THWN-2, single conductors in raceway or wire and cable type as indicated.

C. Splicing shall be done in outlet boxes and junction boxes and not in conduit.

1. Conductors No. 8 and larger: Terminated, spliced and taped, wherever practical, with compression connectors or solderless connectors. Use tools recommended by the manufacturer.
2. Splices in conductors No. 10 and smaller, including lighting fixtures: Made with wire connectors.

D. Wiring in high ambient temperature areas shall be of types required by NFPA 70 including over boilers and breechings, in fixture channels, and on rooftops.

E. Wires shall be neatly shaped in panels, wireways, boxes, and appurtenances.

3.3 INSTALLING CABLE RATED BELOW 100 VOLTS

A. Install in raceway, unless otherwise indicated in individual specification sections.

B. Where individual specification sections allow cable to be installed either in raceway or on J-hooks, install as follows:

1. Wiring method:

    a. Wiring in walls, above inaccessible ceilings, where exposed in finished spaces, exposed on walls, and wherever it may not be accessible or may be subject to physical damage: Install cables in raceway.
    b. Wiring exposed in ceilings of unfinished spaces: Install cables in raceway.
    c. Wiring concealed above accessible suspended ceilings: Install cables on J-hooks.
    d. Wiring in ceiling spaces of communications equipment rooms: Install cables on cable trays.
    e. Wiring within enclosures, consoles, cabinets, desks, and counters: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and/or distribution spools.

2. Conceal raceway and cables, except in unfinished spaces, in open ceiling spaces and raceways on existing walls.
3. Cable not in raceways:

    a. Do not install in hangers used for pipes, electric conduits, or ceiling hangers, nor support it in any way by attachments to pipes, conduits, or ceiling hangers.
    b. Install without damaging conductors, shield, or jacket. Cables shall not run through structural members or be in contact with pipes, ducts, or other potentially damaging items.
    c. Install away from potential EMI sources, including electrical power lines and equipment.
    d. Install parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.

4. Cable support with J-hooks:

    a. Install J-hooks at intervals not exceeding 60 inches.
    b. Secure cables on J-hooks with cable ties. Avoid cinching cables.
    c. Provide separate J-hooks for each low-voltage system.

5. Each cable run shall contain an ‘S’ loop or other means to accommodate expansion or contraction.
6. Where ceiling plenums are used for passage of air by heating and air conditioning system, install cable in conduit or use UL listed plenum cable.

C. For cable installed in conduit, comply with requirements for raceways and boxes specified in Section 26 0533, Conduits, and Section 26 0534, Boxes.

1. Provide separate conduit systems for each low-voltage system.
2. Pull cables without exceeding cable manufacturer's recommended pulling tensions.

    a. Pull cables simultaneously if more than one is being installed in same raceway.
    b. Use pulling compound or lubricant, if necessary. Use compounds that will not damage conductor or insulation.
    c. Use pulling means, including fish tape, cable, rope, and basket-weave wire or cable grips, that will not damage cables or raceway.

D. Avoid installing near hot utilities, which might adversely affect system performance or result in damage to the cable. If cable must be placed close to such utilities, keep it separate and protect with insulation.

E. Cable bends shall have a radius not less than the value recommended by the cable manufacturer.

F. Tag cables connected to electronic equipment, to show function and the location of other end. Securely fasten labels to the cable.

3.4 INSTALLING MC CABLE

A. Install in compliance with NFPA 70.

1. Bend radius shall not be less than 7 times the external diameter of the cable.
2. Securely fasten in place at intervals of not more than six feet, with suitable clamps or fasteners of approved type.
3. Maintain at least 6-inch clearance between MC cables and other piping systems.
4. Do not fasten MC cable to conduits, pipes, or ducts.
5. Support individual MC cables hung from roof structure or structural ceiling by independently supported hangers using hanger rods, jack chains, or No. 10 wire.
6. Support groups of MC cable run in parallel on trapeze hangers suspended from 0.5-inch hanger rods, held in place with MC cable clamps or fasteners.
7. Installing hangers for MC cable shall be similar to installing conduit hangers.
8. Support MC cable on each side of a bend and not more than 1 foot from an enclosure where an MC cable is terminated.

B. Sizes: Cables larger than No. 8 shall not be permitted.

C. Locations: Type MC cable may be used for branch circuits in the following locations and conditions, unless otherwise indicated:

1. Concealed in accessible ceiling spaces or within casework.
2. Light fixture whips from junction box in accessible ceiling to recess-mounted lighting fixtures. Whips shall not exceed 6 feet in length.
3. Within drywall partitions / metal stud wall construction: Between wiring devices and from wiring device to nearest junction box in accessible ceiling.
4. Do not use between ceiling junction boxes and homeruns back to panelboard. Homeruns shall be wire in raceway.
5. From first ceiling junction box located above or below first device or switch to branch circuit loads served. MC cabling shall not be used between first junction box and homerun back to panelboard.
6. Do not install in masonry partitions or masonry walls.

D. Connect cable with wiring accessories specified above.

E. All MC cable, including those run to switches, shall have a neutral conductor. This conductor is not indicated on the drawings.

F. Provide junction box in accessible ceiling space of each space and terminate MC cables in space at box

G. Install in lengths no longer than 12 feet, terminating at junction box or outlet box at each end.

3.5 INSTALLING MC LUMINARY CABLE

A. Install in compliance with NFPA 70.

B. Locations: Type MC luminary cable may be used only above ceilings for LED lighting fixtures with dimmable drivers controlled by a Class 2, low-voltage 0-10VDC controller; connections between the controller and lighting fixtures within a space.

C. Connect cable with wiring accessories specified above.

D. Cable larger than No. 10 shall not be permitted.

E. Maximum length: 12 feet.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Grounding and bonding electrical systems and equipment.

B. Ground system test.

1.2 REFERENCES

A. ANSI/TIA/EIA J-STD-607

B. IEEE STD 142

C. NFPA 70

D. ASTM F467 and F468

E. UL 467

1.3 DEFINITIONS

A. Area served by a separately-derived system: The area within the building that contains any part of a circuit of the system.

1.4 SUBMITTALS

A. Product data: Ground connections.

B. Certifications: System test.

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Ground conductor, unless specifically noted otherwise, shall be copper, 98 percent conductivity, solid for No. 10 AWG and smaller and stranded for No. 8 AWG and larger.

B. Grounding busbar: Predrilled rectangular bars of electro-tin plated copper, 0.25 inches (6.3 mm) thick, 12 inch (300 mm) long, unless otherwise indicated on drawings, with 0.3125 inch or 0.4375 inch (7.9 mm or 11.1 mm) diameter holes horizontally spaced 1 to 1.125 inches (25.4 to 28.6 mm) apart.

1. Stand-off insulators for busbar shall be flame-resistant fiberglass-reinforced thermoset polyester, UL recognized per UL Standard 891.

C. Mechanical type ground connectors:

1. Connectors:

a. IEEE 837 and UL 467 compliant, listed for use for specific types, sizes, and combinations of conductors and connected items.
b. Basis of design: FCI Burndy G Series.

2. Nuts, bolts, and washers: Silicon bronze alloy type B per ASTM F467 and F468.

D. Exothermic type ground connections:

1. Exothermic welding systems.
2. Basis of design: “Cadweld,” manufactured by Erico International Corporation.

E. Lugs:

1. Lugs shall be two- or four-hole.
2. Basis of design: Burndy Hylug series.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Provide the complete grounding of conduit systems, electrical equipment, conductor and equipment enclosures, motors, transformers, and neutral conductors in accordance with applicable codes. Grounded phase and neutral conductors shall be continuously identified. Continuity of metal raceways shall be insured by double locknuts. Metal raceways shall not be used as the pathway to ground.

B. Ground system connections which are beneath the floor and in a concealed or inaccessible location shall be brazed or welded. Brazing and welding shall be “CADWELD.”

C. Bonding interior metal ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.

3.2 EQUIPMENT GROUNDING AND BONDING

A. Provide insulated equipment grounding conductors with feeders and branch circuits.

B. Air-duct equipment circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

C. Isolated grounding receptacle circuits shall be provided with an additional equipment grounding conductor insulated from the normal equipment grounding conductor.

1. Provide an isolated equipment grounding conductor for connection to the isolated ground type receptacle's grounding terminal. The isolated equipment grounding conductor shall be in addition to the system equipment grounding conductor used to bond the outlet box to the grounding system.
2. Multiple isolated ground type receptacles on a single circuit may use a common insulated equipment ground conductor for connection to the grounding terminals.
3. Terminate the circuit's insulated equipment grounding conductor in the circuit's originating panelboard on an insulated equipment ground bar (insulated from the panel's normal equipment ground bar and panel enclosure).
4. Provide an insulated equipment grounding conductor from the panel's insulated equipment ground bar to the originating system's (service or separately derived system) neutral terminal. This conductor shall follow the route of the panel feeder through any intervening distribution equipment to the originating system.
5. Insulating equipment grounding conductors that do not have insulation as described in Part 2 shall be marked (where visible to normal inspection) with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Signal and communication equipment: Ground and bond as required by NFPA 70.

3.3 IDENTIFICATION

A. Comply with requirements in Section 260553, Identification for Electrical Systems, for instruction signs. The label or its text shall be green.

3.4 GROUNDING SYSTEM TEST

A. Ensure that grounding system is continuous and that resistance to earth is not more than 10 ohms.

END OF SECTION 260526

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SECTION 260533 - CONDUITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Conduit, raceways, and accessories, aboveground.

1.2 RELATED SECTIONS

A. Firestopping: Section 260507.

B. Boxes: Section 260534.

C. Painting: Division 09.

1.3 DEFINITIONS

A. Conduit: Conduit, raceway, or tubing.

B. EMT: Electrical metallic tubing.

C. FMC: Flexible metal conduit.

D. IMC: Intermediate metal conduit.

E. LFMC: Liquid-tight flexible metal conduit.

1.4 SUBMITTALS

A. Product data:

1. Each type of conduit and raceway included in the work, and related fittings.
2. Accessory materials.
3. Hangers and fasteners.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, the following listed manufacturers provide products of acceptable quality:

1. Steel conduit and tubing:

    a. AFC Cable Systems, Inc. (FMC and LFMC)
    b. Allied Tube & Conduit; a Tyco International Ltd-Co.
    c. O-Z/Gedney, Unit of General Signal.
    d. Wheatland Tube Co.

2. Steel conduit fittings:

    a. Appleton Electric Co.
    b. Cooper Crouse-Hinds.
    c. Hubbell, Inc.; Killark Electric Manufacturing Co.
    d. O-Z/Gedney; Unit of General Signal.
    e. Spring City Electrical Manufacturing Co.
    f. Thomas & Betts Corporation.
    g. Wheatland Tube Co.

3. Wireways and fittings:

    a. Hoffman Engineering Co.
    b. Lamson & Sessions, Carlon Electrical Products.
    c. Schneider Electric; Square D products.

4. Conduit hangers and supports:

    a. Thomas & Betts “Kindorf”.
    b. Tyco Power-Strut.
    c. Unistrut Diversified Products.

5. Fasteners:

    a. Caddy Fasteners by Erico Products Inc.
    b. ITW Ramset “Red Head”.
    c. Wej-It Fastening Systems.

2.2 CONDUIT AND FITTINGS

A. Galvanized steel conduit: Hot-dip galvanized with threads galvanized after cutting:

    1. Intermediate steel conduit (IMC) conforming to UL 1242 and ANSI C80.6.

B. Steel conduit fittings: Cast malleable iron fittings with smooth finish and full threaded hubs. Include steel or malleable iron locknuts, bushings, and other fittings.

    1. Insulating bushings: Basis of design: Thomas & Betts Series 22.
    2. Hub fittings with recessed sealing ring and nylon insulated throat: Basis of design: Thomas & Betts Series 370.
    3. Fittings for exposed locations: Conduit outlet bodies, cast iron or cast aluminum, zinc or cadmium plated.

C. Electrical metallic tubing (EMT): Hot-dip galvanized or sherardized thin-wall steel conduit conforming to UL 797 and ANSI C80.3.

D. Connectors and couplings for EMT: Concrete- or rain-tight, compression type, made of zinc- or chromium-plated steel. Connectors shall have nylon insulating throats.

1. Compression connector: Basis of design: Thomas & Betts No. 5223.
2. Compression coupling: Basis of design: Thomas & Betts No. 5220.

E. Flexible metal conduit (Type FMC): Made of sheet metal strip, interlocked construction, conforming to UL 1.

F. Liquidtight flexible metal conduit (Type LFMC) shall conform to UL 360.

G. Connectors for flexible metal conduit:

1. Angle wedge with nylon insulated throat.
2. Basis of design: Thomas & Betts “Tite-Bite” connector Series 3110 and 3130.

H. Liquidtight type connectors:

1. UL 14814A. Fittings: With nylon insulated throat.
2. Basis of design: Thomas & Betts Series 5331.

I. Wireways: Steel wireway with hinged cover, complying with UL 870 Standard for Wireways, Auxiliary Gutters, and Associated Fittings.

1. Cover: Front accessible opening along complete length of wireway.
2. Finish: Gray polyester powder finish inside and out.
3. Basis of design: Square D "Square-Duct" or Pentair/Hoffman "Angled Trough".

J. Fittings for wireways: Made with removable covers to permit installation of a complete system with access to wires throughout the system, UL listed with wireways. Connections: Threaded screws at every connector.

K. Weatherproof expansion fittings:

1. With bonding jumpers.
2. Basis of design: O-Z/Gedney Types AX and TX.

2.3 ACCESSORY MATERIALS

A. Pull rope: Polypropylene, minimum 0.1875-inches thick, tensile strength 800 pounds, work load 130 pounds.

B. Caps and plugs: Basis of design: Thomas & Betts Series 1470.

C. Lubricant:

1. UL approved.

2. Basis of design: Ideal Industries, Inc. “Yellow 77”.

D. Bituminous protective coating: Coal tar based, self-priming on steel, applied in a wet film thickness at least 22.0 mils (559 microns) per coat.

E. Rust inhibitive paint:

1. Alkyd based, white, black, or bronzetone; applied in a wet film thickness of at least 2.9 mils.
2. Basis of design: Benjamin Moore Super Spec HP D.T.M. Alkyd Low Lustre P23.

2.4 CONDUIT HANGERS

A. Adjustable hangers: Basis of design: Kindorf C-711 lay-in hanger or C-710 Clevis hanger.

B. Trapeze hangers:

1. Constructed of channels with notched steel straps.
2. Steel strap basis of design: Kindorf C-105.

C. Channels:

1. Steel, 1.5 inches wide with 7/8-inch continuous slot, gauges and weights.
2. Basis of design: Kindorf B-900 series, hot-dipped galvanized finish.

D. Beam clamps:

1. Adjustable type for connecting hanger rod to steel beam.
2. Basis of design: Kindorf E-160 or U-569

E. Hangers for conduit 1.0 inch and smaller, through or below bar joists: “Hang-on” hangers attached to joists with Minerallac scissor clips or two-piece stud clips.

F. Finish: For hangers, assemblies, plate washers, rods, locknuts, channels, bolts, and appurtenances:

1. Zinc plated.

2.5 FASTENERS

A. General: Select fasteners such that load applied does not exceed one-fourth of manufacturer’s load capacity in 3500 psi (24000 kPa) concrete.

B. Fasteners to concrete: Self-drilling type expansion anchors, or machine bolt drop-in anchors for drilled holes. Fasteners to concrete ceilings shall be vibration- and shock-resistant.

C. Fasteners to drywall or cavity wall: Toggle bolts, hollow-wall drive anchors, or nylon anchors as required.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Provide complete, separate and independent raceway system for each of the various wiring systems including, but not limited to, the following:

1. Lighting
2. Power
3. Exit Lighting*
4. Emergency Lighting System*
5. Fire Alarm System
6. Low Voltage Control System
7. Control Wiring
8. Voice and Data Systems
9. Sound System
10. Television System
11. Security Systems

*These wiring systems may be installed in common raceways.

B. Wire raceway systems completely, except where otherwise indicated, as shown on drawings and as required for satisfactory operation of each system.

C. Where wireways are required or used to facilitate the installation, size them to accommodate conductors, in accordance with NFPA 70.

D. Types and locations of conduits are scheduled at the end of the section.

E. Do not install conductors or pull rope during installation of conduit.

F. Where conduit is connected to a cabinet, junction box, pull box, or auxiliary gutter, protect the conductors with an insulating bushing. Provide locknuts both inside and outside the enclosure. Where conduit is stubbed up to above ceilings for future wiring, close ends with bushings.

G. Bituminous protective coating:

1. Coat exposed threads on steel conduits in concrete slabs at couplings and fittings, after joints are made up.
2. Coat metallic conduits below grade not in concrete, and where emerging from below grade or slabs, four inches above and below grade or slab.

H. Rust-inhibitive paint:

1. Exposed threads of exterior conduit.
2. Unfinished metal components.

I. Make turns in conduit runs with manufactured elbows or using machines or tools designed to bend conduit. Turns shall be not less than the various radii permitted by NFPA 70.

J. Sizes:

1. Do not use conduit smaller than 0.75 inches.
2. Feeder conduits shall be as large as indicated, or as required by NFPA 70 (whichever is larger). Do not install more than one feeder in a single conduit.
3. Conduit sizes shown on drawings are based on Type THHN/THWN-2 wire.

K. Make vertical runs plumb and horizontal runs level and parallel with building walls and partitions.

L. Ground conduits as required by NFPA 70.

M. Where conduits pass through building expansion joints, and wherever relative movement could occur between adjacent slabs, equip with weatherproof expansion fittings and bonding jumpers.

N. Where conduits through roof cannot be installed inside equipment or pipe curbs, flash them in accordance with the SMACNA Architectural Manual.

1. Coordinate flashing details and materials with manufacturer and installer of roofing system.

O. Run conduits concealed in new construction except where connecting to surface-mounted cabinets and equipment, and in electrical and mechanical equipment spaces. Install conduit above suspended ceilings and within walls and partitions.

P. From each flush-mounted lighting or power panelboard, provide at least four 0.75-inch empty conduits, to terminate in furred ceiling space above. On floors above ground floor, provide two additional 0.75-inch conduits terminating in furred ceiling space below. Cap these conduits.

Q. Immediately after each run of conduit is completed, test it for clearance, smooth the joints, and close at each end with caps or plugs to prevent entrance of moisture or debris.

R. Conduit installed outdoors or at indoor locations exposed to continuous or intermittent moisture shall provide a liquid-tight seal. Use steel or malleable iron hub fittings. Coat exposed threads with bituminous protective coating.

S. Install no conduit in these locations:

1. Setting beds for terrazzo or tile.
2. Concrete toppings, unless specifically approved by Structural Engineer.

T. Conduit in concrete decks above grade: Not permitted.

U. Install insulated bushings on ends of conduit stubs and sleeves.

3.2 INSTALLING PULL BOXES, JUNCTION BOXES, OUTLET BOXES

A. Install as specified in Section 260534, Boxes.

B. Install pull or junction boxes in long runs of conduits or where necessary to reduce the number of bends in a run.

1. Select inconspicuous locations. Do not install until locations have been approved by the Architect.
2. Install boxes flush with wall or ceiling surfaces, with flat covers. Where removable ceiling units are used, locate boxes above ceilings.

C. Verify door swings with door frame installed before locating switch outlets. Locate switch outlets on the strike side of the door frame.

3.3 INSTALLING FLEXIBLE CONDUIT

A. Installation shall comply with NFPA 70.

1. Minimum length: 2 feet.
2. Maximum length: 6 feet.

B. Make immediate connections to transformers, recessed lighting fixtures, speakers, and other equipment in suspended ceilings with flexible metal conduit. Include sufficient slack to permit removal of fixture or equipment.

C. Make immediate connections to motors with liquid-tight flexible metal conduit. Include sufficient slack to reduce the effects of vibration.

D. In wet locations, install liquid-tight type, in such a manner that liquid tends to run off the surface and not drain toward the fittings.

E. Where fittings are brought into an enclosure with a knockout, install a gasket assembly consisting of an O ring and retainer on the outside.

3.4 INSTALLING PULL ROPE AND CONDUCTORS

A. After conduit is installed, fish pull rope. After completion of the work of this project, pull rope shall remain in conduits identified as to be left empty. Provide minimum 6 inches of pull rope at each end.

B. Do not use a pull rope that has a tensile strength of more than one of the conductors of a two-wire circuit, more than two of the conductors of a three-wire circuit, or more than three of the conductors of a four-wire circuit.

C. Do not pull conductors into the conduits until the system is entirely completed and wet building materials are dry.

D. Use only a lubricant approved for use with conductor materials and pull rope materials.

3.5 INSTALLING SLEEVES

A. Coordinate sleeve selection and application with selection and application of firestopping specified in Section 260507.

B. Concrete slabs and walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Fire-rated assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

D. Cut sleeves to length for mounting flush with both surfaces of walls.

E. Extend sleeves installed in floors 2 inches above finished floor level.

F. Size pipe sleeves to provide 0.25-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed.

G. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.

H. Interior penetrations of non-fire-rated walls and floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint.

I. Fire-rated-assembly penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Section 260507.

J. Roof-penetration sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.

3.6 INSTALLING CONDUIT HANGERS

A. Single runs of overhead conduits 1.25-inch size and larger shall be supported by adjustable hangers, using 0.375-inch rods for conduits up to 2.0-inch size and 0.5-inch rods for conduits larger than 2.0 inches.

B. Support groups of conduits run in parallel on trapeze hangers suspended from 0.5-inch hanger rods.

C. Space hangers not over 5 feet apart for non-metallic conduits, and not over 10 feet apart for metal conduits. Support conduits within 3 feet of each outlet, junction or pull box.

D. Below bar joist construction, support hangers from a length of structural channel, welded to the top chords of at least two joists.

E. Where large numbers of conduits are grouped together, stagger individual hangers so as not to concentrate the load on a few joists.

F. Where hanger rods are attached to structural beams, use adjustable beam clamps.

G. Below precast plank construction, hanger rods shall pass through the precast planks and be secured on top side with nut, locknut and plate washer. Plate washers shall be at least 4 inches square and 0.125 inch thick. Top of hanger assembly shall be concealed in the concrete fill which will be placed over the planks.

H. Attach hanger rods to concrete with expansion bolts and anchors.

3.7 CONDUIT IN EXISTING BUILDING

A. Remove superfluous electrical equipment and cap outlets not being used, as specified in Section 260504, Electrical Demolition.

B. Remove any conduits found to be empty. Conduit shall not be abandoned in place unless embedded in building concrete.

C. In existing areas that are being renovated it is the intent to show on the drawings what the finished areas will contain when completed. Except as specified otherwise, existing conduit, and outlet boxes may be reused where they meet specifications and code requirements. Replace existing products or materials which are not suitable for reuse as determined by the Architect.

D. Suitably cap superfluous concealed outlets, and remove unused wire. Remove superfluous raceways exposed in finished areas, and abandon superfluous raceways concealed in walls.

E. Install concealed conduit in existing building wherever possible above ceilings, in new walls, and in existing furred spaces. Install exposed conduit in secondary rooms, such as storage rooms and utility rooms.

F. Where existing conduit penetrates fire-rated partitions, and where there is no firestopping, provide firestopping. Maintain indicated fire rating of walls, partitions, ceilings, and floors at existing conduit penetrations. Comply with Section 260507.

3.8 SCHEDULE OF LOCATIONS

A. IMC with screw joint couplings:

1. Wiring to exterior equipment.
2. Conduits 2 inches and larger.
3. Conduits for power feeders serving distribution equipment.
4. Elbows penetrating floor slabs, exterior walls, or bearing walls.
5. Conduits in electrical and mechanical rooms.
6. Conduits run between top of beams and roof decking.
7. Conduits for fire alarm system and security system.

B. EMT: Sizes 1.5 inches and smaller except as noted above.

C. FMC and LFMC: Where noted elsewhere in this section.

END OF SECTION 260533

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SECTION 260534 - BOXES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Boxes with covers.

1.2 RELATED SECTIONS

A. Conduits: Section 260533.

B. Access doors: Division 08.

C. Wiring devices: Sections 260923 and 262726.

1.3 SUBMITTALS

A. Product data: Each type of box and poke-thru service fitting included in the project.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, the following listed manufacturers provide products of acceptable quality:

1. Boxes:

a. Appleton/EGS Electrical Group
b. RACO/Hubbell Electrical Products
c. Steel City/Thomas & Betts

2.2 MATERIALS

A. Outlet, switch, and junction boxes:

1. Sheet metal: NEMA OS 1, sherardized or galvanized stamped.
2. Cast-metal, where required for weather-exposed or exposed locations: NEMA FB 1, ferrous alloy or aluminum, Type FD, with gasketed cover.

2.3 BOXES FOR WALLS, PARTITIONS, AND CEILINGS

A. Outlet boxes in concrete construction: Octagonal, two-piece type, of sufficient depth to keep conduits not closer than 1 inch (25 mm) to surface.

B. Toggle / snap switch and receptacle wall boxes in masonry partitions and walls: Square cornered tile wall boxes 3.5 inches (90 mm) deep, or 4-inch (100-mm) square boxes with raised tile wall device covers. The device covers shall be of extra depths required to suit the block or brick construction in which they are placed.

C. Toggle / snap switch and receptacle wall boxes in metal stud partitions: 4 inches (100 mm) square by 1.5 inches (38 mm) minimum deep boxes with 0.75-inch (19-mm) raised tile wall device covers finishing flush with finished wall surface.

D. Lighting controls station wall boxes in metal stud partitions: 4 inches (100 mm) square by 2.25 inches (57 mm) minimum deep boxes with 0.75-inch (19-mm) raised tile wall device covers finishing flush with finished wall surface.

E. Wall- and partition-mounted boxes for low-voltage systems: Same as specified above for toggle / snap switches and receptacles, except with depth as indicated on drawings.

F. Wall- and partition-mounted boxes for audio/visual systems: Wall box service fittings as specified below.

2.4 JUNCTION AND PULL BOXES

A. Junction and pull boxes in feeder conduit runs: Galvanized, of size required for conduit arrangement and not less than the size required by NFPA 70, and furnished with screwed covers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Boxes in metal stud walls or partitions shall be securely supported by metal channels spanning between two studs and attached to same.

B. Provide box at each outlet, switch, and appurtenance. Each box shall be of a type suitable for the duty intended and shall be installed in accordance with the manufacturer’s instructions.

1. Where conduit is weather-exposed or exposed, provide cast-steel or cast-aluminum boxes.

C. Coordinate locations of boxes with installation of conduit as specified in Section 260533.

D. Do not install boxes back-to-back (through the wall) in partitions.

E. Firmly secure the boxes in place, plumb, level, and with front of device cover even with finished wall surface.

F. Outlet boxes used for supporting lighting fixtures: Furnish with malleable iron fixture studs of "No-Bolt" type, secured by locknut. Provide structural channel supports for boxes occurring in ceilings. Outlets in ceilings directly on bottom of joists shall be supported independent of ceiling construction. Outlets in suspended ceilings shall not be supported from ceiling construction. Special supports for boxes shall be as directed and approved by the Architect.

G. Provide a single cover plate where two or more devices are grouped together in one box.

H. Verify door swings with door frame installed before locating switch outlets.

I. Outlet boxes in fire-rated assembly:

1. Clearance between boxes and wallboard shall not exceed 0.125 inch (3.2 mm).
2. Surface area of individual outlet box does not exceed 16 square inches (103 sq cm).
3. Entire surface area of boxes shall not exceed 100 square inches (645 sq cm) per 100 square feet (9.3 sq m) of wall surface.
4. Wherever possible, boxes shall be at a minimum spaced 24" between boxes when on opposite sides of the wall.
5. Where the required surface area and spacing criteria cannot be met, provide firestopping for membrane penetrations. Refer to requirements in 260507, Firestopping for Electrical Work.

3.2 IDENTIFICATION

A. Identification on outside covers of pull and junction boxes in ceiling space or exposed on walls: Paint with colored enamel or mark with permanent waterproof black marker, or both, as specified.

1. Fire alarm system: Red.
2. Other special systems: Mark with system type, such as Data or Security.
3. Power and lighting: Panelboard designation and circuit number(s).

B. Identification inside boxes for recess-mounted or concealed in walls and partitions: Plasticized card stock tags marked with permanent waterproof black markers.

1. Fire alarm system: Fire alarm.
2. Other special systems: Mark with system type, such as Data or Security.
3. Power and lighting: Panelboard designation and circuit number(s).

END OF SECTION 260534

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SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes electrical identification materials and devices required to comply with ANSI, NFPA, and OSHA standards.

B. This section addresses identification of electrical equipment, raceways, boxes, conductors, and other related electrical system components.

1.2 SECTION INCLUDES

A. Identification for raceways and cables.

B. Identification of power conductors and control cables.

C. Identification of equipment and instructions.

D. Miscellaneous identification products.

1.3 RELATED SECTIONS

A. Sections in Division 26.

1.4 REFERENCES

A. ANSI Z535.4: Standard for Product Safety Signs and Labels.

B. ANSI/IEEE C2: National Electrical Safety Code.

C. NFPA 70: National Electrical Code.

D. NFPA 70E: Standard for Electrical Safety in the Workplace.

E. OSHA 29 CFR 1910.144: Safety Color Code for Marking Physical Hazards.

F. OSHA 29 CFR 1910.145: Specifications for Accident Prevention Signs and Tags.

G. UL 969: Standard for Marking and Labeling Systems.

H. Definitions:

1. Circuit designation includes both equipment source and equipment position.

1.5 SUBMITTALS

A. Product data: For each type of electrical identification product.

1.6 QUALITY ASSURANCE

A. Comply with ANSI A13.1 and IEEE C2.

B. Comply with NFPA 70.

C. Comply with OSHA standards.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.7 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other sections requiring identification applications, drawings, shop drawings, manufacturer's wiring diagrams, and the operation and maintenance manual; and with those required by codes, standards, and safety regulations. Use consistent designations throughout Project.

B. Coordinate installation of identification materials and devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identification materials and devices with location of access panels and doors.

D. Install identifying materials and devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following manufacturers, or approved equal:

1. Brady USA, Inc.
2. Carlton Industries
3. Graphic Products, Inc.
4. Ideal Industries, Inc.
5. Panduit Corporation
6. Presco
7. Seton Identification Products

8. Thomas & Betts Company
9. Utility Safeguard

2.2 GENERAL PRODUCT REQUIREMENTS

A. Except where otherwise indicated, provide manufacturer's standard identification products of category and type suitable for each application. Where more than one identification method is specified for an application, the Installer shall select and utilize each material in a consistent manner.

2.3 RACEWAY IDENTIFICATION

A. Comply with ANSI A13.1 for minimum lettering size, length of color field, and coloring schemes for each raceway size, type, and location.

1. Colors: Black letters on Orange field.
2. Legend: Raceways carrying the following:

    a. Power circuits less than 600V: Indicate system voltage.
    b. Low-voltage systems less than 50V: Indicate system type (Example – "TELECOMMUNICATIONS").

B. Adhesive labels: Preprinted, flexible, self-adhesive vinyl with legend overlaminated with a clear weather- and chemical-resistant coating.

2.4 CONDUCTOR AND CABLING IDENTIFICATION

A. Adhesive labels: Preprinted, flexible, self-adhesive vinyl with legend overlaminated with a clear weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

B. Color-coded, adhesive tape: Self-adhesive, vinyl tape, in appropriate colors for system voltage and phase.

2.5 EQUIPMENT IDENTIFICATION

A. Engraved plastic nameplates: Laminated plastic, engraved, white letters on black background, except where other color schemes are noted or specified.

1. Size: Minimum 0.75-inch (19 mm) by 2.5-inches (64 mm).
2. Letter size: Minimum height of 0.375-inch (10 mm).
3. Mechanically fastened, except adhesive mounted where necessary due to substrate.

    a. Mechanical fastener: Punched or drilled, with vandalproof stainless steel or brass screws or rivets.

B. Baked-enamel signs: Preprinted, aluminum signs, punched or drilled for fasteners with corner grommets; with colors, legend, and size required for application.

C. Exterior, metal-backed, signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate (CAB) signs with galvanized steel backing; punched or drilled for fasteners with corner grommets; with colors, legend, and size required for application.

D. Adhesive film label: Machine-printed, black letters on white background, through thermal transfer or equivalent process, with clear weatherproof and UV-resistant covering. Minimum letter size height of 0.375-inch (10 mm).

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Wiring device tape labels:

1. Adhesive film label: Machine-printed, black letters on clear background, through thermal transfer or equivalent process. Minimum letter size height of 0.25-inch (6 mm).

    a. Labeling for electrical devices and components such as receptacles, switches, control device stations, manual motor starters, network and phone jacks, junction and pull boxes, etc.

B. Warning labels and signs:

1. Self-adhesive warning labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configures for display on front cover, door, or other access to equipment unless otherwise noted.
2. Baked-enamel warning signs: Preprinted, aluminum signs, punched or drilled for fasteners with corner grommets; with colors, legend, and size required for application.
3. Fasteners: Self-tapping, stainless-steel screws or, stainless-steel machine screws with nuts, flat and lock washers.

C. Tape markers: Vinyl, pressure-sensitive, with clear vinyl overlay.

D. Cable ties: Fungus-inert, self-extinguishing, one-piece, self-locking, color-coded, nylon cable ties suitable for the application (general purpose, UV-stabilized outdoor, or plenum rated).

E. Paint: Formulated for the type of surface, location, and intended use.

F. Stenciling: Nonfading, waterproof, ink or paint. Black or color-coded.

G. Adhesive: Heavy-duty, thermo-resistant, industrial grade adhesive, for adhesion to any surface without identification curling, peeling, or falling off.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification products at locations for most convenient viewing without interference with operation and maintenance of equipment.

1. For finished public spaces, coordinate identification product mounting locations with Architect.

C. Existing equipment: Apply identification products to unmarked existing equipment where work is being performed.

D. Apply identification products to surfaces after equipment finish work has been completed.

E. Clean surfaces before applying identification products, using materials and methods recommended by manufacturer of identification device.

F. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

G. System identification labeling for raceways and cables: Each label shall be installed on sidewall of conduit and easily placed for proper identification. Locate labels at changes in direction, at penetrations of walls and floors, at 50-foot (15-meter) maximum intervals in straight runs, and at 25-foot (7.6-meter) maximum intervals in congested areas.

H. Cable ties: For attaching tags, use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In spaces handling environmental air: Plenum rated.

3.2 APPLICATION

A. Miscellaneous:

1. Access doors and panels: Apply engraved nameplate labels at access doors identifying concealed electrical item. Do not locate labels in finished, public spaces.
2. Available fault current labels: Refer to Section 26 0573, Overcurrent Protective Device Studies, for fault current labeling requirements.
3. Arc flash warning labels: Refer to Section 26 0573, Overcurrent Protective Device Studies, for arc flash labeling requirements.

B. Junction and pull boxes:

1. Label each junction and pull box, identifying circuit designation or type of system.

a. Exposed boxes: Place label on coverplate, externally visible.

b. Concealed boxes: Place label or tag on inside cover of box.
c. Junction boxes concealed above suspended ceilings or exposed in non-occupied spaces may be marked with permanent ink marker in lieu of printed labels.

2. Boxes with conductors greater than 600V: Apply labels identifying nominal system voltage on cover and minimum of one fixed side. One label shall be visible from the floor where boxes are installed exposed.
3. Fire alarm system boxes shall have red finish. Boxes shall be prefinished prior to installation.

C. Raceway identification: Apply identification products for each raceway.

1. Apply color-coded identification products to raceways as follows:

a. Normal power system: None.
b. Standby/emergency power system: None.
c. Fire alarm system: Red, solid colored.
d. Telecommunications system: None.
e. Security System: None.

2. Apply labels identifying nominal system voltage for the raceways containing feeders and raceways larger than 2-inch (53 mm) with power conductors. Labeling of raceways with branch circuit conductors is not required.
3. Apply system identification labels identifying type of system for low-voltage system raceways.
4. Apply circuit designation markings on each feeder and branch circuit raceway entering and leaving each panelboard and switchboard. Mark raceway clearly with permanent ink marker or printed labels.
5. Empty raceways: Apply labels indicating description of empty raceways (i.e., spare, future use) and identifying the beginning and end locations. Mark raceway clearly with permanent ink marker or printed labels.
6. Abandoned raceways: Apply labeling indicating raceway has been abandoned.

D. Wiring and cabling identification:

1. Power circuit conductor identification, 600 volts or less: Apply color-coded identification for cables, feeders, and power circuit conductors exposed in accessible vaults, junction and pull boxes, utility structures, and equipment enclosures. Apply color-coding scheme as indicated below throughout the building's network of feeders and circuits, unless otherwise required by the authority having jurisdiction.

a. Colors on conductors No. 10 and smaller, or No. 6 and smaller for grounded and grounding conductors: Solid colored insulation.
b. Colors on conductors No. 8 and larger, or No. 4 and larger for grounded and grounding conductors: Apply colored tape wrapped a minimum of 6 inches (150 mm) on either end of conductor and in boxes where splices or taps are made.
c. Conductors used solely for grounding purposes shall be green, if insulated.
d. Where multi-conductor cables are used, use same color coding system for identification of wiring.

COLOR CODE (600 volts maximum)				
VOLTAGE	NEUTRAL	PHASE		
		A	B	C
120 volts, 2-wire	White	Black, Red, or Blue depending on phase		
277 volts, 2-wire	Gray	Brown, Orange, or Yellow depending on phase		
208/120 volts wye, 3-phase, 4-wire	White	Black	Red	Blue
460/265 volts wye, 3-phase, 4-wire	Gray	Brown	Orange	Yellow

2. Conductors for future use: Attach tags with circuit designation for conductors to be extended for future use.
3. Control and low-voltage system wiring shall be coded with colors and markings different from those used to designate phase wires.

E. Wiring device labels: For wiring devices such as receptacles, devices installed in surface raceway assemblies, and other wiring devices operating at or greater than 120V.

1. Apply adhesive film labels on outside of wiring device coverplates identifying circuit designation serving device, except apply on the inside cover for the following locations.

   a. Public lobbies, corridors, and vestibules.

2. For special receptacle configurations, apply label identifying applicable device NEMA configuration designation in location not concealed by plug.
3. Apply labels to devices serving low-voltage system devices including the following:

   a. Fire alarm devices and test stations: Circuit designation.
   b. Telecommunications device stations: Work area outlet designation.
   c. Audio-visual device stations: Device designation.
   d. Security device stations: Device designation.

F. Equipment identification: Install unique designation label consistent with contract documents and shop drawings.

1. Labeling instructions:

   a. Engraved plastic laminate nameplates, unless otherwise indicated.
   b. Unless otherwise required, provide a single line of text with 0.5-inch (13 mm) high lettering on 1.5-inch (38 mm) high label. Where two or more lines are required, use single label with increased height.
   c. For multi-section or multi-compartment equipment, apply labels identifying each compartment or section.
   d. For fusible equipment, identify fuse type and size on the front cover.
   e. For enclosed circuit breaker equipment, identify device trip rating where rating is not visible.

2. Additional labeling requirements:

   a. Identify the designation and location of the power source where the equipment power feed originates. (Example “Feed from: XXXXX; Location: XXXXX”).

(1) Where equipment has more than one source of power (i.e., transfer switch, separate control power source), the location and designation of each power source shall be clearly identified at the equipment location.

b. Identify available fault current and calculation date for service entrance equipment.

3. Apply nameplates and labels to equipment according to the below identification schemes:

a. Identify available fault current and calculation date. Apply products to the following equipment:

(1) Panelboards

b. Identify equipment designation; voltage rating; phase and number of wires; and designation and location of load served. Apply products to the following equipment:

(1) Panelboards
(2) Dimming system equipment

c. Identify equipment designation; primary and secondary voltage ratings; phase and number of wires; circuit designation and location of primary source; and designation and location of load served. Apply products to the following equipment:

(1) Enclosed switches (disconnects/safety switches)
(2) Enclosed circuit breakers
(3) Contactors
(4) Motor starters and combination motor starter-disconnects
(5) Variable frequency drives

d. Identify equipment designation; and circuit designation and location of primary source. Apply products to the following equipment:

(1) Monitoring and control equipment
(2) Control stations
(3) Fire alarm control panels and auxiliary equipment
(4) Security panels and auxiliary equipment

4. Nameplates shall incorporate white lettering on colored backgrounds based on the following color-coding scheme:

a. Normal power system: Black background.
b. Emergency power system (life-safety branch): Red background.
c. Emergency power system (optional standby): Orange background.

G. Warning and caution labels and signs:

1. Apply warning and caution labels on equipment in accordance with NFPA 70 and 70E, ANSI, and OSHA requirements including arc flash hazard warning labels and special clearance requirements.
2. Apply warning and caution labels and signs at locations where safe operation and maintenance of electrical system equipment is of concern.

3. Apply warning signs on electrical room doors in accordance with NFPA 70 and 70E, ANSI, and OSHA requirements. Where doors are located in finished, public areas, locate sign on the inside of the door. Coordinate mounting requirements with door type.

H. Operating instruction signs:

1. Apply instruction signs at locations where directions for safe operation and maintenance of electrical system equipment are necessary. Apply approved text where instructions are needed for proper system operation.

a. Emergency instructions: Provide white text on red background.

3.3 FIELD QUALITY CONTROL

A. Coordinate names, abbreviations, colors, and other designations with construction documents, submittals, and applicable code and standards requirements. Utilize consistent designations and identification techniques throughout project.

B. Install identification products at locations that are clearly visible at normal viewing angles and without interference with operation and maintenance of the equipment.

C. Install identification products in a neat and clean, workmanship-like manner where products are securely attached and oriented parallel to equipment edges.

END OF SECTION 260553

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SECTION 260923 - STAND-ALONE LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Toggle / snap switches for lighting.

B. Occupancy sensors, non-networked, stand-alone.

C. Emergency lighting control transfer relay device.

D. Conductors and cables.

E. Device programming requirements.

1.2 RELATED SECTIONS

A. Section specifying requirements for LEED rating is specified in Division 01.

B. Commissioning requirements: Division 01.

C. Identification: Section 260553.

D. Networked modular lighting controls: Section 260936.

E. Interior lighting: Section 265100.

1.3 REFERENCES

A. IECC: International Energy Conservation Code

B. NECA 1: Standard Practices for Good Workmanship in Electrical Construction.

C. NFPA 70: National Electrical Code.

1.4 SUBMITTALS

A. Product data: Each type of device used in the project.

B. Bill of materials: Provide detailed list of components and quantities.

C. Field quality control test reports.

D. Operation and maintenance data: For lighting controls system and associated components, provide product data, shop drawings, and test reports in operation and maintenance manual. In addition to items specified in Division 01, include list of replacement parts and assemblies.

1.5 QUALITY ASSURANCE

A. Comply with requirements for LEED certification specified in Division 01.

B. Devices shall be UL listed and labeled for their intended application.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store components indoors in a clean dry space with uniform temperature to prevent condensation. Protect devices from exposure to dirt, fumes, water, corrosive substances, and physical damage.

1.7 COMMISSIONING

A. This project includes commissioning under the direction of a Commissioning Agent (CxA). Contractor's and subcontractors' responsibilities are described in Division 01 for Commissioning Requirements.

B. Cooperate with the CxA to accomplish the requirements of the Commissioning Plan during the construction and correction periods.

PART 2 - PRODUCTS

2.1 TOGGLE / SNAP SWITCHES FOR LIGHTING

A. Manufacturers:

1. Arrow Hart/Eaton Wiring Devices
2. Hubbell/Bryant Electric
3. Legrand/Pass & Seymour (P&S)
4. Leviton Manufacturing Co.

B. Toggle / snap switches: Specification grade conforming to UL 20:

1. General-use: Single-pole, 3-way, and 4-way, 20 amperes, 120/277 volts:

a. Basis of design: P&S PS20AC1, PS20AC3 (3-way), PS20AC4 (4-way), industrial extra heavy-duty.
b. Weatherproof cover with actuating lever mounted directly over general-use toggle switch:

(1) Basis of design: P&S CA1-GL cover, heavy-duty die-cast zinc, for PS20AC1, PS20AC3 (3-way), and PS20AC4 (4-way) switches.

C. Device color: White.

D. Device covers: Type 302 stainless steel.

1. Basis of design: P&S: Type 302 stainless steel, SS series.

2.2 OCCUPANCY SENSORS

A. Acceptable manufacturer:

1. Wattstopper/Legrand

B. Sensor types:

1. Wall switch sensor: Wired, dual-technology, combination ultrasonic/passive infrared detector with override switch, capable of installation in a standard wall switch backbox.

a. Line-voltage: 120/277-volt dual-input, 60 hertz.
b. Line-voltage with 0-10V dimming: 120/277-volt dual-input, 60 hertz and 0-10V analog resistive dimmer.
c. Device finish color: White, with matching decorator style device cover and mounting screws above and below device.

C. Characteristics:

1. Adjustable delayed off-time range: Between 30 seconds and 30 minutes, factory set to 20 minutes.
2. Fail on: Lights will go to full brightness if sensor fails.
3. Ultrasonic detector: Volumetric sound wave at 40 kHz frequency. Detector shall automatically adjust detection threshold to compensate for learned environmental behavior.
4. Infrared detector: Passive, with field-adjustable ambient light adjustment.

2.3 EMERGENCY LIGHTING CONTROL TRANSFER RELAY DEVICE

A. External type (multiple fixture): Self-contained, modular unit mounted within accessible ceiling. UL 924 and UL 1008 listed as “emergency lighting equipment” and UL listed for field installation.

1. Capable of bypassing the local switching means when normal utility power has been lost.
2. Device shall consist of a remote test switch, normal power indicator light and an alternate power indicator light in a common faceplate. This remote indicating station shall be mounted in an acoustical ceiling tile or drywall ceiling near the device whenever the location of the transfer relay device is obstructed from view.
3. Rated for 120 through 277 volts AC, up to 20 amperes of lighting load.
4. Basis of design: Bodine, model GTD20A.

B. External type with dimming (multiple fixture): Self-contained, modular unit mounted within accessible ceiling. UL 924 listed as "emergency lighting equipment" and UL listed for field installation.

1. Capable of bypassing the local switching means when normal utility power has been lost.
2. Device shall consist of a remote test switch, normal power indicator light and an alternate power indicator light in a common faceplate. This remote indicating station shall be mounted in an acoustical ceiling tile or drywall ceiling near the device whenever the location of the transfer relay device is obstructed from view.
3. Rated for 120 through 277 volts AC, up to 16 amperes of lighting load.
4. Includes 0-10 volt dimming override.
5. Includes contacts for interface with fire alarm and security systems.
6. Basis of design: Bodine, Model BLCD16DIM.

2.4 CONDUCTORS AND CABLES

A. Wiring to supply side of remote-control power sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519, Wires and Cables.

B. Low-voltage control cable: Manufacturer's standard multi-conductor cable with stranded-copper conductors not smaller than No. 22 AWG, plenum rated.

1. Class 2 control cables: Multi-conductor cable with copper conductors not smaller than No. 18 AWG.
2. Class 1 control cables: Multi-conductor cable with copper conductors not smaller than No. 14 AWG.

2.5 DEVICE PROGRAMMING REQUIREMENTS

A. Refer to lighting controls diagrams and lighting controls schemes on the drawings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install devices in complete compliance with manufacturer's recommendations.

B. Provide a single cover plate where two or more devices are grouped together in one box.

C. Verify door swings with door frame installed prior to rough-in for switches.

D. Ground components according to Section 260526, Grounding and Bonding.

E. Devices shall be installed and programmed to meet the control intent.

3.2 INSTALLING OCCUPANCY SENSORS

A. Install in accordance with manufacturer's written instructions.

B. Provide line-voltage type detectors when a single wall device controls lighting within a single space.

C. Provide low-voltage type ceiling detectors when a device controls lighting within a single space.

D. Coverage pattern: Verify coverage pattern of a single detector or system of detectors to be capable of complete coverage of the space in which the lighting is intended to be controlled. Provide additional detectors as necessary to satisfy complete coverage.

E. Install at least three feet away from HVAC diffusers, or as indicated in manufacturer's written instructions

F. Programming requirements: Indicated on the drawings.

1. Vacancy mode (manual on, automatic off).
2. Occupancy mode (automatic on, automatic off).

3.3 IDENTIFICATION

A. Materials: Refer to Section 260553, "Identification for Electrical Systems." Identify devices and wiring.

3.4 FIELD QUALITY CONTROL

A. Functional testing: Perform tests and prepare test reports for the following:

1. Occupancy sensors: Confirm that the placement, sensitivity, and time-out settings are optimized to ensure lights turn off only after each space is vacated and do not turn on unless the space is occupied.
2. Fully document control device calibration settings and submit information as a part of the operation and maintenance data.

END OF SECTION 260923

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SECTION 260936 - NETWORKED MODULAR LIGHTING CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Networked lighting relay controllers (0-10V dimming relay controllers).

B. Plug load relay controllers.

C. Lighting control stations (low-voltage digital wall switches), including touchscreen controller.

D. Sensors and interfaces.

E. Network components.

F. Conductors and cables.

G. Startup and installation requirements.

1.2 RELATED SECTIONS

A. Section specifying requirements for LEED rating is specified in Division 01.

B. Commissioning requirements: Division 01.

C. HVAC integration: Division 23.

D. Identification: Section 260553.

E. Stand-alone lighting control devices: Section 260923.

F. Interior lighting: Section 265100.

1.3 REFERENCES

A. ANSI/ASHRAE/IES 90.1: Energy Standard for Buildings Except Low-Rise Residential Buildings.

B. IECC: International Energy Conservation Code.

C. IgCC: International Green Construction Code.

D. NECA 1: Standard Practices for Good Workmanship in Electrical Construction.

E. NFPA 70: National Electrical Code.

F. UL 924: Emergency Lighting and Power Equipment.

1.4 DEFINITIONS

A. Full light output: Lighting fixture (luminaire) producing the maximum number of rated lumens.

B. Scene: The lighting effect created by adjusting several zones of lighting to the desired intensity.

C. Zone: A lighting fixture or group of lighting fixtures controlled simultaneously by a single dimmer/relay.

1.5 PREINSTALLATION MEETING

A. Schedule a preinstallation meeting with a factory certified technician and local representative to review general installation requirements indicated under article "Field Quality Control" below.

1.6 SUBMITTALS

A. Product data: Include manufacturer’s technical product datasheet for each system component including assembly ratings and dimensioned plans, sections, and elevations showing minimum clearances, cable termination sizes, conductor entry, gutter space, installed features, where applicable.

B. Bill of materials: Provide detailed list of components and quantities.

C. Shop drawings: Detail assemblies of standard and project specific components. Indicate dimensions and arrangement of components.

1. Floor plans: Identify locations of lighting control system components; interconnection of components. Utilize reflected ceiling plans to show the following:

a. Location, orientation, and coverage area of sensors.
b. Locations of lighting relay controllers, lighting control stations, and network components.

2. Summary list of control devices, sensors, other loads, and interface devices.
3. Wiring diagrams: Power, signal, and control wiring, differentiating between manufacturer-installed and field-installed wiring, provided on a schematic diagram.
4. Include representative views of components, including button layouts, engraving, colors, and other physical characteristics pertinent to each device.
5. Load schedules: Indicate connected load, load type, and voltage per circuit, circuits and their respective control zones, circuits that are on emergency, and capacity, phase, and corresponding circuit numbers.

D. Field quality control test reports.

E. Operation and maintenance data: For lighting controls system and associated components, provide product data, shop drawings, and test reports in operation and maintenance manual. In addition to items specified in Division 01, include the following:

1. List of replacement parts and assemblies.

1.7 QUALITY ASSURANCE

A. Comply with requirements for LEED certification specified in Division 01.

B. System components shall be UL listed and labeled for their intended application.

C. Provide services from factory certified field service engineer to perform functional testing.

D. Qualifications for factory certified field service engineer:

1. Minimum experience of 2 years training in the electrical/electronic field.
2. Certified by the equipment manufacturer on the system installed.

E. Obtain system components from a single source with total responsibility for compatibility of the lighting control system components.

F. Lighting control system installation shall comply with NFPA 70, as well as applicable ANSI and IEC standards, and FCC regulations.

G. Lighting control system shall meet IEC801-2, tested to withstand a 15 kV electrostatic discharge without damage or loss of memory.

H. Technical support:

1. Onsite support: Manufacturer's authorized service and maintenance representative characteristics shall include the following:

a. Located in the Baltimore/Washington, DC metropolitan area.
b. Staff is factory employed and trained.
c. Service available 24 hours a day, seven days a week, 365 days a year.
d. Maintains an adequate stock of manufacturer's genuine or approved parts to service this equipment.
e. Service and maintenance contracts available.

2. Phone support: Toll free technical support shall be available.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store components indoors in a clean dry space with uniform temperature to prevent condensation. Protect equipment and devices from exposure to dirt, fumes, water, corrosive substances, and physical damage.

B. Do not deliver or install equipment and devices until spaces are enclosed and weather-tight, wet work in spaces is complete and dry, work above equipment is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period

1.9 PROJECT CONDITIONS

A. Environmental conditions: Lighting control system components shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient temperature: 0 to 40 degrees C.
2. Relative humidity: 5 to 90 percent, non-condensing.

1.10 WARRANTY

A. Special warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of lighting control system and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty period: Two years from date of substantial completion.
2. Warranty shall include parts and labor with no deductible.
3. Warranty shall begin at the date the equipment is accepted by the Owner.

B. Warranty service: Qualified personnel shall be available to repair or replace components of lighting control system and associated auxiliary components that fail in materials or workmanship. Furnish Owner with a telephone number where service representative can be reached at all times. Service personnel shall be at the site within 48 hours after receiving a request for service, and shall restore the lighting control system to proper operating condition within 72 hours.

1.11 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged in protective box or covering for storage and identified with labels describing contents.

1. Lighting relay room controllers: A minimum of three (3).
2. 20-ampere plug load relays: A minimum of three (3).
3. Lighting control stations (low-voltage digital wall switches): Five (5) of each type.
4. Occupancy sensors: A minimum of five (5).
5. Daylight sensors: A minimum of five (5).
6. Accessory interface devices: A minimum of five (5).

1.12 COMMISSIONING

A. This project includes commissioning under the direction of a Commissioning Agent (CxA). Contractor's and subcontractors' responsibilities are described in Division 01 and specification 260800 for Commissioning Requirements.

B. Cooperate with the CxA to accomplish the requirements of the Commissioning Plan during the construction and correction periods.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Basis-of-design product: Subject to compliance with requirements, provide products manufactured by Wattstopper Controls, Digital Lighting Management (DLM) series.

2.2 SYSTEM REQUIREMENTS

A. Design requirements: The lighting control shall meet the mandatory control requirements as defined in IECC 2021 energy code.

B. Performance requirements:

1. Provide a complete, networked digital lighting controls system. Lighting controls system shall include equipment necessary for the proper operation and program of the lighting controls system including 0-10V dimming relay controllers, control stations, sensors, and other interfaces.
2. System shall be able to meet the functionality and sequence of operation(s) as indicated on the drawings.
3. Each 0-10 volt dimming relay shall be individually controllable and shall include on-off, fade, dimming, scene settings, and other control functions to meet designated sequence of operation(s).

C. General system operation:

1. System shall be capable of receiving input signals from lighting control system sensors, lighting control stations (low-voltage digital wall switches), and fire alarm control modules.

    a. The system shall communicate with components through a wired, point to point architecture.

2. Each input and controlled device shall be connected to associated lighting relay room controller via low-voltage signal cabling.
3. The system shall be networked to be accessed, modified, and controlled from a central location.
4. The system shall be able to control 120V receptacle load based on occupancy signal.
5. The system shall be able to provide occupancy signal to the local VAV or fan-powered terminal.
6. The system shall be able to receive signal from the fire alarm system.

D. System shall comply with UL standards including UL 916 and UL 924.

E. Comply with UL 2900-1 or IEC 62443, Standards for Software Cybersecurity for Network-Connectable Products, for devices connected to the internet.

F. System requirements:

1. Emergency mode: Lighting relay room controllers and associated lighting fixture LED drivers shall operate under the following conditions:

a. Loss of Power: Upon Loss of power or signal, UL924 rated lighting relay controllers operate in the closed ('on') position and associated LED drivers operate in a full light output state.
b. Fire alarm system input: Upon alarm signal from the fire alarm system, lighting relays operate in the closed ('on') position and associated LED drivers operate in a full light output state. Upon alarm silencing, lighting relays shall remain in the closed ('on') position and LED drivers shall remain in a full light output state until a new command is initiated.

2. Occupancy detection: The system shall reduce the power consumption in vacant areas by reading the status of low voltage occupancy sensors.

   a. Occupancy sensor wiring: Occupancy sensors shall be wired directly to the associated lighting control system room controller for power and communications. Where the number devices/sensors exceed the amount allowed for a room controller, provide necessary interface devices and power packs to meet controllability intent of the contract documents.
   b. Occupancy sensor groupings: The set of light fixtures that are controlled by a given occupancy sensor shall be configurable through associated lighting relay room controller and shall not require any manual wiring to modify.
   c. Occupancy sensor modes: Each occupancy sensor shall have the following programmable lighting modes:

      (1) Occupied mode: The occupied mode represents the lighting mode when occupancy is detected. Light levels will remain at the occupied level until occupancy is no longer detected.
      (2) Setback or transition mode: Transition or setback modes provide a gradual change in light levels when occupancy is no longer detected.
      (3) Vacancy mode: The vacancy mode represents the lighting mode when occupancy is no longer being detected and setback and transition levels have expired.

3. Daylight harvesting: The lighting system shall adjust light levels (100-percent light level to minimum 10-percent light level) in response to varying ambient light levels in a continuous and imperceptible manner in order to maintain a constant light level at the work plane (2 feet, 6 inches above floor) or at the floor as indicated on the Drawings. Ambient light levels shall be determined from daylight sensors.

   a. Daylight sensor wiring: Daylight sensors shall be wired directly to the associated lighting relay room controller for power and communications. Where the number devices/sensors exceed the amount allowed for a room controller, provide necessary interface devices and power packs to meet controllability intent of the contract documents.
   b. Daylight sensor groupings: The set of zones that are controlled by a given daylight sensor shall be configurable through associated lighting relay room controller and shall not require manual wiring to modify.
   c. Daylight sensor settings: Settings associated with a given daylight sensor shall be adjustable through associated lighting relay room controller and shall not require any physical adjustment to the sensor itself.

4. Power failure: The lighting control operations shall resume following a power outage to the pre-outage state.

5. Programmable intelligence shall include time-of-day control, 32 holiday dates, warn occupants of an impending off, timed inputs, preset control, auto daylight savings, astronomical clock with offsets, and local control, digital switches and network overrides.

    a. Time-of-day: 64 time-of-day/holiday schedules for 365-day programming.
    b. Holidays: 32 holiday dates.
    c. Warn off: Flash lights and provide an extra 1 second to 99 minutes of illumination.
    d. Preset: Pre-programmed switch patterns.
    e. Timed inputs: Switch input timers 1-999 minutes.
    f. Timed overrides: Timed override 1-999 minutes, resumes to normal schedule.
    g. Local control: From local switch.
    h. Astronomical clock: Longitude and latitude input with sunset-sunrise offsets to customize outdoor lighting.
    i. Auto daylight savings: Adjust Automatically adjusts the clock at the appropriate dates, selectable.
    j. Priorities: Establishes a hierarchy for inputs and network control commands.
    k. Masking: Provides permission orientation to switch inputs and network commands thereby ensuring building lighting control integrity.
    l. Soft-linking: Group linking for rapid programming.
    m. Global linking: Each panel shall provide 64 addressable groups for network linking of control commands.

2.3 LIGHTING RELAY CONTROLLERS

A. Description:

1. Lighting relay controller: Minimum of one lighting relay, 0-10 volt dimming output, network capable, pre-programmed from factory for plug-and-play operation.

B. Characteristics:

1. Enclosure: Thermoplastic housing.
2. Delivered and installed as a UL listed factory assembly.
3. Input power: Dual-rated 120/277 volts, 60 hertz, phase to neutral.
4. Feed-through type.
5. Relay(s):

    a. 16-ampere, 120/277-volt rated.
    b. Independently addressable.
    c. Minimum of 500,000 switching cycles at full load.

6. Capable of switching light-emitting diode (LED) lighting fixtures/luminaires.
7. Capable of dimming 0–10-volt lighting loads.
8. Capable of connecting to local system sensors and devices via wired connection.
9. Microprocessor controlled, with programming accomplished through either the RJ-45 port, RF remote, or through the network connection.

C. Functionality: Functions of associated lighting control stations shall be set up at the lighting relay controllers' electronic controls that include indicated number and arrangement of scene presets, channels, and operational times.

2.4 PLUG LOAD RELAY CONTROLLERS

A. Description: Single plug-load relay, networking capable, pre-programmed from factory for plug-and-play operation.

B. Characteristics:

1. Enclosure: Thermoplastic housing.
2. Delivered and installed as a UL listed factory assembly.
3. Input power: 120 volts, 60 hertz, phase to neutral.
4. Feed-through type.
5. Relays:

    a. 20-ampere, 120-volt rated.
    b. Independently addressable.
    c. Minimum of 500,000 switching cycles at full load.

6. Capable of switching 20 amperes of general receptacle load.
7. Capable of connecting to local system sensors and devices via wired connection.
8. Microprocessor controlled, with programming accomplished through either the RJ-45 port, RF remote, or through the network connection.

2.5 LIGHTING CONTROL STATIONS (LOW-VOLTAGE DIGITAL WALL SWITCHES)

A. Description: Low-voltage, pre-programmed or field-programmable digital wall switch device with button configurations and functions as shown on the drawings.

B. Functionality: Lighting control station(s) shall provide an immediate local LED illumination response upon button activation to indicate that a system command has been requested. LED will remain lit contingent upon receiving system confirmation of the successful completion of the command.

1. Each button shall be capable of performing an ‘On’ or ‘Off’ operation of the programmed zone.
2. Buttons shall be capable of modifying the state of multiple zones to create a scene.
3. Lighting control station(s) with raise/lower buttons shall have capability of raising or lowering light levels.

C. Lighting control stations shall be engraved with appropriate zone and scene descriptions, furnished to the manufacturer prior to fabrication. Any silk-screened borders, logos, graduations, etc. shall use a graphic process that chemically bonds the graphics to the faceplate, resisting removal by scratching, cleaning, etc. Coordinate exact engraving text with Owner prior to order. If Owner does not have a preference, use manufacturer’s standard designations.

D. Lighting control station(s) functions shall be configurable from associated lighting relay room controller.

E. Configurations: Button-based style with each button fully customizable to perform defined function. Button shall have toggle capability. Multi-button configurations as indicated on drawings.

F. Controller power packs: Provide when quantity of sensors exceeds the maximum allowable per control circuit. Provide sensor power packs where required for power connection to sensors. Provide plenum-rated, Class 2 control wiring between sensors and control units.

G. Device finish color: White, with matching decorator style device cover and mounting screws above and below device.

2.6 LIGHTING TOUCHSCREEN CONTROLLER

A. Description: Capacitive touch, 4-inch LCD backlit touchscreen lighting controller.

B. Functionality: Lighting control touchscreen shall provide an immediate illumination upon proximity detection.

1. Multiple screen design allows for multiple channel and scene control.
2. Provide dedicated 120/277-volt power pack.
3. Compatible with system dimming and relay controllers for zone control.
4. On-board storage of device setting.
5. On-screen setup, no network connection required.

C. Power Supply: 120/277 volts AC, 60 hertz input, 24 volts DC output.

2.7 SENSOR AND INTERFACE DEVICES

A. Ceiling-mounted occupancy sensors: Wired, dual-technology, combination ultrasonic/passive infrared detector, independently adjustable for installed conditions.

1. Dual-technology detector: Includes both passive infrared and ultrasonic detectors:

a. Passive infrared: Utilize multiple segmented lens with internal grooves to eliminate dust and residue build-up, with field adjustable ambient light adjustment.
b. Ultrasonic: Utilize an operating frequency of 32 kHz or 40 kHz, controlled to operate within plus/minus 0.01 percent tolerance. Detector shall automatically adjust detection threshold to compensate for learned environmental behavior.

2. Characteristics:

a. Indicator: LED positive detection.
b. Adjustable delayed off-time range: Between 30 seconds and 20 minutes.
c. Capable of installation in acoustic ceiling tile or gypsum ceiling. Detector shall have 360-degree coverage, minimum 2000 square feet.

B. Daylight sensors: Ceiling or fixture mounted open-loop interior photocell.

1. Open-loop basis for daylight sensor control scheme. Continual monitoring of daylight entering building windows to enable daylight harvesting control of room lighting.
2. Partially shielded for accurate detection of available daylight to prevent fixture lighting and horizontal light component from skewing sensor detection.
3. Linear response from 0 to at least 500 footcandles.

4. Performance requirements: The lighting control system manufacturer or authorized representative shall provide daylight sensor layout that provides adequate coverage for performance requirements of each space.

    a. Provide design layout of daylight sensor devices.
    b. The lighting control system manufacturer shall arrange an onsite pre-installation meeting and system startup meeting. The lighting control manufacturer shall provide direction regarding sensor location and relocation should conditions require a deviation from indicated design locations.
    c. Provide at no additional cost any additional daylight sensors or hardware required to meet sequence of operations.
    d. Lighting control system manufacturer shall program or provide guidance to program areas utilizing daylight sensors to ensure conformance with contract document requirements.

C. Input/Output Module (Isolated Relay Interface): Dry contact closure module, toggle or momentary signal.

D. Sensor finish color: White.

E. Sensors shall communicate through wired connection to the nearest room controller.

F. Additional sensor power packs: Provide when quantity of sensors exceeds the maximum allowable per control circuit. Provide sensor power packs where required for power connection to sensors. Provide plenum-rated, Class 2 control wiring between sensors and control units.

2.8 NETWORK COMPONENTS

A. Building area controller:

1. Supports connection to wired system devices.
2. Ethernet 10/100 Mbps connection to additional units for building wide network.
3. On-board browser-based dashboard.
4. Provides demand response, sensor adjustment, and timeclock-based controls.
5. Power supply: Internal or External, 100-277V AC, 50/60 hertz.
6. Connect to any smartphone, tablet or computer using built in Wi-Fi. 2.4 GHz 802.11b/g using WPA2 security for programming.
7. Mounted above ceiling in accessible ceiling space or located on wall in back of house space.
8. BACnet building management system compatible.

B. Building management system (BMS) interface:

1. Supports connection to wired system devices.
2. Ethernet 10/100 Mbps connection to additional units for building wide network.
3. On-board browser-based dashboard.
4. Power supply: External, 100-277V AC, 50/60 hertz.
5. Mounted above ceiling in accessible ceiling space or located on wall in back of house space.
6. BACnet addresses for individual devices and functions.

2.9 CONDUCTORS AND CABLES

A. Wiring to supply side of remote-control power sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519, Wires and Cables.

B. Low-voltage control cable: Manufacturer's standard multi-conductor cable with stranded-copper conductors not smaller than No. 22 AWG, plenum rated.

1. Class 2 control cables: Multi-conductor cable with copper conductors not smaller than No. 18 AWG.
2. Class 1 control cables: Multi-conductor cable with copper conductors not smaller than No. 14 AWG.

C. Digital UTP cabling: Unshielded, twisted-pair cable with copper conductors, complying with TIA/EIA-568-B.2, Category 5E or Category 6 for horizontal copper cable.

1. Cable color: Orange.

2.10 DEVICE PROGRAMMING REQUIREMENTS

A. Programming of lighting controls shall be performed by a factory certified field service engineer.

B. Refer to lighting controls diagrams and lighting controls schemes on the drawings.

2.11 SOURCE QUALITY CONTROL

A. Perform full-function testing on 100 percent of system components and panel assemblies at the factory.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install devices in complete compliance with manufacturer's recommendations.

B. Ground components according to Section 260526, Grounding and Bonding.

C. Devices shall be installed and programmed to meet the control intent.

D. Manufacturer's factory certified field service engineer shall provide start-up service, including physical inspection of lighting control system and connected wiring and final adjustments to meet specified performance requirements.

3.2 INSTALLING LIGHTING AND PLUG LOAD RELAY CONTROLLERS

A. Lighting relay and plug load controllers shall be mounted to junction box in accessible ceiling space above entry door, per manufacturer's instructions.

B. Lighting relay panels shall be surface mounted in accessible ceiling space above entry door or in back of house space.

C. Provide identification of ceiling grid below room controllers to locate device.

3.3 INSTALLING LIGHTING CONTROL STATIONS (LOW-VOLTAGE DIGITAL WALL SWITCHES)

A. Provide a single cover plate where two or more lighting control stations are grouped together in one box.

B. Verify door swings with door frame installed prior to rough-in for lighting control stations.

3.4 INSTALLING LIGHTING TOUCHSCREEN CONTROLLER

A. Provide back box sized per manufacturer's requirements for touchscreen controller.

B. Mount power supply above touchscreen in accessible ceiling space.

C. Verify door swings with door frame installed prior to rough-in for touchscreen controller.

3.5 INSTALLING SENSOR AND INTERFACE DEVICES

A. Install in accordance with manufacturer's written instructions.

B. Occupancy sensors:

1. Provide low-voltage type detectors.
2. Coverage pattern: Verify coverage pattern of a single detector or system of detectors to be capable of complete coverage of the space in which the lighting is intended to be controlled. Provide additional detectors as necessary to satisfy complete coverage.
3. Install at least three feet away from HVAC diffusers, or as indicated in manufacturer's written instructions.
4. Coordinate interconnection of occupancy sensors with Division 23 contractor for local occupancy signal.
5. Programming requirements: Indicated on the drawings.

    a. Vacancy mode (manual on, automatic off).
    b. Occupancy mode (automatic on, automatic off).

C. Daylight sensors: Location of interior daylight sensors shall be determined by manufacturer's certified field service engineer, based on optimization calculations for greatest energy savings.

D. Wire sensors directly to local room controller. Do not daisy chain devices.

E. Accessory interface devices: Where additional devices are required and need power connection, provide the following:

1. 277-volt circuit: Connect to room/space unswitched normal lighting circuit using 2 #12 + #12 ground in 3/4-inch conduit.
2. 120-volt circuit: Connect to nearest unswitched receptacle circuit using 2 #12 + #12 ground in 3/4-inch conduit.

3.6 BUILDING MANAGEMENT SYSTEM INTEGRATION

A. Provide BACnet certified means for the building lighting control system to communicate with the Building Automation System, specified as part of Division 23.

B. Program and document BACnet address for all devices. Submit to Division 23 Controls contractor for integrated programming.

C. Verify functionality testing with Division 23 contractor to determine Building Automation System is acquiring the correct signals and operations from the lighting controls system.

3.7 IDENTIFICATION

A. Materials: Refer to Section 260553, "Identification for Electrical Systems." Identify devices, wiring, and ceiling grid below locations of lighting relay room controllers.

B. Lighting control stations: Provide custom engraving on each button of each control station, defining button’s function. Coordinate with Owner for final approval of engraving prior to ordering.

3.8 FIELD QUALITY CONTROL

A. Manufacturer's field service: Engage a factory certified field service engineer to test and inspect components, assemblies, and equipment installations, including connections.

B. Engage a factory certified field service engineer to make site visits indicated to ensure proper system installation and operation. Visit duration shall be suitable to accomplish required tasks.

C. Preinstallation meeting: Make first visit prior to installation of wiring for lighting control system.

1. Review:

    a. Low-voltage wiring requirements.
    b. Separation of power and low-voltage/data wiring.
    c. Wire labeling.
    d. Lighting relay controller locations.
    e. Lighting control station locations.
    f. Sensor locations.
    g. Network component locations.
    h. Load circuit wiring.
    i. Connections to other equipment.
    j. Installer responsibilities.
    k. Power panel locations.
    l. Additional manufacturer installation requirements.

D. Completion of installation and programming: Make visits upon completion of installation of the lighting control system. Perform system startup.

E. On-site training: Make two visits for on-site training as described under the article “Operating Instructions.”

F. Lighting control components shall be considered defective if they do not pass tests and inspections.

G. Prepare test reports, including a certified report that identifies lighting control panels and describes results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.

3.9 SYSTEM STARTUP

A. Upon completion of installation of the lighting and lighting controls system, engage a manufacturer's certified field service engineer to perform startup service.

1. Wiring and hardware review: Wiring connections and electrical equipment included in the scope of the lighting control system shall be assessed.
2. Field testing:

    a. Verify connections to sensors and lighting control stations.
    b. Ensure that control hardware and software are calibrated, adjusted, programmed, and in proper working condition in accordance with the contract documents and manufacturer's installation instructions.
    c. For occupancy sensors, confirm that the placement, sensitivity, and time-out settings are optimized to ensure lights turn off only after each space is vacated and do not turn on unless the space is occupied.
    d. For programmable schedule controls, confirm settings are programmed. Document the settings of lighting relay room controllers that have integral astronomic clock for time schedules.
    e. For daylight sensors, confirm daylight sensor location is optimized to achieve maximum energy savings while maintaining the desired set point and that the light levels in the space are reduced relative to the amount of usable daylight in the space.

3. Tuning: Coordinate with factory certified field service engineer an on-site meeting with the Owner and Engineer to make required adjustments to the lighting control system for conformance with the original design intent.
4. Operational test: After installing time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
6. Submit test reports.

3.10 OPERATING INSTRUCTIONS

A. As specified in Section 260500, "Common Work Results for Electrical", provide operating instructions.

B. Engage a factory certified field service engineer to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

C. On-site training:

1. Provide at least two sessions of eight consecutive training hours of instruction time.

2. Train Owner's facility management and maintenance personnel, and selected Owner representatives.
3. Training shall include, but not be limited to, overview, adjustment, operation, use, maintenance, and demonstration of the lighting control system.
4. The first training session shall occur within one month of substantial completion. The second training session shall be scheduled between 6 months and 9 months of substantial completion.
5. Each training session shall include on-site demonstration of lighting control system functionality with the Owner.
6. Provide Owner with costs to schedule additional training sessions, if requested.

END OF SECTION 260936

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SECTION 264113 - LIGHTNING PROTECTION FOR STRUCTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Modification to the existing facility lightning protection system including removal, relocation, and/or addition of new system components and system inspection.

1.2 RELATED SECTIONS

A. Conduit: Section 260533.

1.3 REFERENCES

A. NFPA 780: Installation of Lightning Protection Systems.

B. UL 96: Lightning Protection Components.

C. UL 96A: Installation Requirements for Lightning Protection Systems.

1.4 DEFINITIONS

A. LPI: Lightning Protection Institute.

B. NRTL: National recognized testing laboratory.

1.5 SUBMITTALS

A. Shop drawings: For air terminals and mounting accessories.

1. Detail lightning protection system, including air-terminal locations, conductor routes and connections, and bonding and grounding provisions.
2. Indicate use of raceway, and provide data on how concealment requirements will be met and calculations required by NFPA 780 for bonding of grounded and isolated metal bodies.
3. Provide scaled drawings of proposed layout.

B. Product data: For each type of product specified, including roof adhesive, if used, submit evidence to establish that materials are manufactured, furnished, and recommended for their intended use by a lightning protection manufacturer who is a Manufacturer Member of the Lightning Protection Institute.

C. Qualification data: For firms and persons specified in “Quality Assurance” article. Include data on listing or certification by an NRTL or LPI.

D. Certifications:

1. Certifications required by “Field Quality Control” in Part 3 below.

E. Reports: Tests and inspections required by “Field Quality Control” in Part 3 below.

F. Project records:

1. Drawing: As required by Division 01 and Section 260101, at the same scale as contract documents, showing the actual locations of air terminals, cable routes, connections and grounding, and other components installed; to be made part of Operation and Maintenance manuals.
2. Forms and final documentation as required in “Field Quality Control” in Part 3 below.
3. Photo documentation of concealed portions of the lightning protection system as they are installed.

1.6 QUALITY ASSURANCE

A. Install system under the supervision of the manufacturer’s authorized and approved representative qualified as follows:

1. Actively engaged in the installation of lightning protection systems.
2. Having a satisfactory record of performance, including providing adequate service, as demonstrated by at least 5 systems of the same type, and similar size and duty, which have performed for not less than 2 years.
3. Certified Member in good standing of the Lightning Protection Institute.

B. Electrical components, devices, and accessories: Comply with applicable requirements of NFPA 70.

C. Comply with NFPA 780, UL 96, and UL 96A.

1.7 COORDINATION

A. Coordinate installation of lightning protection with installation of other building systems and components, including electrical wiring, supporting structures and building materials, metal bodies requiring bonding to lightning protection components, and building finishes.

B. Coordinate installation of air terminals attached to roof systems with roofing manufacturer and Installer.

C. Coordinate installation of counterpoise conductor and ground rods with installation of other buried systems and components.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturers/Installers: Subject to compliance with requirements, provide products by one of the following:

1. Advanced Lightning Systems, Inc.
2. Bonded Lighting Protection Systems, Inc.
3. Brazill Brothers & Associates, Inc.
4. Dillon Lightning Protection Systems, Inc.
5. East Coast Lightning Equipment, Inc.
6. Heary Bros. Lightning Protection Co. Inc.
7. Thompson Lightning Protection, Inc.

2.2 LIGHTNING PROTECTION SYSTEM COMPONENTS

A. Comply with UL 96.

B. Air terminals and conductors: NFPA 780 Class I solid copper or aluminum unless otherwise indicated.

1. Air terminals: Tapered end.
2. Air terminals shall be approved by Architect prior to installation.

C. Through-roof and through-wall connectors: Assembly for conductors passing through roof or wall penetrations to facilitate water-tight seal.

D. Ground rods:

1. Copper bonded steel, 0.75-inch diameter by 10 feet long, one end pointed and the other end tinned,
2. Basis of design: Erico International Corporation.

E. Mechanical type ground connectors:

1. Connectors:

a. IEEE 837 and UL 467 compliant, listed for use for specific types, sizes, and combinations of conductors and connected items.
b. Basis of design: FCI Burndy G Series.

2. Nuts, bolts, and washers: Silicon bronze alloy type B per ASTM F467 and F468.

F. Exothermic type ground connections:

1. Exothermic welding systems.
2. Basis of design: “Cadweld,” manufactured by Erico International Corporation.

G. Conduit: Schedule 40 Polyvinyl chloride (PVC), minimum trade size 1 inch (27 mm).

H. PVC conduit fittings, solvents and adhesives:

1. Fittings: Complying with NEMA TC 3 and UL 514.
2. Solvents and adhesives: As recommended by conduit manufacturer.

I. Grounding Test Well: 8” nominal diameter, 24” depth clay tile well with cast iron grated lid.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not begin work until shop drawings have been approved. Notify Architect 24-hours in advance of concealing lightning protection work.

B. Install lightning protection components and systems in accordance with NFPA 780 and UL 96A.

C. Install conductors with direct horizontal and downward paths from air terminals to ground connections. Avoid sharp bends and narrow loops; make no bends sharper than 90 degrees and minimum bending radius of 8 inches.

D. Conceal the following conductors unless otherwise indicated on drawings.

1. Down conductors.
2. Conductors inside building.
3. Conductors located on the roof in normal view from exterior locations at grade within 200 ft (60 m) of building.
4. Exposed conductors subject to damage.

E. Cable connections: Use approved exothermic-welded connections for all connections between conductors and ground rods.

F. Air terminals shall extend not less than 10 inches (255 mm) above the objects they are to protect.

G. Counterpoise conductors shall be buried a minimum of twenty-four-inches below finished grade.

3.2 CORROSION PROTECTION

A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.

B. Install conductors in conduit within wall cavities and where conditions would cause deterioration or corrosion of conductors.

3.3 GROUNDING AND BONDING

A. Provide equipment grounding and bonding connections sufficiently tight to ensure permanent and effective grounds and bonds.

3.4 FIELD QUALITY CONTROL

A. Testing: Upon completion of the installation, perform ground resistance test, and submit a copy of the results. Ground resistance shall not exceed 10 ohms. Test, correct, and retest until results are satisfactory.

B. Inspection: Provide an inspection by a UL field inspector certified by UL.

1. Inspection shall be performed in accordance with UL 96A and NFPA 780.

C. Inspection documents: Provide UL inspection and submit UL Master Label Certificate.

D. Testing: Perform ground resistance test before and after installation. Submit a copy of the results. Existing and modified system ground resistance shall not exceed 10-ohms. Test, correct, and retest until results are satisfactory.

END OF SECTION 264113

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SECTION 265100 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Lighting fixtures, including LED light engines, LED drivers, and accessories.

1.2 RELATED SECTIONS

A. LEED Certification: Division 01.

B. Commissioning requirements: Divisions 01.

C. Dimming control:

1. Lighting control devices: Section 260923.
2. Modular dimming control: Section 260936.

D. Occupancy sensors: Section 260923 and 260936.

1.3 SUBMITTALS

A. LEED submittal:

1. Energy and Atmosphere (EA): Prerequisite for minimum energy performance.
2. EQ Credit 6: Interior Lighting.

    a. Product data for light fixtures in regularly occupied spaces, indicating luminance value between 45 and 90 degrees from nadir.
    b. Product data for all lighting fixtures, indicating CRI value and rated life statement.

3. IN Credit 1: Reduced mercury in lamps.

    a. Product data for all mercury-containing lamps, indicating mercury content and lamp life.

B. Product data: For each type of lighting fixture indicated, arranged in order of fixture designation. Include data on features, accessories, and the following:

1. Dimensions of fixtures, photometrics and efficiency, wattage, reflectors, voltage, suspension, and appurtenances.
2. Certified results of laboratory tests for lighting fixtures for photometric performance.
3. LED drivers.
4. Lumen output, rated color temperature, and manufacturer’s LED binning procedures.

C. Shop drawings: Show details of nonstandard or custom fixtures. Indicate dimensions, weights, method of field assembly, components, features, and accessories.

1. Wiring diagrams: Detail wiring for fixtures and differentiate between manufacturer-installed and field-installed wiring.

D. Maintenance data: For lighting fixtures to include in maintenance manuals specified in Division 01.

1.4 QUALITY ASSURANCE

A. UL label and local testing (if required): As specified in Section 260500, Common Work Results for Electrical.

B. Comply with requirements for LEED certification and commissioning specified in Division 01.

C. Fixtures and accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

D. Comply with NFPA 70.

E. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

1.5 COORDINATION

A. Fixtures, mounting hardware, and trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

1.6 COMMISSIONING

A. This project includes commissioning under the direction of a Commissioning Agent (CxA). Contractor's and subcontractors' responsibilities are described in Divisions 01 for Commissioning Requirements.

B. Cooperate with the CxA to accomplish the requirements of the Commissioning Plan during the construction and correction periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-design products: Fixtures indicated in the Fixture Schedule on the drawings are the basis of design of the project.

1. Subject to compliance with requirements, provide the scheduled products. Unnamed products will only be considered and approved according to Bidding and Contracting requirements and Division 01 requirements for substitutions.

B. Subject to compliance with requirements, provide products by one of the following:

1. Drivers:

a. Philips/Advance
b. Osram Sylvania
c. Universal Lighting Technologies
d. Lutron

e. EldoLED

2.2 LIGHTING FIXTURES, GENERAL

A. Lighting fixtures shall comply with UL 1598 and be complete with casings, fittings, holders, shades, and appurtenances, wired and completely assembled.

B. Metal parts: Free from burrs, sharp corners, and edges.

C. Sheet metal components: Steel, unless otherwise indicated. Form and support to prevent warping and sagging.

D. Doors, frames, and other internal access: Smoothly operating, free from light leakage under operating conditions, and arranged to permit access without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during access and when secured in operating position.

E. Metal finishes: Powder-coated during fixture fabrication.

F. Reflecting surfaces: Minimum reflectance as follows, unless otherwise indicated:

1. White surfaces: 85 percent.
2. Specular surfaces: 83 percent.
3. Diffusing specular surfaces: 75 percent.
4. Laminated silver metalized film: 90 percent.

G. Lenses, diffusers, and covers: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated, exactly as scheduled or specified in optical details and lighting characteristics.

1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
2. Lens thickness: 0.125 inch (3 mm) minimum, unless greater thickness is indicated.

2.3 LED DRIVERS

A. Driver shall operate from a 120-volt or 277-volt, 60-Hz input power source and be suitable for outputting power to 12-volt or 24-volt LED light sources, as required.

B. Drivers, where specified, shall be capable of being dimmed. Dimmable drivers shall be controlled by a Class 2 low-voltage 0-10VDC controller.

C. Performance Criteria:

1. Driver shall have a Class A sound rating.
2. Driver shall have a power factor (PF) greater than 0.90.
3. Driver shall have Total Harmonic Distortion (THD) of input current equal to or less than 20 percent.

D. Driver shall meet FCC and Title 47 CFR regulations for EMI/RFI.

E. Driver shall comply with ANSI C62.41 Class A requirements for transient protection.

2.4 EXIT SIGNS

A. General requirements: Exit signs shall meet the Energy Star Program requirements to operate on 5 watts or less input power per face. Comply with UL 924 and the following:

1. Sign colors and lettering size: Comply with authorities having jurisdiction.

B. Internally lighted signs: As follows:

1. Light sources for ac operation: Light-emitting diodes, 70,000 hours minimum rated life.

2.5 LED LIGHT ENGINES

A. The LED manufacturer shall provide the quantity and wattage of LEDs required to achieve the defined lighting output set forth by the lighting fixture manufacturer.

B. LED light engines shall be integrated into an engineered package for the specific lighting fixture application, including heat dissipation components.

C. Color temperature: As specified in lighting fixture schedule, with a tolerance of plus or minus 100K and within a range of three macadam ellipses. Noticeable color temperature variation between adjacent lighting fixtures shall be considered a failure to meet these specifications and shall be replaced at no cost to the owner.

D. Minimum performance characteristics:

1. Life: Minimum lumen maintenance of L70 at 50,000 hours, as defined by IES LM-80.
2. Lumen output: Based on absolute photometry, lumens (total luminous flux exiting the physical luminaire), as specified on contract drawings and schedules.
3. Color rendering index: Rated at 80 or higher, as indicated on the drawings.

2.6 FIXTURE SUPPORT COMPONENTS

A. Comply with Section 260500, Common Work Results for Electrical, for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-stem hangers: 1/2-inch (12-mm) steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.

C. Twin-stem hangers: Two, 1/2-inch (12-mm) steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.

D. Rod hangers: 3/16-inch- (5-mm-) minimum diameter, cadmium-plated, threaded steel rod.

E. Hook hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

F. Aircraft cable support: Use cable, anchorages, and intermediate supports recommended by fixture manufacturer.

2.7 FINISHES

A. Fixtures: Manufacturer's standard, unless otherwise indicated.

1. Paint finish: Powder coat applied during fabrication over corrosion-resistant treatment or primer, free of defects.
2. Metallic finish: Corrosion-resistant.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before ordering the light fixtures, consult with the installer of the ceilings to ensure that the correct fixture trim is supplied and installed. Provide the supports and accessories required for installation in each ceiling system.

B. Before ordering the light fixtures, verify the specified voltage with the voltage shown on the drawings to ensure the correct voltage is supplied.

3.2 INSTALLATION

A. Furnish and install a complete lighting fixture for every outlet indicated on the drawings so that every outlet shall be properly provided with a suitable fixture of type specified, of wattage indicated.

B. Fixture wire shall bear UL label. Fixture wiring for fixtures and branch circuit wiring in fixture channels shall be type THHN.

C. Furnish fixtures in the quantities, sizes, and types indicated on drawings.

D. Where a letter designating fixture type is adjacent to a row of fixtures, it shall be understood that all fixtures in the row shall be of this type, consisting of either four-foot or eight-foot units, the rows consisting of the total lengths indicated. Where the catalog numbers of the fixtures refer to 4-foot units, 8-foot units may be used where applicable.

E. Provide recessed fixtures with flexible conduit connector and wire (fixture whip), or a removable wiring access plate, so that they may be wired without removing ballast cover. Plate shall be screwed to fixture housing and conduit shall be securely attached and grounded to fixture to meet NEC requirements.

3.3 FIXTURE SUPPORT

A. Support from building structure: Provide fasteners appropriate to the supporting substrate, and wire, jack chain, or rods as specified for particular fixture types below.

1. Provide channels bolted or welded between joists where required to obtain proper spacing for lighting supports.
2. Connections to joists or beams: Beam clamps. For wire supports, wrap wire securely around structural member.
3. Connections to concrete: Embedded, as specified in Section 260533, Conduits.

B. In suspended plaster and drywall ceilings, fixtures may be supported from the suspended ceiling construction. Fasten box and fixture supports securely to suspension system. Where fixtures are surface-mounted, cut neat holes in the plaster as required for supports.

C. Recessed fixtures in suspended acoustical ceilings: Coordinate fixture installation with ceiling installer. Ensure that ceiling supports are located to clear fixtures.

1. Support from building structure: Use fasteners specified in Section 260533, Conduits, and No. 10 wire.

a. Provide 2 supports for each individual fixture, one at each end of fixture. In continuous rows, install additional supports at each joint.

D. Surface-mounted and stem-suspended fixtures on or below suspended acoustical ceilings: Supported from the building structure above with No. 10 wire.

1. Provide 2 supports for each individual fixture, 1 at each end of fixture. In continuous rows, install an additional support at each joint.
2. Surface-mounted fixtures mounted on low-density ceilings shall be provided with spacers where required.

E. Where it is necessary for a fixture to be installed directly below an air duct, install two hanger rods, one on each side of the duct, bolted to a channel or angle suspended from the hangers under the duct, and support the fixtures from the suspended channel or angle.

3.4 ADJUSTMENT PERIOD

A. Occupancy adjustments: When requested within 6 months of date of Substantial Completion, provide on-site assistance in adjusting fixtures to suit occupied conditions. Provide up to 2 visits to project outside of normal occupancy hours for this purpose. Some work may be required after dark.

3.5 CLEANING

A. Light fixtures, used for temporary lighting during construction, shall be cleaned free of construction dirt to like-new condition.

END OF SECTION 265100

SECTION 283111 – ADDRESSABLE FIRE DETECTION AND ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes fire alarm systems.

B. Include system internal provision for future interface to the security system related to the release of egress door upon building evacuation alarms.

C. Include system provisions for interface to the Mass Notification System.

1.3 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. NICET: National Institute for Certification in Engineering Technologies.

D. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.4 SYSTEM DESCRIPTION

A. Noncoded, addressable system; multiplexed signal transmission dedicated to fire alarm service only.

1.5 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 72.

B. Fire alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Smoke detectors.
3. Verified automatic alarm operation of smoke detectors.
4. Heat detectors.
5. Automatic sprinkler system water flow.

6. Smoke evacuation system initiated by smoke detector.
7. Hood fire suppression system.

C. Fire alarm signal shall initiate the following actions:

1. Alarm notification appliances shall operate continuously.
2. Identify alarm at the FACP and remote annunciators.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Transmit an alarm signal to the building management system via BACNet.
5. Activate voice/alarm communication system.
6. Initiate the digital alarm communicating transmitter (DACT).
7. Switch heating, ventilating, and air-conditioning equipment controls to fire alarm mode.
8. Record events in the system memory.
9. Record events by the system printer.

D. Supervisory signal initiation shall be by one or more of the following devices or actions:

1. Operation of a fire-protection system valve tamper.
2. Operation of a duct mounted smoke detector.

E. System trouble signal initiation shall be by one or more of the following devices or actions:

1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at the FACP.
4. Ground or a single break in FACP internal circuits.
5. Abnormal ac voltage at the FACP.
6. A break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at the FACP or annunciator.

F. System Trouble and Supervisory Signal Actions: Ring trouble bell and annunciate at the FACP and remote annunciators. Record the event on system printer.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:

1. Shop Drawings shall be prepared by persons with the following qualifications:

a. Trained and certified by manufacturer in fire alarm system design.
b. Fire alarm certified by NICET, minimum Level III.

2. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
3. Device Address List: Coordinate with final system programming.
4. System riser diagram with device addresses, conduit sizes, and cable and wire types and sizes.
5. Wiring Diagrams: Power, signal, and control wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.
6. Batteries: Size calculations.
7. Duct Smoke Detectors: Performance parameters and installation details for each detector, verifying that each detector is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
8. Ductwork Coordination Drawings: Plans, sections, and elevations of ducts, drawn to scale and coordinating the installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, the detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
9. Voice/Alarm Signaling Service: Equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
10. Floor Plans: Indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.

C. Qualification Data: For Installer.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, Appendix A, recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACP.

F. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals specified in Division 1 Section "Submittals," make an identical submittal to authorities having jurisdiction. To facilitate review, include copies of annotated Contract Drawings as needed to depict component locations. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Owner for review.

G. Documentation:

1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, and authorities having jurisdiction.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.8 WARRANTY

A. Warranty Period and Coverage: Two years from date of Substantial Completion. Warranty shall cover manufacturer's standard form in which manufacturer and installer agree to repair or replace system devices and equipment that fail in materials or workmanship within specified warranty period. Warranty work shall include all labor on a 24 hour per day, 7 days per week basis.

B. Provide complete system inspection and testing every 6 months, after the initial installation, testing, and inspection, for the duration of the warranty. Submit to the College a written report of the inspection. Correct all deficiencies found during the inspection and testing of the system.

C. All warranty work shall be provided to the College at no additional cost.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
3. Smoke and Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.
5. Keys and Tools: One extra set for access to locked and tamperproofed components.
6. Audible and Visual Notification Appliances: One of each type installed.
7. Fuses: Two of each type installed in the system.

1.10 FIRE WATCH

A. The College’s Security will provide fire watch service if work is provided while the facility is occupied. The intent of the fire watch is to allow the use of existing system flush outlets and avoid exposed wiring on existing finished surfaces. The provision of a fire watch is part of this work and shall be initiated at the start of the demolition work. Maintain the fire watch for the duration of the work while facilities are occupied until the new system has been approved by the local Authority. Coordinate all fire watch activities with the College and provide 2 weeks written notice.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following, no substitution. Components shall be compatible with existing Simplex ES4100 fire alarm system.

1. FACP and Equipment:

   a. SimplexGrinnell LP; a Tyco International Company.

2. Wire and Cable:

   a. Comtran Corporation.
   b. Helix/HiTemp Cables, Inc.; a Draka USA Company.
   c. Rockbestos-Suprenant Cable Corporation; a Marmon Group Company.
   d. West Penn Wire/CDT; a division of Cable Design Technologies.

2.2 MANUAL FIRE ALARM BOXES

A. Description: UL 38 listed; finished in red with molded, raised-letter operating instructions in contrasting color. Station shall show visible indication of operation. Mounted on recessed outlet box; if indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
2. Station Reset: Key- or wrench-operated switch.

2.3 SYSTEM SMOKE DETECTORS

A. General Description:

1. UL 268 listed, operating at 24-V dc, nominal.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
3. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
4. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5. Integral Visual-Indicating Light: LED type. Indicating detector has operated status.
6. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

B. Ionization Smoke Detector:

1. Sensor: Responsive to both visible and invisible products of combustion. Self-compensating for changes in environmental conditions.
2. Detector Sensitivity: Between 0.5 and 1.7 percent/foot smoke obscuration when tested according to UL 268A.

C. Duct Smoke Detectors:

1. Photoelectric Smoke Detectors:

a. Sensor: LED or infrared light source with matching silicon-cell receiver.
b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.

2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated status.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
8. Each sensor shall have multiple levels of detection sensitivity.
9. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
10. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.4 NOTIFICATION APPLIANCES

A. Description: Equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.
2. All notification appliances shall be addressable.

B. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "ALERT" is engraved in minimum 1-inch-high letters on the lens.

1. Rated Light Output: 15 candela minimum unless otherwise indicated.
2. Adjustable Candela Output: Field adjustable at the device or programmable from the FACP when the device dip switch is set to “Auto”.
3. Strobe Leads: Factory connected to screw terminals.

C. Voice/Tone Speakers:

1. UL 1480 listed.
2. Low-Range Units: Rated 1 to 2 W.
3. Mounting: Flush, semirecessed, or surface mounted; bidirectional as indicated.
4. Matching Transformers: Tap range matched to the acoustical environment of the speaker location.

2.5 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, resetting, and testing.

1. Mounting: Surface cabinet, NEMA 250, Class 1 at the Ground Floor and flush mounted cabinet at the First Floor vestibule area.

B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LEDs permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

C. Annunciator panel shall be smoke plexiglass, back lighted with appropriate LEDs. Provide graphic as indicated on the drawing with photo emulsion material.

2.6 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall and to a circuit-breaker shunt trip for power shutdown.

2.7 WIRE AND CABLE

C. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.

D. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG and size as recommended by system manufacturer.

1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70 Article 760, Classification CI, for power-limited fire alarm signal service. UL listed as Type FPL, and complying with requirements in UL 1424 and in UL 2196 for a 2-hour rating.

E. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 16 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.
3. Multiconductor Armored Cable: NFPA 70 Type MC, copper conductors, TFN/THHN conductor insulation, copper drain wire, galvanized steel armor, red striped, UL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

PART 3 - EXECUTION

3.1 PHASING OF THE WORK

A. Initiate a fire watch. Remove existing fire alarm system complete. Provide new system. Reuse existing outlets for the installation of new fire alarm system devices such as manual striking stations and notification appliances. Reuse existing concealed raceways in wall to these outlets for the provision of new system wiring. This process will avoid use of exposed wiring on existing finished surfaces.

B. At the completion of the work, inspect and test system. Maintain fire watch until new system is accepted by the Authority.

3.2 EQUIPMENT INSTALLATION

A. Smoke or Heat Detector Spacing:

1. Smooth ceiling spacing shall not exceed the rating of the detector.
2. Spacing of heat detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas, shall be determined according to Appendix A in NFPA 72.
3. Spacing of heat detectors shall be determined based on guidelines and recommendations
4. in NFPA 72.

B. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.

C. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of the duct.

D. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.

E. Audible Alarm-Indicating Devices: Install as indicated on the drawings.

F. Visible Alarm-Indicating Devices: Install as indicated on the drawings.

G. Device Location-Indicating Lights: Locate in public space near the device they monitor.

H. FACP: Surface mount with tops of cabinets not more than 72 inches above the finished floor.

I. Annunciator: Install with top of panel not more than 72 inches above the finished floor. Surface mount the cabinet at the Ground Floor and fabricate a chase above the cabinet to conceal all wiring to the annunciator panel and simulate the installation of a flush cabinet. Coordinate final arrangement with the College. Flush mount the cabinet at the First Floor.

J. System printer: Install the system printer on stand adjacent the fire alarm control panel.

3.3 WIRING INSTALLATION

A. Install wiring according to the following:

1. NECA 1.
2. TIA/EIA 568-A.

B. Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceways and Boxes for Electrical Systems" and rated cables according to Division 26 Section “Low Voltage Electrical Power Conductors and Cables”. Provide raceways and cables in accordance with the following:

1. Major system distribution and Risers: Provide conductor in metal raceway for all system wiring between the FACP, voice evacuation control panel (VACP), all Fire Alarm Terminal Cabinets (FATC) and Fire Alarm Extender Panels (FAEP) as indicated on the drawings. Terminate all system conductors on terminal strips in each FATC. Provide a minimum of 50 percent spare conductors for alarm initiating circuits, alarm notification circuits and other control wiring associated with the fire alarm system. Terminate spare conductors on terminal strips in each FATC. Label each system conductors terminating in the FACT and provide a typed legend in the cover of the FATC identifying all active and spare conductors. These conductors will be considered and labeled on the drawing as the back bone of the system and are intended to meet future system wiring needs.
2. Lateral distribution system: Provide MC cable from the FATC to the system alarm initiating devices, alarm notification appliances and control wiring associated with the fire alarm system. Conceal cables in finished spaces. Provide conductors in metal raceway for exposed wiring.
3. Annunciator Panel: Provide system conductors in metal raceway from the FACP to the remote annunciator panel. Provide a minimum of 50 percent spare conductors in the raceway and terminate spare conductors on terminal strips.
4. Firefighter’s two-way communication station: Provide system conductors in metal raceway from the FACP to the equipment.
5. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

E. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

F. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the FACP and the remote equipment. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Basic Electrical Materials and Methods."

B. Install instructions frame in a location visible from the FACP.

C. Paint power-supply disconnect switch red and label "FIRE ALARM."

3.5 GROUNDING

A. Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.
2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.
3. Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
4. Testing: Follow procedure and record results complying with requirements in NFPA 72.
5. Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in NFPA 70.

3.7 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.

B. Follow-Up Tests and Inspections: After date of Substantial Completion, test the fire alarm system complying with testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for three monthly, and one quarterly, periods.

C. Annual Test and Inspection: One year after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, semiannual, and annual periods. Use forms developed for initial tests and inspections.

3.8 DEMONSTRATION AND TRAINING

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 283111

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SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Removing above- and below-grade site improvements.
5. Disconnecting, capping or sealing, removing site utilities, and abandoning site utilities in place.
6. Temporary erosion and sedimentation control.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.

D. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects larger than 2 inches in diameter; and free of weeds, roots, toxic materials, or other nonsoil materials.

E. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

F. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, indicated on Drawings, and indicated according to requirements in Section 015639 "Temporary Tree and Plant Protection.

G. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PRE-INSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.5 MATERIAL COLLEGESHIP

A. Except for materials indicated to be stockpiled or otherwise remain College's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video recordings.
2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.

B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

C. Burning: Burning is not permitted.

1.7 QUALITY ASSURANCE

A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

1.8 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from College and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by College or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on College's premises.

C. Utility Locator Service: Notify Miss Utility for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed .

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to College.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Protect trees and plants remaining on-site.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.

3.4 EXISTING UTILITIES

A. The College will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.

1. Arrange with utility companies to shut off indicated utilities.
2. College will arrange to shut off indicated utilities when requested by Contractor.

C. Locate, identify, and disconnect utilities indicated to be abandoned in place.

D. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by the College or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify the College not less than two weeks days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without A/E's written permission.

E. Excavate for and remove underground utilities indicated to be removed.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
3. Use only hand methods or air spade for grubbing within protection zones.
4. Chip removed tree branches and dispose of off-site.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
2. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off College's property.

B. Burning tree, shrub, and other vegetation waste is permitted according to burning requirements and permitting of authorities having jurisdiction. Control such burning to produce the least smoke or air pollutants and minimum annoyance to surrounding properties. Burning of other waste and debris is prohibited.

C. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

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SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
3. Excavating and backfilling for buildings and structures.
4. Subbase course for concrete walks and pavements.
5. Subsurface drainage backfill for walls and trenches.
6. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. Related Requirements:
1. Section 311000 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.

1.3 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by A/E. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by A/E. Unauthorized excavation, as well as remedial work directed by A/E, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.

I. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

J. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

K. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

L. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct pre-excavation conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Warning tapes.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

B. Material Test Reports: For each soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.
2. Laboratory compaction curve according to ASTM D 698.

C. Pre-excavation Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by earth-moving operations. Submit before earth moving begins.

1.7 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

1.8 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the College and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by the College or authorities having jurisdiction.

B. Utility Locator Service: Notify "Miss Utility" for area where Project is located before beginning earth-moving operations.

C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures specified in Section 015000 "Temporary Facilities and Controls" and Section 311000 "Site Clearing" are in place.

D. The following practices are prohibited within protection zones:

1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Foot traffic.
4. Erection of sheds or structures.
5. Impoundment of water.
6. Excavation or other digging unless otherwise indicated.
7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

E. Do not direct vehicle or equipment exhaust towards protection zones.

F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups ML, SM, SP, SW, GC, GM, GP or SC according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

1. Liquid Limit: 45.
2. Plasticity Index: 15.

C. Unsatisfactory Soils: Soil Classification Groups OL, CH, MH and OH according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 294/D 2940M 0; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and zero to 5 percent passing a No. 8 sieve.

I. Sand: ASTM C 33/C 33M; fine aggregate.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability: As follows:

a. Grab Tensile Strength: 200 lbf; ASTM D 4632.
b. Tear Strength: 80 lbf; ASTM D 4533.
c. Puncture Strength: 450 lb; ASTM D 4833.

2. Apparent Opening Size: No. 70 sieve, maximum; ASTM D 4751.
3. Permittivity: 1.1 per second, minimum; ASTM D 4491.
4. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.

B. Separation Geotextile: Woven geotextile fabric, manufactured for separation applications, made from polyolefins or polyesters; with elongation less than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:
   1. Survivability: As follows:
      a. Grab Tensile Strength: 200 lbf; ASTM D 4632.
      b. Tear Strength: 75 lbf; ASTM D 4533.
      c. Puncture Strength: 450 lbf; ASTM D 4833.
   2. Apparent Opening Size: No. 30 sieve, maximum; ASTM D 4751.
   3. Permittivity: 0.05 per second, minimum; ASTM D 4491.
   4. UV Stability: 70 percent after 500 hours' exposure; ASTM D 4355.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
   1. Red: Electric.
   2. Yellow: Gas, oil, steam, and dangerous materials.
   3. Orange: Telephone and other communications.
   4. Blue: Water systems.
   5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

    a. 24 inches outside of concrete forms other than at footings.
    b. 12 inches outside of concrete forms at footings.
    c. 6 inches outside of minimum required dimensions of concrete cast against grade.
    d. Outside dimensions of concrete walls indicated to be cast against rock without forms or exterior waterproofing treatments.
    e. 6 inches beneath bottom of concrete slabs-on-grade.
    f. 6 inches beneath pipe in trenches and the greater of 24 inches wider than pipe or 42 inches wide.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Pile Foundations: Stop excavations 6 to 12 inches above bottom of pile cap before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

B. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand or with an air spade to indicated lines, cross sections, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose

roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.7 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.8 SUBGRADE INSPECTION

A. Notify A/E when excavations have reached required subgrade.

B. If A/E determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

C. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by A/E, and replace with compacted backfill or fill as directed.

D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.

E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by A/E, without additional compensation.

3.9 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2,500 psi, may be used when approved by A/E.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by A/E.

3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.12 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 033000 "Cast-in-Place Concrete."

D. Trenches under Roadways: Provide 4-inch-thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course. Concrete is specified in Section 033000 "Cast-in-Place Concrete."

E. Backfill voids with satisfactory soil while removing shoring and bracing.

F. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of subbase material, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

    a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

G. Final Backfill:

1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
2. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.

H. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.13 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.14 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.15 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.16 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1/2 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Install separation geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place base course material over subbase course under hot-mix asphalt pavement.
3. Shape subbase course and base course to required crown elevations and cross-slope grades.
4. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
5. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
6. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.18 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
2. Place drainage course 6 inches or less in compacted thickness in a single layer.
3. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.19 FIELD QUALITY CONTROL

A. Special Inspections: Contractorr will engage a qualified special inspector to perform the following special inspections:

1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
2. Determine that fill material classification and maximum lift thickness comply with requirements.

3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.

B. Testing Agency: Contractor will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by A/E.

E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length but no fewer than two tests.
3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.20 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by A/E; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off the College's property.

END OF SECTION 312000

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SECTION 321313 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes Concrete Paving.

1. Walks.

B. Related Requirements:

1. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1. Review methods and procedures related to concrete paving, including but not limited to, the following:

a. Concrete mixture design.
b. Quality control of concrete materials and concrete paving construction practices.

2. Require representatives of each entity directly concerned with concrete paving to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete paving Subcontractor.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer and testing agency.

B. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Fiber reinforcement.
4. Admixtures.
5. Curing compounds.
6. Applied finish materials.
7. Bonding agent or epoxy adhesive.
8. Joint fillers.

C. Material Test Reports: For each of the following:

1. Aggregates: Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

D. Field quality-control reports.

1.7 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified independent testing agency to perform preconstruction testing on concrete paving mixtures.

1.9 FIELD CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
2. Do not use frozen materials or materials containing ice or snow.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, fabricated from galvanized-steel wire into flat sheets.

B. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.

C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

D. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 deformed bars; assembled with clips.

E. Plain-Steel Wire: ASTM A 1064/A 1064M, galvanized.

F. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars; zinc coated (galvanized) after fabrication according to ASTM A 767/A 767M, Class I coating]. Cut bars true to length with ends square and free of burrs.

G. Tie Bars: ASTM A 615/A 615M, Grade 60; deformed.

H. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against paving form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

I. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:

   1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
   2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

J. Zinc Repair Material: ASTM A 780/A 780M.

2.4 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:

   1. Portland Cement: ASTM C 150/C 150M, gray portland cement Type II.

B. Normal-Weight Aggregates: ASTM C 33/C 33M, uniformly graded. Provide aggregates from a single source.

C. Air-Entraining Admixture: ASTM C 260/C 260M.

D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

E. Water: Potable and complying with ASTM C 94/C 94M.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that comply with or exceed requirements.

B. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

C. Concrete Mixtures: Normal-weight concrete.

1. Compressive Strength (28 Days): 4500 psi and 3500 psi.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.

1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness to match jointing of existing adjacent concrete paving:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes.

a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.

2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.

3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Screed paving surface with a straightedge and strike off.

H. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface, perpendicular to line of traffic, to provide a uniform, fine-line texture.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 3/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-feet-long; unleveled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.

10. Joint Width: Plus 1/8 inch, no minus.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

    a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

D. Test results shall be reported in writing to A/E, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by A/E but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by A/E.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.11 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by A/E.

B. Drill test cores, where directed by A/E, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 321313

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SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cold-applied joint sealants.
2. Hot-applied joint sealants.
3. Joint-sealant backer materials.
4. Primers

1.3 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of joint sealant and accessory.

1.6 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

2.2 COLD-APPLIED JOINT SEALANTS

A. Single-Component, Nonsag, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type NS.

B. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type SL.

C. Multicomponent, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 25, for Use T.

2.3 HOT-APPLIED JOINT SEALANTS

A. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I.

B. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I or Type II.

C. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type I, II, or III.

D. Hot-Applied, Single-Component Joint Sealant: ASTM D 6690, Type IV.

2.4 JOINT-SEALANT BACKER MATERIALS

A. Joint-Sealant Backer Materials: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.

B. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

C. Round Backer Rods for Cold-Applied Joint Sealants: ASTM D 5249, Type 3, of diameter and density required to control joint-sealant depth and prevent bottom-side adhesion of sealant.

D. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.5 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated unless more stringent requirements apply.

B. Clean-out joints immediately before installing joint sealants.

C. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.

D. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of joint-sealant backings.
2. Do not stretch, twist, puncture, or tear joint-sealant backings.
3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

E. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:

1. Place joint sealants so they fully contact joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:

1. Remove excess joint sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

G. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

3.4 CLEANING AND PROTECTION

A. Clean off excess joint sealant as the Work progresses, by methods and with cleaning materials approved in writing by joint-sealant manufacturers.

B. Protect joint sealants, during and after curing period, from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations in repaired areas are indistinguishable from the original work.

END OF SECTION 321373

SECTION 321400 – UNIT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Concrete Unit Pavers
2. Porcelain Pavers
3. Paver Pedestals (for Porcelain Pavers)
4. Paver Tray System (for Porcelain Pavers)
5. Paver Adhesive (for Porcelain Pavers)
6. Jointing Sand (for Concrete Unit Pavers)

1.3 SUBMITTALS

A. Product Data: For the following:
1. Concrete Unit Pavers
2. Porcelain Pavers
3. Paver Pedestals
4. Paver Tray System
5. Paver Adhesive
6. Jointing Sand

B. Samples for Verification:

1. 4” x 4” min. sample of each Concrete Unit Paver
2. 4” x 4” min. sample of each Porcelain Paver
3. Jointing Sand

C. Installer Qualifications:
1. An installer with at least ten years’ experience who has completed unit paver installations similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

B. Mockups: Before installing pavers, build mockups for each form and pattern of unit pavers required to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, and contiguous work as indicated.
   1. Build 8’ x 8’ mockups for the following, in the location as directed by the Architect.
      a. Concrete Unit Pavers
      b. Porcelain Pavers
   2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
   3. Obtain Architect's approval of mockups before starting unit paver installation.
   4. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   5. Demolish and remove mockups when directed.
   6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Preinstallation Conference: Conduct conference at Project site after construction of mockups and prior to final installation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store liquids in tightly closed containers protected from freezing.

1.6 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

PART 2 - PRODUCTS

2.1 CONCRETE UNIT PAVERS

A. Manufacturer:

   1. Hanover Architectural Products

a. Type A
   1) Product: Prest Paver
   2) Face Size (Nominal): 12” x 24” x 2”
   3) Color: Tan
   4) Finish: Tudor

b. Type B
   1) Product: Prest Paver
   2) Face Size (Nominal): 12” x 24” x 2”
   3) Color: Cream
   4) Finish: Tudor

c. Type C
   1) Product: Prest Paver
   2) Face Size (Nominal): 12” x 24” x 2”
   3) Color: Natural
   4) Finish: Tudor

2.2 PORCELAIN PAVERS

A. Manufacturer:

1. Tile Tech

   a. Wood Look Porcelain Paver
      1) Product: Natural Plank
      2) Face Size (Nominal): 24” x 24” x 3/4"

2.3 ACCESSORIES

A. Paver Pedestals (for Porcelain Pavers)
   1. Manufacturer: Tile Tech
   2. Product name: Stak-Cap Pedestal System

B. Paver Tray System (for Porcelain Pavers)
   1. Manufacturer: Tile Tech
   2. Product name: Hex Tray Wind Uplift System
   3. Size (Nominal): 24” x 24” x 3/4"

C. Paver Adhesive (for Porcelain Pavers)
   1. Manufacturer: Chem Link by Soprema
   2. Product Name: M-1 Universal Adhesive & Sealant
   3. Note: This product is recommended by the Porcelain Paver manufacturer for use in this application.

D. Filter Fabric (for Concrete Unit Pavers)
   1. Product name: non-woven polypropylene geotextile fabric (ASTM D4759, ASTM D4491, and ASTM D4632)

E. Jointing Sand (for Concrete Unit Pavers)

1. Product name: Masonry Sand (ASTM C144)
2. Color: Natural (no color additives)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances, load capacity and other conditions affecting performance.
   1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove substances from concrete substrates that could impair bond, including curing and sealing compounds, form oil, and laitance.

B. Notify Landscape Architect and Owner of any existing substrates found to be in need of repair to produce a suitable, level surface prior to installation of pavers.

C. Clean concrete substrates to remove dirt, dust, debris, and loose particles.

3.3 INSTALLATION, GENERAL

A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.

B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

D. Exercise care in handling coated brick pavers to prevent coated surfaces from contacting backs or edges of other units. Remove coating from bonding surfaces before setting brick.

E. Joint Pattern: As indicated on drawings.

F. Tolerances: Do not exceed 1/16-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.

G. Install pavers per paver manufacturer’s instructions.

3.4 FILTER FABRIC PLACEMENT AT CONCRETE UNIT PAVERS

A. Place filter fabric directly over insulation with no wrinkles or folds to ensure full contact and uniform paver support.

B. Overlap edges by a minimum of 6” or per manufacturer’s recommendations.

3.5 SAND PLACEMENT AT CONCRETE UNIT PAVERS

A. After placement and final alignment of Concrete Unit Pavers, sweep sand into the joints using soft- to medium-bristle brooms.

B. Sand shall be dry at the time of installation to allow for full penetration into the joints.

C. Work sand diagonally across joints to ensure complete penetration into hand-tight joints.

D. Perform multiple passes, sweeping in different directions, to ensure joints are completely filled.

E. Lightly mist sand-filled joints with water to aid settling.

F. Carefully remove all excess sand from the surface with clean, dry brooms or a low-pressure air blower. Take care not to dislodge joint sand during cleaning.

G. Protect the installation from foot traffic for a minimum of 24 hours to allow the joint sand to settle.

H. Inspect joints periodically after installation. Reapply sand as needed due to wind displacement or movement.

END OF SECTION 321400

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SECTION 321813 – SYNTHETIC GRASS SURFACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Artificial Turf
   2. Infill Material
   3. Pedestals
   4. Turf Tray System
   5. Turf Adhesive

1.3 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For synthetic grass surfacing.

   1. Include sections and details.
   2. Show locations of seams and method of seaming.

C. Samples: For each type of synthetic grass surfacing indicated.

   1. Artificial Turf: 12 inches square.
   2. Infill Material: 4 oz. of each type.
   3. Seam Sample: 24 inches square with seam centered in sample.

D. Installer Qualifications:
   1. An installer with at least ten years' experience who has completed artificial turf installations similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.

E. Sample Warranties: For special warranties.

F. Maintenance Data: For synthetic grass surfacing, including maintenance cleaning instructions, to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Mockups: Before installing artificial turf, build a mockup to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction and contiguous work as indicated.
   1. Build 8’ x 8’ mockups for the following, in the location as directed by the Architect.
      a. Artificial Turf
   2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
   3. Obtain Architect's approval of mockups before starting artificial turf installation.
   4. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
   5. Demolish and remove mockups when directed.
   6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Preinstallation Conference: Conduct conference at Project site after construction of mockups and prior to final installation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials in location and manner to allow installation of synthetic grass surfacing without excess disturbance of granular base.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace synthetic grass surfacing that fails in materials or workmanship within specified warranty period.

   1. Failures include, but are not limited to, the following:

      a. Deterioration and excessive wear.
      b. Deterioration from UV light.
      c. Seam separation.

   2. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ARTIFICIAL TURF

A. Artificial Turf: Complete surfacing system, consisting of synthetic yarns bound to water-permeable backing and infill indicated, suitable for roof deck installation.

B. Manufacturer:

   1. Synlawn

a. Artificial Turf
   1) Product: SYNRye 200
   2) Seaming Method: Adhesive

2.2 INFILL MATERIAL

A. Manufacturer:

1. The Motz Group

a. Infill Material
   1) Product: Envirofill
   2) Size: 16/30
   3) Color: Green
   4) Note: Use manufacturer's standard proportions for rooftop installations of 2 lbs / SF

2.3 MATERIALS

A. Seam Adhesive: One- or two-part urethane, recommended or approved by synthetic grass surfacing manufacturer, and suitable for ambient conditions at time of installation.

2.4 PEDESTALS

A. Manufacturer:

1. Tile Tech
   a. Product: Stak-Cap Pedestal System

2.5 TURF TRAY SYSTEM

A. Manufacturer:

1. Tile Tech
   a. Product: Turf Tray System

2.6 TURF ADHESIVE

A. Manufacturer:

1. Chem Link
   a. Product: M-1 Universal Adhesive & Sealant

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine base and other conditions, with Installer present, for compliance with requirements for installation tolerances, permeability, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Avoid disturbance of base during installation of turf fabric.

B. Roll out turf fabric and allow to relax at least four hours prior to seaming.

C. Provide seams flat and snug, with no gaps or fraying. Remove yarns that are trapped within seams. Attach turf fabric to tray system as recommended by the manufacturer.

D. Repair loose seams and bubbles formed due to expansion of turf fabric prior to installation of infill.

E. Evenly broadcast and groom infill by machine in proportions and depth after settling as recommended by the manufacturer, and to meet indicated performance requirements. Rake fibers trapped by infill to surface.

3.3 DEMONSTRATION

A. Train Owner's maintenance personnel in proper maintenance procedures for synthetic grass surfacing.

END OF SECTION 321813

SECTION 323300 – SITE FURNISHINGS

PART 1 - GENERAL

RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

SUMMARY

B. Section includes:
   1. Linear Wood Terrace
   2. Circular Bench
   3. Rectangular Planter Type A
   4. Rectangular Planter Type B
   5. Rectangular Planter Type C
   6. Backed Bench
   7. Backless Bench

ACTION SUBMITTALS

C. Product Data: Manufacturers product data for each type of product.

D. Shop Drawings (if indicated): Include plans, elevations, sections, details, and attachments to adjacent construction. Indicate dimensions, materials, finishes, installation methods, and relationship to surrounding construction.

E. Samples for Verification: For each color and texture specified.

INFORMATIONAL SUBMITTALS

F. Installation and Maintenance manuals.

PART 2 - PRODUCTS

LINEAR WOOD TERRACE

A. Products: Subject to compliance with requirements, provide the following:
   1. Manufacturer: Streetlife
      a. Product name: Solid Linear Terraces
      b. Product code: SOL-TER-Custom

c. Size: Custom size & configuration; see drawings
d. Seat Material: Timber, Accoya Wood
e. Cover/End Panels: Powdercoated Steel (color to be selected from manufacturer's full range)
f. Support Structure Material: Hot-dip galvanized steel
g. Installation: See drawings
h. Notes:
1) Shop Drawing submittal is **required**

CIRCULAR BENCH PLANTER

A. Products: Subject to compliance with requirements, provide the following:
1. Manufacturer: Streetlife
a. Product name: Solid Podium Disc
b. Product code: SOL-PD-E-D300
c. Size: 119" Diameter (top) / 110" Diameter (base) x 19" H
d. Seat Material: Timber, Accoya Wood
e. Frame Material: Powdercoated hot-dip galvanized steel (color to be selected from manufacturer's full range)
f. Installation: Freestanding
g. Notes:
1) Include optional decorative perforations in metal wall; see drawings
2) Shop Drawing submittal is **required**

RECTANGULAR PLANTER TYPE A

A. Products: Subject to compliance with requirements, provide the following:
1. Manufacturer: Green Theory
a. Product name: Stock Trough
b. Size: 6'-0" L x 3'-0" W x 2'-6" H (custom dimensions)
c. Material: Powdercoated Aluminum, AAMA 2604 Powder Coat (color to be selected from manufacturer's full range)
d. Installation: Freestanding
e. Notes:
1) Include optional Drip Tray
2) Shop Drawing submittal is **required**

RECTANGULAR PLANTER TYPE B

A. Products: Subject to compliance with requirements, provide the following:
1. Manufacturer: Green Theory
a. Product name: Stock Trough
b. Size: 4'-2" L x 3'-0" W x 3'-6" H (custom dimensions)
c. Material: Powdercoated Aluminum, AAMA 2604 Powder Coat (color to be selected from manufacturer's full range)
d. Installation: Freestanding

e. Notes:
1) Include optional Drip Tray
2) Shop Drawing submittal is **required**

RECTANGULAR PLANTER TYPE C

A. Products: Subject to compliance with requirements, provide the following:
1. Manufacturer: Green Theory
a. Product name: Stock Trough
b. Size: 4’-8” L x 3’-0” W x 3’-6” H (custom dimensions)
c. Material: Powdercoated Aluminum, AAMA 2604 Powder Coat (color to be selected from manufacturer’s full range)
d. Installation: Freestanding
e. Notes:
1) Include optional Drip Tray
2) Shop Drawing submittal is **required**

BACKED BENCH

A. Products: Subject to compliance with requirements, provide the following:
1. Manufacturer: Tournesol
a. Product name: Camino Backed Bench, Straight, Standalone
b. Product code: CB-90-0 (Bench) & CBK-90-0 (Back, Straight, No Armrests)
c. Frame Material: Powdercoated Steel (color to be selected from manufacturer’s full range)
d. Seat Material: Thermally Modified Oak
e. Size: 92” L x 21” W x 18” H (Bench) & 89” L x 5” W x 13” H (Back)
f. Mounting: Freestanding

BACKLESS BENCH

A. Products: Subject to compliance with requirements, provide the following:
1. Manufacturer: Tournesol
a. Product name: Camino Backless Bench, Straight, 1 Joiner
b. Product code: CB-90-1
c. Frame Material: Powdercoated Steel (color to be selected from manufacturer’s full range)
d. Seat Material: Thermally Modified Oak
e. Size: 92” L x 21” W x 18” H
Mounting: Freestanding

PART 3 - EXECUTION

3.1 INSTALLATION

2. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.
3. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
4. Install site furnishings level, plumb, true, and securely anchored or positioned at locations indicated on Drawings.

END OF SECTION 323300

SECTION 328400 – PLANTING IRRIGATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Provisions for the design and installation of an on-structure irrigation system including the following:

1. Static pressure verification and coordination with landscape material installation.
2. Complete irrigation system including but not limited to irrigation system design, piping, backflow preventer assemblies, valves, fittings, heads, controllers and wiring, and final adjustments to insure complete coverage.
3. Water connections.
4. Replacement of unsatisfactory materials.
5. Tests, Clean-up, inspections, and approval.

1.3 PERFORMANCE REQUIREMENTS

A. Provide all components required for a high efficiency, weather-based irrigation system, utilizing drip irrigation, soil moisture and rainfall sensors, weather station, and smart controllers throughout.

B. Irrigation zone control shall be automatic operation with controller and automatic control valves.

C. Delegated Design: Design 100 percent coverage irrigation system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Wiring Diagrams: For power, signal, and control wiring.

C. Delegated-Design Submittal: For irrigation systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Submit complete shop drawings to include all irrigation system components including controllers, valves, piping and tubing, emitters, misters, spray heads, valve boxes, etc. Show each irrigation zone and its control valve.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from Installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions.

B. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.

C. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For sprinkler controllers and automatic control valves to include in operation and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have had considerable experience and demonstrate ability in the installation of irrigation system(s) of specific type(s) in a neat orderly, and responsible manner in accordance with recognized standards of workmanship. To demonstrate ability and experience necessary for this Project, and financial stability, submit if requested by Owners Representative, prior to contract award the following:

1. List of 5 projects completed in the last 2 years of similar complexity to this Project. Description of projects shall include:

2. his Project. Description of projects shall include:

a. Name of project.
b. Location.
c. Owner.
d. Brief description of work and project budget.

3. Current company financial statement.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, unload, store, and handle materials, packaging, bundling, products in dry, weatherproof, condition in manner to prevent damage, breakage, deterioration, intrusion, ignition, and vandalism. Deliver in original unopened packaging containers prominently displaying manufacturer's name, volume, quantity, contents, instructions, and conformance to local, state, and federal law. Remove and replace cracked, broken, or contaminated items or elements prematurely exposed to moisture, inclement weather, snow, ice, temperature extremes, fire, or jobsite damage.

B. ice, temperature extremes, fire, or jobsite damage.

C. Handling of PVC Pipe - Exercise care in handling, loading and storing, of PVC pipe. All PVC pipe shall be transported in a vehicle which allows length of pipe to lie flat so as not to subject it to undue bending or concentrated external loads. All sections of pipe that have been dented or damaged shall be discarded, and if installed, shall be replaced with new piping.

1.9 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Construction Manager Owner no fewer than four days in advance of proposed interruption of water service.
2. Do not proceed with interruption of water service without Construction Manager's and Owner's written permission.

B. Protection of Property:

1. Preserve and protect all trees, plants, monuments, structures, and paved areas from damage due to Work of this Section. In the event damage does occur, all damage to inanimate items shall be completely repaired or replaced to satisfaction of Owner, and all injury to living plants shall be repaired by Owner. All costs of such repairs shall be charged to and paid by Contractor.
2. Protect buildings, walks, walls, and other property from damage. Flare and barricade open ditches. Damage caused to asphalt, concrete, or other building material surfaces shall be repaired or replaced at no cost to Owner. Restore disturbed areas to original condition.

1.10 WARRANTY/GUARANTEE

A. Manufacturer shall warrant materials against defects for a period of one year from date of Substantial Completion. Installer(s) shall guaranty workmanship for similar period.

1. Expenses due to vandalism before substantial completion shall be borne by Contractor.
2. Owner will maintain planting areas during warranty period, so as not to hamper proper operation of irrigation system.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

B. Galvanized-Steel Pipe: ASTM A 53/A 53M, Standard Weight, Type E, Grade B.

C. Ductile-Iron Pipe with Mechanical Joints: AWWA C151, with mechanical-joint bell and spigot ends.

D. Ductile-Iron Pipe with Push-on Joint: AWWA C151, with push-on-joint bell and spigot ends.

E. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.

F. Hard Copper Tube: ASTM B 88, Type L, and ASTM B 88, Type M, water tube, drawn temper.

G. PE Pressure Pipe: AWWA C906, with DR of 7.3, 9, or 9.3 and PE compound number required to give pressure rating not less than 160 psig.

H. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedules 40 and 80.

2.2 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick unless otherwise indicated; full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.

2.3 AUTOMATIC CONTROL VALVES

A. Bronze, Automatic Control Valves:

1. Description: Cast-bronze body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

2.4 AUTOMATIC DRAIN VALVES

A. Description: Spring-loaded-ball type of corrosion-resistant construction and designed to open for drainage if line pressure drops below 2-1/2 to 3 psig.

2.5 TRANSITION FITTINGS

A. General Requirements: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

2.6 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

2.7 SPRINKLERS

A. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.

2.8 QUICK COUPLERS

A. Description: Factory-fabricated, bronze or brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.

2.9 DRIP IRRIGATION SPECIALTIES

A. Freestanding Emitters: Device to deliver water at approximately 20 psig.

B. Manifold Emitter Systems: Manifold with tubing and emitters.

C. Multiple-Outlet Emitter Systems: Emitter with tubing and button-type outlets.

D. Drip Tubes with Direct-Attached Emitters.

E. Drip Tubes with Remote Discharge.

F. Off-Ground Supports: Plastic stakes.

G. Application Pressure Regulators: Brass or plastic housing, NPS 3/4, with corrosion-resistant internal parts; capable of controlling outlet pressure to approximately 20 psig.

H. Filter Units: Brass or plastic housing, with corrosion-resistant internal parts; of size and capacity required for devices downstream from unit.

I. Air Relief Valves: Brass or plastic housing, with corrosion-resistant internal parts.

J. Vacuum Relief Valves: Brass or plastic housing, with corrosion-resistant internal parts.

2.10 CONTROLLERS

A. Description:

1. Weather based controller for Automatic Control Valves: Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station.

2. Weather / climate based sensors to include soil moisture sensors, rainfall sensors, or connection to a weather station with the ability to interrupt or modify irrigation schedules.

3. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and two matching keys; include provision for grounding.

    a. Body Material: Stainless-steel sheet metal.

4. Interior Control Enclosures: NEMA 250, Type 12, drip proof, with locking cover and two matching keys.

    a. Body Material: Stainless-steel sheet metal.

5. Control Transformer: 24-V secondary, with primary fuse.

6. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate two or more times daily.

    a. Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
    b. Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.
    c. Surge Protection: Metal-oxide-varistor type on each station and primary power.

2.11 BOXES FOR AUTOMATIC CONTROL VALVES

A. Plastic Boxes:

1. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.

B. Polymer-Concrete Boxes:

1. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.

C. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4 inch minimum to 3 inches maximum.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.

B. Install piping free of sags and bends.

C. Install groups of pipes parallel to each other, spaced to permit valve servicing.

D. Install fittings for changes in direction and branch connections.

E. Install unions adjacent to valves and to final connections to other components with NPS 2 or smaller pipe connection.

F. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.

G. Install underground thermoplastic piping according to ASTM D 2774.

H. Install expansion loops in control-valve boxes for plastic piping.

I. Lay piping on solid subbase, uniformly sloped without humps or depressions.

J. Install PVC piping in dry weather when temperature is above 40 deg F. Allow joints to cure at least 24 hours at temperatures above 40 deg F before testing.

K. Install water regulators with shutoff valve and strainer on inlet and pressure gage on outlet. Install shutoff valve on outlet. Install above ground or in control-valve boxes.

L. Water Hammer Arresters: Install between connection to building main and circuit valves aboveground or in control-valve boxes.

M. Install piping in sleeves under parking lots, roadways, and sidewalks.

N. Install sleeves made of Schedule 80 PVC pipe and socket fittings, and solvent-cemented joints.

3.2 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

E. Ductile-Iron Piping Gasketed Joints: Comply with AWWA C600 and AWWA M41.

F. Copper-Tubing Brazed Joints: Construct joints according to CDA's "Copper Tube Handbook," using copper-phosphorus brazing filler metal.

G. Copper-Tubing Soldered Joints: Apply ASTM B 813 water-flushable flux to tube end unless otherwise indicated.

3.3 VALVE INSTALLATION

A. Underground Curb Valves: Install in curb-valve casings with tops flush with grade.

B. Underground Iron Gate Valves, Resilient Seat: Comply with AWWA C600 and AWWA M44. Install in valve casing with top flush with grade.

1. Install valves and PVC pipe with restrained, gasketed joints.

C. Aboveground Valves: Install as components of connected piping system.

D. Pressure-Reducing Valves: Install in boxes for automatic control valves or aboveground between shutoff valves.

E. Throttling Valves: Install in underground piping in boxes for automatic control valves.

F. Drain Valves: Install in underground piping in boxes for automatic control valves.

3.4 SPRINKLER INSTALLATION

A. Install sprinklers after hydrostatic test is completed.

B. Install sprinklers at manufacturer's recommended heights.

C. Locate part-circle sprinklers to maintain a minimum distance of 4 inches from walls and 2 inches from other boundaries unless otherwise indicated.

3.5 DRIP IRRIGATION SPECIALTY INSTALLATION

A. Install freestanding emitters on pipe riser to mounting height indicated.

B. Install manifold emitter systems with tubing to emitters. Plug unused manifold outlets. Install emitters on off-ground supports at height indicated.

C. Install multiple-outlet emitter systems with tubing to outlets. Plug unused emitter outlets. Install outlets on off-ground supports at height indicated.

D. Install drip tubes with direct-attached emitters on ground.

E. Install drip tubes with remote-discharge on ground with outlets on off-ground supports at height indicated.

F. Install off-ground supports of length required for indicated mounted height of device.

3.6 IDENTIFICATION

A. Identify system components.

B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.

1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Section 312000 "Earth Moving" for warning tapes.

3.7 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation. Confirm that weather based components are operational.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Any irrigation product will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.8 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that controllers are installed and connected according to the Contract Documents.
3. Verify that electrical wiring installation complies with manufacturer's submittal.

3.9 ADJUSTING

A. Adjust settings of controllers.

B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.

C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/2 inch above, finish grade.

3.10 CLEANING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

3.11 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

END OF SECTION 328400

SECTION 329300 – PLANTS AND PLANTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
1. Deciduous tree, shrub and perennial planting
2. Maintenance

1.3 SUBMITTALS

A. Submit a list of all nurseries that will supply plants.

B. Qualification Data: For qualified landscape Installer.

C. Plant Photographs: Submit color photographs of representative specimens of each type of plant on the plant list. Photos shall be taken from an angle that depicts the size and condition of the typical plant to be furnished. A scale rod or other measuring device shall be included in the photograph. Label each photograph with the plant name, size and name of growing nursery.

D. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of exterior plants during a calendar year. Submit before expiration of required maintenance periods.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have not less than 5 years documented successful experience in meadow installations and be a member of the Landscape Contractors Association. Installer shall submit evidence of qualifications including photographs, locations and references of owners for review by the Landscape Architect and the Owners Representative.

1. Plant material observation: Landscape Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size and quality. Landscape Architect retains right to observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
2. Notify Landscape Architect two weeks in advance of plant observation / tagging schedule.
3. Notify Landscape Architect of sources of planting materials seven days in advance of delivery to site.

B. The contractor shall maintain continuously a competent supervisor, satisfactory to the Owner's Representative, with authority to act in all matter pertaining to this work.

C. Conference: Before any work is started a conference shall be held between the Contractor, the Owner's Representative and the Landscape Architect concerning the work under this contract.

D. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."

E. It is the Landscape Contractor's responsibility to coordinate and cooperate with the other Contractors to enable work to proceed rapidly and efficiently. Coordinate with all adjacent Contractors' work including all paving, lawn, electrical, etc.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver exterior plants freshly dug.

B. Do not prune trees and shrubs before delivery except as approved by Landscape Architect. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery.

C. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants and trees in shade, protect from weather and mechanical damage, and keep roots moist. Plants shall not be stored on site longer than 1 week.

1.6 PROJECT CONDITIONS

A. Plant material should be installed within the following dates: March 1 – June 1 or September 1 – November 15, or as approved by the Landscape Architect. Plant material may not be dug after May 15.
   1. If the plants are installed outside of the designated planting season, the contractor is responsible for providing an additional 9 month warranty.

B. Weather limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.7 MAINTENANCE SERVICE

A. Initial Planting Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until completion of site construction and initial acceptance.

B. Continuing Maintenance Proposal: From Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.8 ACCEPTANCE AND WARRANTY

A. An inspection of work completed shall be conducted by the Landscape Architect and Owner's Representative for the purpose of initial acceptance. Any outstanding items revealed on inspection and identified on the punch list shall be corrected with two weeks. Initial acceptance shall be withheld until those items are completed. Acceptance can be on partially completed work. Warranty, for a period of one year, shall begin after landscape inspection and initial acceptance.

B. Warrant in writing that all plant material, including groundcovers, placed on this Project will remain alive and be in healthy vigorous condition for a period of 1 year after completion and initial acceptance of entire project.

C. During the warranty period replace, in accordance with the drawings and specifications, all plants that are in an unhealthy or unsightly condition, or more than 25% dead. Warrant all replacement trees for an additional one year period.

D. Final Inspection and Acceptance: An inspection will be conducted with the Landscape Contractor, Landscape Architect and Owner at the end of the one year warranty period for purposes of Final Acceptance.

E. Warranty shall not include damage or loss of plants due to vandalism, fire, severe winds, extreme cold, or negligence on the Owner's part.

F. Owner's maintenance shall begin upon initial acceptance of plant material.

PART 2 - PRODUCTS

2.1 TREE MATERIAL

A. General: Furnish nursery-grown trees complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
   1. Root balls shall comply with ANSI 260.1 standards and shall meet sizes laid out in the ANSI 260.1 standards as well as being intact and undamaged when they arrive on the site. Trees that have deteriorated root balls will not be accepted.

B. If formal arrangements or consecutive order of trees shown, select stock for uniform height and spread, and number label to assure symmetry in planting.

2.2 SHADE TREES

A. Shade Trees: Single-stem trees with straight trunk, well-balanced crown, and intact leader, of height and caliper indicated, complying with ANSI Z60.1 for type of trees required.

   1. Provide balled and burlapped trees.
   2. All trees shall have their north side marked in the nursery prior to digging. Set trees in the hole with the marker facing north.

2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight. Organic matter to be “Leaf Gro Compost” or approved equal.

2.4 FERTILIZER

A. All fertilizers shall be uniform in composition, free flowing and suitable for application with approved equipment. Applications shall be determined by soil test recommendations.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.

C. Slow-Release Fertilizer: Granular or pellet fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium.

D. Planting tablets: Tightly compressed chip type, long lasting, slow release, commercial grade planting fertilizer in tablet form.

2.5 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs. Mulch shall consist of shredded hardwood and be natural in origin, with no dyes or color additives. Color shall be natural brown to dark brown.

2.6 STAKES AND GUYS

A. Upright and Guy Stakes: Rough-sawn, sound, new hardwood or pressure-preservative-treated softwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch by length indicated, pointed at one end.

B. Guys and Tie Wires: No. 12 gauge galvanized wire.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, and lawns and existing exterior plants from damage caused by planting operations.

B. Lay out plants at locations directed by Landscape Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.2 TREE PIT EXCAVATION

A. Tree Pits: Excavate circular pits with sides sloped inward, as shown on the Drawings. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation.

1. Excavate approximately two times as wide as ball diameter.
2. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.

B. Notify Landscape Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

3.3 TREE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements. Do not use planting stock if root ball is cracked or broken before or during planting operation.

B. Set plants to the elevations shown on the drawings. Place a maximum 2” soil on top of root ball. Set trees on compacted pads as shown. Use plant mix specified to backfill pit approximately 2/3 full. Water thoroughly before installing remainder of the plant mix to top of pit, eliminating all air pockets. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

C. Place planting tablets in each tree planting pit when pit is approximately one half filled, in amounts recommended in soils reports from soil testing laboratory. Place tablets beside the root ball about one inch from root tips.

D. Cut ropes and strings from top of tree root balls after plant has been set. Remove burlap or cloth wrapping from around top half of balls, do not remove from under root balls. Do not turn under and bury any portion of burlap.

E. Smooth planting areas to conform to the grades indicated after full settlement has occurred and mulch has been applied. Thoroughly water plants after mulching.

3.4 TREE PRUNING

A. Prune, thin, and shape trees as only as directed by Landscape Architect.

3.5 SHRUB PLANTING

A. Preparation of planting beds: Excavate entire planting bed to specified depths as shown on Drawings. Till subsurface to a depth of 6 inches. Place planting soil in 8” lifts to specified depths, allowing for settlement. Compact lightly after placement of each lift.

B. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in shrub planting beds.

C. Mulch entire planting bed with mulch. Thoroughly water plants after mulching.

3.6 GUYING AND STAKING

A. Stake trees as shown on drawings.

3.7 CLEANUP AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition.

B. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

3.8 MAINTENANCE

A. Contractor is responsible for the following maintenance period by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings.

1. Maintenance Period: Until completion of site construction and initial acceptance of all plant material.

B. Maintenance between initial acceptance and final acceptance shall be the responsibility of the Owner.

END OF SECTION 329300

SECTION 329400 - TREE PROTECTION AND TRIMMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the protection and trimming of existing trees that interfere with, or are affected by, execution of the Work, whether temporary or permanent construction.

B. Related Sections include the following:
   1. Division 1 Section "Temporary Facilities and Controls" for temporary tree protection.
   2. Division 31 Section "Site Clearing" for removal limits of trees, shrubs, and other plantings affected by new construction.
   3. Division 31 Section "Earthwork" for building and utility trench excavation, backfilling, compacting and grading requirements, and soil materials.

1.3 DEFINITIONS

A. Tree Protection Zone: Area surrounding individual trees or groups of trees to remain during construction, and defined by the drip line of individual trees or the perimeter drip line of groups of trees, unless otherwise indicated. Additional tree protection zones are those areas enclosed by tree protection fence, installed in the location and manner shown on the plans.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Tree Pruning Schedule: Written schedule from arborist detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.

   1. Species and size of tree.
   2. Location on site plan. Include unique identifier for each.
   3. Reason for pruning.
   4. Description of pruning to be performed.
   5. Description of maintenance following pruning.

C. Qualification Data: For tree service firm and arborist.

D. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.

E. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work. Additional recommendations are shown on the forest conservation plan.

1.5 QUALITY ASSURANCE

A. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed tree protection and trimming work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of tree protection and trimming.

B. Arborist Qualifications: An arborist certified by ISA and licensed in the jurisdiction where Project is located.

C. Tree Pruning Standard: Comply with ANSI A300 (Part 1), "Tree, Shrub, and Other Woody Plant Maintenance--Standard Practices (Pruning)."

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1. Before tree protection and trimming operations begin, meet with representatives of authorities having jurisdiction, the College, A/E, and other concerned entities to review tree protection and trimming procedures and responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Drainage Fill: Selected crushed stone, or crushed or uncrushed gravel, washed, ASTM D 448, Size 24, with 90 to 100 percent passing a 2-1/2-inch sieve and not more than 10 percent passing a 3/4-inch sieve.

B. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 1 inch in diameter; and free of weeds, roots, and toxic and other nonsoil materials.

1. Obtain topsoil only from well-drained sites where topsoil is 4 inches deep or more; do not obtain from bogs or marshes.

C. Filter Fabric: Manufacturer's standard, nonwoven, pervious, geotextile fabric of polypropylene, nylon, or polyester fibers.

D. Chain-Link Fence: Metallic-coated steel chain-link fence fabric of 0.120-inch-diameter wire; a minimum of 48 inches high; with 1.9-inch-diameter line posts; 2-3/8-inch-diameter terminal and corner posts; 1-5/8-inch-diameter top rail; and 0.177-inch-diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.

E. Galvanized Wire Mesh, etc. per City of Rockville regs.

F. Organic Mulch: Shredded, well-aged hardwood bark, free of deleterious materials.

PART 3 - EXECUTION

3.1 PREPARATION

A. Temporary Fencing: Install temporary fencing around tree protection zones to protect remaining trees and vegetation from construction damage. Keep temporary fencing in place and in good repair for the entire duration of construction. Maintain temporary fence and remove when construction is complete.

1. Install tree protection fence as indicated on the plans.

B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Mulch areas inside tree protection zones and other areas indicated.

1. Apply 3-inch average thickness of organic mulch. Do not place mulch within 6 inches of tree trunks.

D. Do not store construction materials, debris, or excavated material inside tree protection zones. Do not permit vehicles or foot traffic within tree protection zones; prevent soil compaction over root systems within tree protection zones.

E. Maintain tree protection zones free of weeds and trash.

F. Do not allow fires within tree protection zones.

3.2 EXCAVATION

A. Install shoring or other protective support systems to minimize sloping or benching of excavations.

B. Do not excavate within tree protection zones, unless otherwise indicated.

C. Where excavation for new construction is required within tree protection zones, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks and comb soil to expose roots.

1. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches back from new construction.
2. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

D. Where utility trenches are required within tree protection zones, tunnel under or around roots by drilling, auger boring, pipe jacking, or digging by hand.

1. Root Pruning: Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots with sharp, clean pruning instruments; do not pull, tear, break or chop.

3.3 REGRADING

A. Grade Lowering: Where new finish grade is indicated below existing grade around trees, slope grade beyond tree protection zones. Maintain existing grades within tree protection zones.

B. Minor Fill: Where existing grade is 3 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations. Keep all fill at least 3 feet from any tree trunk.

3.4 TREE PRUNING

A. Prune trees to remain that are affected by temporary and permanent construction.

B. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist and as shown on Forest Conservation Plan.

C. Pruning Standards: Prune trees according to ANSI A300 (Part 1).

D. Cut branches with sharp, clean pruning instruments; do not break or chop.

E. Chip removed tree branches and dispose of off-site.

3.5 TREE REPAIR AND REPLACEMENT

A. Promptly repair trees damaged by construction operations within 24 hours. Treat damaged trunks, limbs, and roots according to arborist's written instructions.

B. Remove and replace trees indicated to remain that die or are damaged during construction operations to such an extent that Landscape Architect determines they are incapable of recovering to normal growth patterns.

C. Aerate surface soil, compacted during construction, 10 feet beyond drip line and no closer than 36 inches to tree trunk. Drill 2-inch-diameter holes a minimum of 12 inches deep at 24 inches o.c. Backfill holes with an equal mix of augered soil and sand.

3.6 DISPOSAL OF WASTE MATERIALS

A. Burning is not permitted.

B. Disposal: Remove excess excavated material and displaced trees from the College's property.

END OF SECTION 329400

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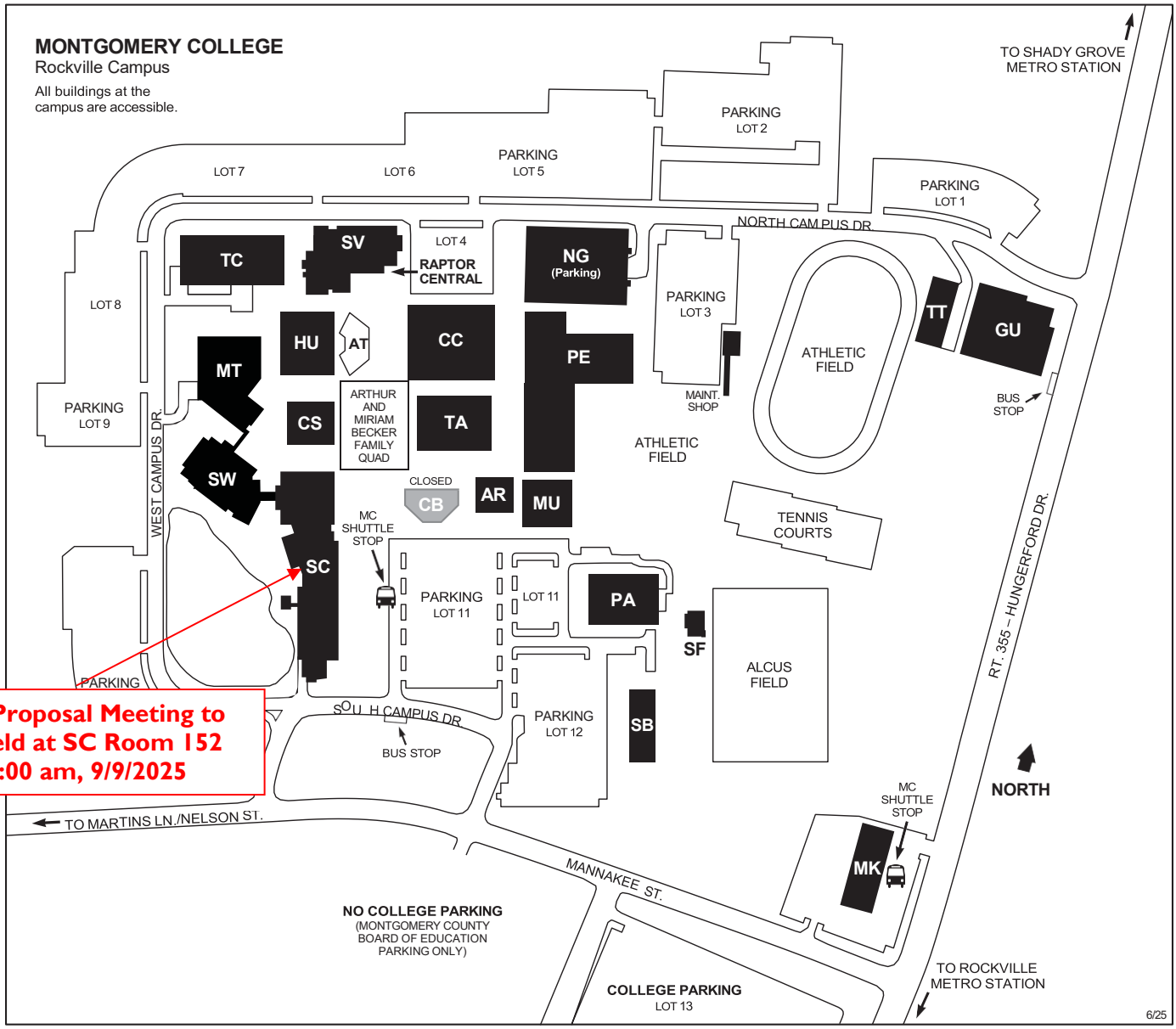
APPENDIX A

MONTGOMERY COLLEGE
Rockville Campus



Pre-Proposal Meeting to be held at SC Room 152 at 10:00 am, 9/9/2025

MONTGOMERY COLLEGE
Rockville Campus
51 Mannakee Street
Rockville, MD 20850
240-567-5000; TTY 301-294-9672

Public Safety: 240-567-3333 (24/7)
montgomerycollege.edu/safety

montgomerycollege.edu/maps

Legend of Campus Buildings
(as of June 2025)

AR Paul Peck Art Building

AT Amphitheatre

CB Academic Annex
(closed for renovation)

CC Campus Center
- *Bookstore*
- *Cafeteria*
- *Workforce Development and Continuing Education (WDCE)*

CS Computer Science Building

GU Homer S. Gudelsky Institute for Technical Education

HU Humanities Building

MK Mannakee Building
- *Center for Training Excellence*
- *ignITe Hub*

MT Gordon and Marilyn Macklin Tower
- *Library*

MU Music Building

NG North Garage (parking)

PA Robert E. Parilla Performing Arts Center

PE Physical Education Center

SB South Campus Instruction Building

SC Science Center

SF Soccer Field Concession Building

SV Long Nguyen and Kimmy Duong Student Services Center
- *Assessment and Testing Centers*
- *Counseling and Advising*
- *Disability Support Services*
- *Financial Aid Office*
- *Public Safety Office*
- *Raptor Central (Admissions, Enrollment, Visitor Services)*
- *Records and Registration Office*
- *Student Life Office*

SW Science Center West

TA Theatre Arts Building

TC Technical Center

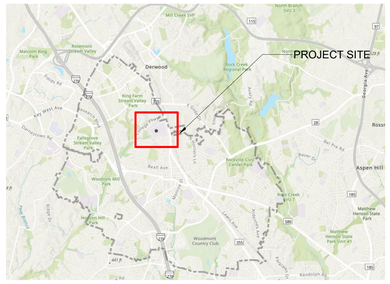
TT Interim Technical Training Center

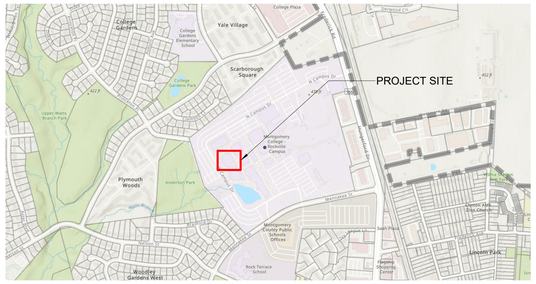
APPENDIX B

MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES

PROJ: 225012.00
MONTGOMERY COLLEGE
51 MANNAKEE STREET
ROCKVILLE, MD 20850

BUILDING: MACKLIN TOWER - ROCKVILLE CAMPUS
MC PROJECT # FP24-021 / BUILDING # 206





SITE VICINITY MAPS

CURRENT ISSUE: 08/29/2025 PERMIT & BID SET

ARCHITECT
HORD COPLAN MACHT
1925 BALLENGER AVENUE, SUITE 525
ALEXANDRIA, VA 22314
571.388.7761

STRUCTURAL ENGINEER
A + F ENGINEERS, INC.
1112 16TH ST NW UNIT 920
WASHINGTON, DC 20036
202.828.1600

FPME ENGINEER
JAMES POSEY ASSOCIATES INC
11150 RED RUN BLVD.
OWINGS MILLS, MD 21117
410.265.6100

EXTERIOR ENVELOPE CONSULTANT
GALE ASSOCIATES, INC
1122 KENILWORTH DRIVE, SUITE 206
TOWSON, MD 21204
443.279.4500

MONTGOMERY COLLEGE
MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
51 MANNAKEE STREET
ROCKVILLE, MD 20850
MC PROJECT # FP24-021
BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: FT
Checked By: MF

Drawing
COVER SHEET

G.000

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

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THE LINE SHOWN ABOVE IS EXACTLY ONE INCH LONG AT THIS SHEET'S ORIGINAL PAGE SIZE

THE SQUARES ABOVE ARE COLOR, WITH BLACK AND WHITE LETTERS, IF PRINTED CORRECTLY

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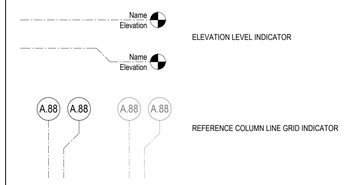
#	POUND OR NUMBER	FIXT	FIXTURE	O/O	OUT TO OUT	VIF	VERIFY IN FIELD
&	AND	FJ	FLOOR JOIST	OBS	OBSCURE	VOL	VOLUME
'	FOOT (FEET)	FLASH	FLASHING	OC	ON CENTER	VP	VINYL PLANK
(E)	EXISTING	FLR	FLOOR	OD	OUTSIDE DIAMETER	VWC	VINYL WALL COVERING
<	ANGLE	FLUOR	FLUORESCENT	OF/CI	OWNER FURNISHED/ CONTRACTOR INSTALLED		
@	AT	FOB	FACE OF BRICK	OF/OI	OWNER FURNISHED/ OWNER INSTALLED	W	WEST, WIDE, WIDTH, WASHER
CL	CENTERLINE	FOC	FACE OF CONCRETE	OFF	OFFICE	W/	WITH
		FOF	FACE OF FINISH	OH	OPPOSITE HAND	W/D	WASHER / DRYER
A/C	AIR CONDITIONING	FOH	FRONT OF HOUSE	OPNG	OPENING	W/O	WITHOUT
AAD	ATTIC ACCESS DOOR	FOS	FACE OF STUD	OPP	OPPOSITE	WC	WATER CLOSET
AAP	ATTIC ACCESS PANEL	FP	FIREPLACE	OSB	ORIENTED STRAND BOARD	WD	WOOD
AB	ANCHOR BOLT	FPRF	FIREPROOF			WDW	WINDOW
ABV	ABOVE	FR	FIRE RATED	PAN	PANTRY	WF	WIDE FLANGE
ACOUS	ACOUSTICAL	FRIG	REFRIGERATOR	PAR	PARALLEL	WGL	WIRED GLASS
ACT	ACOUSTICAL CEILING TILE	FRMG	FRAMING	PAV	PAVEMENT	WH	WATER HEATER
AD	AREA DRAIN, ACOUSTIC DIMENSIONS	FRT	FIRE RETARDANT TREATED	PB	PARTICLE BOARD	WI	WROUGHT IRON
ADA	AMERICANS WITH DISABILITIES ACT	FS	FULL SIZE	PCF	POUNDS PER CUBIC FOOT	WIC	WALK IN CLOSET
ADD	ADDENDUM, ADDITION	FT	FOOT OR FEET	PED	PEDESTAL, PEDESTRIAN	WP	WATERPROOF(ING)
ADJ	ADJUSTABLE, ADJUSTMENT	FTG	FOOTING	PERF	PERFORATE(D)	WR	WATER RESISTANT, WASTE RECEPTACLE
AFF	ABOVE FINISHED FLOOR	FURN	FURNISHING), FURNITURE	PERIM	PERIMETER	WRB	WEATHER-RESISTANT BARRIER
AGGR	AGGREGATE	FURR	FURRING	PERP	PERPENDICULAR	WS	WEATHERSTRIPPING
ALT	ALTERNATE	FUT	FUTURE	PKG	PARKING	WSCT	WAINSCOT
ALUM	ALUMINUM	FWC	FABRIC WALL COVERING	PL	PLATE	WT	WEIGHT
AMSMV	ADHERED MANUFACTURED STONE MASONRY VENEER			PLAM	PLASTIC LAMINATE		
AOR	AREA OF REFUGE	GA	GAUGE	PLAS	PLASTER	YD	YARD
AP	ACCESS PANEL	GALV	GALVANIZED	PLBG	PLUMBING		
APPROX	APPROXIMATE	GB	GRAB BAR	PLF	POUNDS PER LINEAR FOOT		
APT	APARTMENT	GC	GENERAL CONTRACTOR	PLYWD	PLYWOOD		
ARCH	ARCHITECT, ARCHITECTURAL	GDR	GUARD RAIL	PNL	PANEL		
ASB	ASBESTOS	GFCI	GROUND FAULT CIRCUIT INTERRUPT	PR	PAIR		
ASPH	ASPHALT	GFI	GROUND FAULT INTERRUPT	PRCST	PRE-CAST		
		GFRC	GLASS FIBER REINFORCED CONCRETE	PREFAB	PREFABRICATED		
BATH	BATHROOM	GI	GALVANIZED IRON	PREFIN	PREFINISHED		
BD	BOARD	GL	GLASS, GLAZED, GLAZING	PREP	PREPARATION		
BEL	BELOW	GND	GROUND	PROD	PRODUCTION		
BITUM	BITUMINOUS	GOVT	GOVERNMENT	PROJ	PROJECT(OR), PROJECTION		
BLDG	BUILDING	GR	GRADE	PS	PROJECTION SCREEN		
BLK	BLOCK	GWB	GYPSUM WALLBOARD	PSF	POUNDS PER SQUARE FOOT		
BLKG	BLOCKING	GYP BD	GYPSUM BOARD	PSI	POUNDS PER SQUARE INCH		
BM	BEAM			PT	PRESSURE TREATED		
BM	BENCHMARK	H	HIGH	PTD	PAINTED, PAPER TOWEL DISPENSER		
BOF	BOTTOM OF FOOTING	HB	HOSE BIB	PTD/R	COMBO. PAPER TOWEL DISPENSER & RECEPTACLE		
BOH	BACK OF HOUSE	HC	HANDICAP, HOLLOW CORE	PTN	PARTITION		
BOP	BOTTOM OF PLATE	HCW	HOLLOW WOOD CORE	PTR	PAPER TOWEL RECEPTACLE		
BOT	BOTTOM	HD	HEAVY DUTY	PVC	POLYVINYL CHLORIDE		
BOW	BOTTOM OF WALL	HDR	HEADER	PWR	POWER		
BPL	BEARING PLATE	HDW	HARDWARE				
BR	BEDROOM	HM	HOLLOW METAL	QT	QUARRY TILE		
BRG	BEARING	HO	HOLD OPEN	QTR	QUARTER		
BRK	BRICK	HORIZ	HORIZONTAL	QTY	QUANTITY		
BSMT	BASEMENT	HR	HOUR, HANDRAIL	QUAD	QUADRANT		
BUR	BUILT-UP ROOFING	HT	HEIGHT				
		HTG	HEATING	R	RISER, RISE		
CAB	CABINET	HVAC	HEATING, VENTILATION AND AIR CONDITIONING	RA	RETURN AIR		
CB	CATCH BASIN	HW	HOT WATER	RAD	RADIUS		
CEM	CEMENT	HWD	HARDWOOD	RB	RUBBER BASE		
CER	CERAMIC	HWH	HOT WATER HEATER	RCP	REFLECTED CEILING PLAN		
CF	CUBIC FOOT			RD	ROOF DRAIN		
CFM	CUBIC FEET PER MINUTE	IBC	INTERNATIONAL BUILDING CODE	REBAR	REINFORCING BAR		
CG	CORNER GUARD	ID	INSIDE DIAMETER	REC	RECESSED		
CH	COAT HOOK	IN	INCH	RECPT	RECEPTION, RECEPTACLE		
CI	CAST IRON	INCL	INCLUDE, INCLUDING	REF.	REFRIGERATOR		
CJ	CONTROL JOINT	IND	INDUSTRIAL	REF:	REFER TO, REFERENCE		
CL	CENTERLINE, CLEARANCE	INFO	INFORMATION	REINF	REINFORCED		
CLG	CEILING	INSUL	INSULATION, INSULATE	REPRO	REPRODUCE, REPRODUCTION		
CLKG	CAULKING	INT	INTERIOR, INTERNAL	REQD	REQUIRED		
CLOS	CLOSET	INV	INVERT	RESIL	RESILIENT		
CLR	CLEAR(ANCE)			RET	RETURN		
CMT	CERAMIC MOSAIC TILE	J	JOIST	REV	REVISE, REVISION		
CMU	CONCRETE MASONRY UNIT	JAN	JANITOR	RGTR	REGISTER		
CNTR	COUNTER	JCT	JUNCTION	RH	RIGHT HAND		
CO	CASED OPENING, CLEAN OUT	JST	JOIST	RM	ROOM		
COL	COLUMN	JT	JOINT	RO	ROUGH OPENING		
CONC	CONCRETE			ROW	RIGHT OF WAY		
CONN	CONNECTION	KDN	KNOCKDOWN	RS	ROD & SHELF		
CONST	CONSTRUCTION	KIT	KITCHEN	RT	RIGHT		
CONT	CONTINUOUS	KO	KNOCKOUT	RWD	REDWOOD		
CORR	CORRIDOR, CORRUGATED	KP	KICK PLATE	RWL	RAIN WATER LEADER		
CPT	CARPET						
CR	CHAIR RAIL	L	LENGTH, LONG	S	SOUTH		
CRS	COLD ROLLED STEEL	LA	LANDSCAPE ARCHITECT	S/S	STAINLESS STEEL		
CSMT	CASEMENT	LAB	LABORATORY	SAFB	SOUND ATTENUATING FIRE BLANKET		
CT	CERAMIC TILE	LAD	LADDER	SAM	SELF-ADHERED MEMBRANE		
CTR	CENTER, COUNTER	LAM	LAMINATE(D)	SAN	SANITARY		
CTSK	COUNTERSUNK	LAV	LAVATORY	SC	SOLID CORE		
CW	CURTAIN WALL	LBL	LABEL	SCD	SEAT COVER DISPENSER		
CY	CUBIC YARD	LBR	LUMBER	SCHED	SCHEDULE(D)		
		LD	LINEAR DIFFUSER	SD	SMOKE DETECTOR		
D	DRYER, DISPOSAL	LF	LINEAR FOOT	SECT	SECTION, SECTOR		
DB	DECIBEL	LH	LEFT HAND	SEP	SEPARATE, SEPARATION		
DBL	DOUBLE	LIN	LINEAR, LINEN	SF	SQUARE FOOT (FEET), STOREFRONT		
DEMO	DEMOLISH	LKR	LOCKER	SGD	SLIDING GLASS DOOR		
DEPT	DEPARTMENT	LL	LIVE LOAD	SGL	SINGLE		
DET, DTL	DETAIL	LNDG	LANDING	SH	SHELF, SINGLE HUNG		
DF	DRINKING FOUNTAIN	LNT	LINTEL	SHLVG	SHELVING		
DH	DOUBLE HUNG	LOC	LOCATION	SHT	SHEET		
DIA	DIAMETER	LR	LIVING ROOM	SHWR	SHOWER		
DIAG	DIAGONAL	LT	LIGHT	SIM	SIMILAR		
DIFF	DIFFUSER	LTWT	LIGHTWEIGHT	SND	SANITARY NAPKIN DISPENSER		
DIM	DIMENSION	LUM	LUMINOUS	SNR	SANITARY NAPKIN RECEPTACLE		
DISP	DISPENSER	LV	LOW VOLTAGE	SPEC	SPECIFICATION		
DIV	DIVISION	LVR	LOUVER	SQ	SQUARE		
DL	DEAD LOAD	LVT	LUXURY VINYL TILE	SR	SHOWER ROD		
DN	DOWN			SSK	SERVICE SINK		
DO	DOOR OPENING	M	METER	SST	STAINLESS STEEL		
DR	DOOR	MACH	MACHINE	ST	STUCCO		
DS	DOWNSPOUT	MAINT	MAINTENANCE	STA	STATION		
DSP	DRY STANDPIPE	MAN	MANUAL	STC	SOUND TRANSMISSION COEFFICIENT		
DW	DISHWASHER	MAS	MASONRY	STD	STANDARD		
DWG	DRAWING	MAT	MATERIAL	STK	OPEN STACKED SHELVING		
DWR	DRAWER	MAX	MAXIMUM	STL	STEEL		
		MB	MARKER BOARD	STOR	STORAGE		
E	EAST	MC	MEDICINE CABINET	STRUCT	STRUCTURAL		
EA	EACH	MDF	MEDIUM DENISTY FIBER BOARD	SURF	SURFACE		
EF	EXHAUST FAN	MDO	MEDIUM DENSITY OVERLAY	SUSP	SUSPEND(ED)		
EHW	ENGINEERED HARDWOOD	MECH	MECHANICAL	SV	SHEET VINYL		
EIFS	EXTERIOR INSULATED FINISHING SYSTEM	MEMB	MEMBRANE	SVC	SERVICE		
EJ	EXPANSION JOINT	MEZZ	MEZZANINE	SW	SHEAR WALL		
EL	ELEVATION	MFD	MANUFACTURED	SYM	SYMETRICAL		
ELEC	ELECTRICAL	MFR	MANUFACTURER	SYS	SYSTEM		
ELEV	ELEVATOR	MH	MANHOLE				
EMER	EMERGENCY	MIN	MINIMUM	T	TREAD(S)		
ENCL	ENCLOSURE	MIR	MIRROR	T&B	TOP & BOTTOM		
ENG	ENGINEER	MISC	MISCELLANEOUS	T&G	TONGUE & GROOVE		
ENT	ENTRANCE	MLD	MOLDING	TB	TOWEL BAR, TACK BOARD, THROUGH BOLT		
EOC	EDGE OF CARPET	MM	MILLIMETER	TC	TOP OF CURB		
EOS	EDGE OF SLAB	MO	MASONRY OPENING	TEL	TELEPHONE		
EP	ELECTRICAL PANELBOARD	MOD	MODULAR	TEMP	TEMPERED, TEMPERATURE		
EQ	EQUAL	MOV	MOVABLE	TER	TERRACE, TERRAZZO		
EQUIP	EQUIPMENT	MR	MOISTURE RESISTANT	THK	THICK		
EWC	ELECTRIC WATER COOLER	MRT	MOISTURE RESISTANCE TREATED	TLT	TOILET		
EXH	EXHAUST	MTD	MOUNTED	TOC	TOP OF CONCRETE		
EXIST	EXISTING	MTL	METAL	TOP	TOP OF PLATE		
EXP	EXPANSION, EXPOSED	MULL	MULLION	TOW	TOP OF WALL		
EXT	EXTERIOR	MULT	MULTIPLE	TP	TOP OF PAVEMENT		
		MWK	MILLWORK	TPH	TOILET PAPER HOLDER		
F	FARENHEIT			TRTD	TREATED		
FA	FIRE ALARM	N	NORTH	TS	TUBULAR STEEL		
FACP	FIRE ALARM CONTROL PANEL	N/A	NOT APPLICABLE	TV	TELEVISION		
FAS	FASTEN	NAT	NATURAL	TYP	TYPICAL		
FB	FLAT BAR	NEC	NATIONAL ELECTRIC CODE				
FCB	FIBER-CEMENT BOARD	NEO	NEOPRENE	UC	UNDER COUNTER		
FD	FLOOR DRAIN	NIC	NOT IN CONTRACT	UL	UNDERWRITERS LABORATORIES, INC.		
FDN	FOUNDATION	NO or #	NUMBER	UNF	UNFINISHED		
FE	FIRE EXTINGUISHER	NOM	NOMINAL	UNO	UNLESS NOTED OTHERWISE		
FEC	FIRE EXTINGUISHER CABINET	NR	NOISE REDUCTION	UR	URINAL		
FF	FINISHED FLOOR	NRC	NOISE REDUCTION COEFFICIENT	UTIL	UTILITY		
FF&E	FURNITURE, FIXTURES & EQUIPMENT	NS	NON-SLIP				
FFS	FACE OF FINISHED SURFACE	NTS	NOT TO SCALE	VAR	VARIES, VARIABLE, VARIOUS		
FGL	FIBERGLASS			VCT	VINYL COMPOSITION TILE		
FHC	FIRE HOSE CABINET	O/A	OVERALL	VERT	VERTICAL		

GENERAL NOTES

1. A
2. B
3. C
4. D
5. E
6. F
7. G
8. H

DATUMS

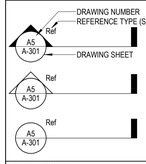


ELEVATION LEVEL INDICATOR

REFERENCE COLUMN LINE GRID INDICATOR

VIEW MARKERS

SECTIONS

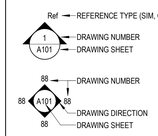


BUILDING SECTION INDICATOR

WALL SECTION INDICATOR

DETAIL SECTION INDICATOR

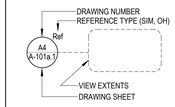
ELEVATIONS



EXTERIOR ELEVATION INDICATOR

INTERIOR ELEVATION INDICATOR

CALLOUTS

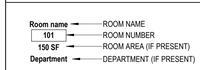


DETAIL CALLOUT INDICATOR

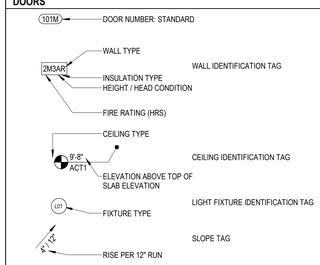
ITEM TAGS

AREAS

ROOMS



DOORS



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MONTGOMERY COLLEGE

MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES

51 MANNAKEE STREET
ROCKVILLE, MD 20850

MC PROJECT # FP24-021 / BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OF APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By:
Checked By:

Drawing
PROJECT GENERAL INFORMATION

G.010

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

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CODE INFORMATION

DESIGN PHASE
PERMIT & BID SET

PROJECT NAME AND LOCATION
MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
MONTGOMERY COLLEGE
51 MANNAKEE STREET
ROCKVILLE, MD 20850

PROJECT DESCRIPTION
PROPOSED WORK COMPRISES OF A LEVEL 2 INTERIOR RENOVATION OF ABOUT 56,000 GSF OVER FLOORS G THROUGH 6 OF AN EXISTING BUILDING RESULTING IN NO CHANGE TO OCCUPANCY CLASSIFICATION. THE WORK INCLUDES, UPDATING RAILINGS OF EGRESS STAIRS TO COMPLY WITH ADA, CONVERTING AN EXISTING TERRACE INTO A GREEN ROOF AND CLOSING OFF THE ACCESS DOORS, UPGRADING THE BUILDING'S MECHANICAL SYSTEM AND REPLACING THE ROOF.

EXISTING BUILDING STRUCTURE: 7-STORY CONCRETE FRAME STRUCTURE; FLOORS ARE FLAT SLABS WITH COLUMNS DROP PANELS.

EGRESS SYSTEMS: (2) EXISTING FULL-HEIGHT AND (2) EXISTING LEVEL G-3, TWO-HOUR RATED ENCLOSED FIRE STAIRS; PLUS EXISTING CENTRAL STAIRCASE OPEN ON LEVEL 1 SERVING LEVELS 1-3.

APPLICABLE CODES AND STANDARDS

A. ACCESSIBILITY	MARYLAND ACCESSIBILITY CODE (COMAR 09.12.51) 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN
B. BUILDING	2021 INTERNATIONAL BUILDING CODE (IBC) / IBC ER31-19 MONTGOMERY COUNTY BUILDING CODE CHAPTER 8 2021 INTERNATIONAL EXISTING BUILDING CODE (IEBC) 2018 IGCC PUBLISHED
C. ELECTRICAL	MONTGOMERY COUNTY CODE CHAPTER 17 2023 NFPA 70 (NATIONAL ELECTRICAL CODE)
D. ENERGY	2021 INTERNATIONAL ENERGY CONSERVATION CODE (IECC) 2015 INTERNATIONAL GREEN CONSTRUCTION CODE
E. FIRE PREVENTION	2018 NFPA 1 FIRE CODE 2018 NFPA 101 LIFE SAFETY CODE 2016 NFPA 13, NFPA13R, NFPA 13D FIRE SPRINKLER CODES 2016 NFPA 72 FIRE ALARM CODE 2016 NFPA 14 STANDPIPE AND HOSE SYSTEMS
F. MECHANICAL	MONTGOMERY COUNTY CODE CHAPTER 8 2021 INTERNATIONAL MEHCANICAL CODE (IMC)
G. PLUMBING	2021 INTERNATIONAL PLUMBING CODE

GENERAL BUILDING DATA

EXISTING BUILDING AREA:		RENOVATED BUILDING AREA:
LEVEL G -	24,888 SF	0 SF
LEVEL 1 -	22,306 SF	578 SF
LEVEL 2 -	22,306 SF	7,578 SF
LEVEL 3 -	21,614 SF	0 SF
LEVEL 4 -	5,967 SF	5,955 SF
LEVEL 5 -	5,967 SF	5,955 SF
LEVEL 6 -	5,967 SF	5,955 SF
TOTAL =	109,015 SF	26,021 SF
EXISTING BUILDING HEIGHT:		66' FROM GROUND LEVEL TO HIGHEST OCCUPIED FLOOR 78' 2" FROM GROUND LEVEL TO T.O. PARAPET
NUMBER OF STORIES:		6 STORIES ABOVE GROUND LEVEL + GROUND LEVEL
ZONING:		---
PARKING:		SURFACE LOT

CONSTRUCTION TYPE:

IBC (TABLE 601)	TYPE IIA
NFPA (TABLE 4.1.1)	TYPE II (111)

BUILDING USE:

CURRENT USE GROUP:	B - EDUCATIONAL OCCUPANCIES ABOVE 12TH GRADE (IBC 304.1)
PROPOSED USE GROUP:	B - EDUCATIONAL OCCUPANCIES ABOVE 12TH GRADE (IBC 304.1) A-3 - ASSEMBLY USE (IBC 303.4)

OCCUPANCY CLASSIFICATION: (IBC 304.1, 303.4, 1004.1, 508.2, 508.2.1 & 508.2.4)
MIXED USE, NON-SEPARATED
B-BUSINESS (PRIMARY) / A-3 ASSEMBLY (ACCESSORY) / MECHANICAL & STORAGE (ACCESSORY)

INTERIOR FINISH REQUIREMENTS:

	IBC (TABLE 803.13)		NFPA	
GROUP	**B**	**A**	**B**	**A**
WALL AND CEILING				
ENCLOSED EXITS & STAIRWAYS	B	B	B (38.3.3.2)	A (12.3.3.2)
EXIT ACCESS CORRIDORS	C	B	B (38.3.3.2)	B (12.3.3.2)
ROOMS / ENCLOSED SPACES	C	C	C (38.3.3.2)	C (12.3.3.3)

	IBC (TABLE 804.4.2)		NFPA	
GROUP	**B**	**A**	**B**	**A**
FLOOR				
ENCLOSED EXITS & STAIRWAYS	II	II	II (7.1.4.2)	II (7.1.4.2)
EXIT ACCESS CORRIDORS	II	II	II (38.3.3.3)	II (12.3.3.5)
ROOMS / ENCLOSED SPACES	II	II	II (38.3.3.3)	II (12.3.3.5)

OCCUPANCY LOAD: (IN BOLD IS THE MOST RESTRINGENT CODE)

	IBC (TABLE 1004.5)		NFPA (7.3.1.2)
ACCESSORY STORAGE, MECH. EQUIP. ROOM	**1 PER 300 GROSS**		N/A (IN STORAGE)
ASSEMBLY (UNCONCENTRATED)	1 PER 15 NET	=	1 PER 15 NET
ASSEMBLY LIBRARY STACK AREAS	1 PER 100 GROSS	=	1 PER 100 GROSS
ASSEMBLY LIBRARY READING ROOMS	1 PER 50 NET	=	1 PER 50 NET
BUISNESS	1 PER 150 GROSS	=	1 PER 150 GROSS
BUSINESS COLLABOARTION ROOMS (<450 SF)	**N/A (IN ASSEMBLY)**		1 PER 30 NET
EDUCATIONAL (CLASSROOM)	1 PER 20 NET	=	1 PER 20 NET
STORAGE IN OTHER THAN STORAGE OCC.	**N/A (IN ACCESSORY)**		1 PER 500

FIRE RESISTANCE REQUIREMENTS:

	IBC	NFPA
PRIMARY STRUCTURAL FRAME:	1 HOUR (TABLE 601)	1 HOUR
EXTERIOR BEARING WALLS:	1 HOUR (TABLE 601)	1 HOUR (12.1.6)
EXTERIOR NON-BEARING WALLS:	0 HOUR (TABLE 601)	0 HOUR (12.1.6)
INTERIOR BEARING WALLS:	1 HOUR (TABLE 601)	1 HOUR (12.1.6)
INTERIOR NON-BEARING WALLS:	0 HOUR (TABLE 601)	0 HOUR (12.1.6)
FLOOR-CEILING ASSEMBLIES AND SECONDARY MEMBERS:	1 HOUR (TABLE 601)	1 HOUR (12.1.6)
ROOF-CEILING ASSEMBLIES AND SECONDARY MEMBERS:	1 HOUR (TABLE 601)	1 HOUR (12.1.6)
EXISTING STAIRS AND ELEVATORS SHAFT ENCLOSURES:	1 HOUR (IEBC 802.2.1)	1 HOUR (7.1.3.2.1 (3b))
EXIT ENCLOSURE:	1 HOUR (1023.2)	1 HOUR (7.1.3.2.1 (3))
FIRE DOOR ASSEMBLIES IN 1HR RATED EXIT ENCLOSURES:	60 MIN (TABLE 716.1(2))	60 MIN (TABLE 8.3.3.2.2)
FIRE DOOR ASSEMBLIES IN 1HR RATED FIRE BARRIERS:	45 MIN (TABLE 716.1(2)	45 MIN (TABLE 8.3.3.2.2)
FIRE DOOR ASSEMBLIES IN SMOKE BARRIERS:	20 MIN (TABLE 716.1(2)	20 MIN (TABLE 8.3.3.2.2)
CORRIDORS:		
BUSINESS (B)	0 HOUR (TABLE 1020.2)	0 HOUR (38.3.6.1 (3))
ASSEMBLY (A)	0 HOUR (TABLE 1020.2)	0 HOUR (12.3.6 (2))
OPEN STAIRWAY (OPENING: 562 SF / HZTAL PROJECTION: 323 SF):	PERMITTED (1019.3 (4))	PERMITTED (8.6.9.2, 38.3.1.1 (2), 12.3.1 (4))

FIRE PROTECTION REQUIRMENTS

	REQ'D	IBC	NFPA
AUTOMATIC SPRINKLERS:	YES	903	8.6.9.2(2) & 13.3.5
FIRE EXTINGUISHING SYSTEM:	NO	904	N/A
STANDPIPE SYSTEM:	YES	905.4	9.10
PORTABLE FIRE EXTINGUISHERS:	YES	906	NFPA-1 13.6.1
FIRE ALARM SYSTEM:	YES	907.2.2	39.3.4
EMERGENCY ALARM SYSTEM:	NO	908	---
SMOKE HEAT AND VENTS:	NO	910	---
FIRE COMMAND CENTER:	NO	911	403
FIRE DEPT. CONNECTIONS:	YES	912	NFPA13 8.17.2
VOICE/ALARM COMMUNICATIONS:	YES	907.2.1.1	12.3.4

FIRE SUPRESSION SYSTEM:

BUILDING WILL BE FULLY SPRINKLERED. (NFPA 13, 2016)
BUILDING WILL BE EQUIPPED WITH AUTOMATIC FIRE ALARM SYSTEM. (2016 NFPA 72 FIRE ALARM CODE)

FIRE EXTINGUISHERS:

OCCUPANCY CLASSIFICATION:	BUSINESS
CLASSIFICATION OF HAZARD CONTENTS:	ORDINARY & LIGHT HAZARD OCCUPANCY
DESIGN OF SPRINKLER SYSTEMS:	IN ACCORDANCE WITH 2016 NFPA 13
MAX. DISTANCE OF TRAVEL TO EXTINGUISHER:	75'

MEANS OF EGRESS:

	IBC (SECTION 1005.3.1 & 1005.3.2)	NFPA (TABLE 7.3.3.1)
EGRESS WIDTH (FULLY SPRINKLERED)		
EGRESS WIDTH @ DOORS:	0.15 INCHES / PERSON	0.2 INCHES / PERSON
EGRESS WIDTH @ STAIRS:	0.2 INCHES / PERSON	0.3 INCHES / PERSON (CAPACITY INCREASED PER (7.3.3.2))
MAX COMMON PATH OF TRAVEL (B):	100' (TABLE 1006.2.1)	100' (38.2.5.3.1)
MAX COMMON PATH OF TRAVEL (A):	75' (TABLE 1006.2.1)	20' >50 OCC. & 75' <50 OCC. (12.2.5.1.2)
EXIT ACCESS TRAVEL DISTANCE (B):	300' MAX (TABLE 1017.2)	300' MAX (38.2.6.3)
EXIT ACCESS TRAVEL DISTANCE (A):	250' MAX (TABLE 1017.2)	250' MAX (12.2.6.2 (1))
MAX DEAD END CORRIDOR LENGTH (B):	50' MAX (1020.4 (2))	50' MAX (38.2.5.2.1)
MAX DEAD END CORRIDOR LENGTH (A):	20' MAX (1020.4)	20' MAX (12.2.5.1.3)
MINIMUM CORRIDOR WIDTH (B):	44" (TABLE 1020.3)	44" (38.2.3.2)
MINIMUM CORRIDOR WIDTH (A):	44" (TABLE 1020.3)	44" (12.2.3.8)
MINIMUM STAIR WIDTH:	44" (1024.2)	44" (7.2.2.2.1.2 (B))
MINIMUM EXITS REQUIRED		
<500 OCC. PER STORY:	2 PER STORY (TABLE 1006.3.2)	2 PER STORY (7.4.1.1)
>500 OCC. PER STORY:	3 PER STORY (TABLE 1006.3.2)	3 PER STORY (7.4.1.2 (1))
PANIC HARDWARE:	YES, >49 OCC.(1010.2.9)	YES, >100 OCC. (12.2.2.2.3)
MINIMUM CEILING HEIGHT:	7'0" A.F.F (IEBC 801.4 (4))	7'0" A.F.F. (7.1.5.1 (1))
SLOPED CEILINGS:	5'0" A.F.F IN < 1/2 AREA (1208.2 (2))	6'8" A.F.F IN < 1/3 AREA (7.1.5.2)
HEADROOM:	6'8" A.F.F. (10003.3.1)	6'8" A.F.F (7.1.5.1)
EXISTING EGRESS STAIRS PERMITTED TO REMAIN:	YES (IEBC 804.2)	YES (7.2.2.2.1.1 (2))

OCCUPANT LOADS & EGRESS CAPACITY @ DOORS & STAIRS:

LEVEL 1:	618 OCCUPANTS
LEVEL 2:	79 OCCUPANTS
LEVEL 3:	NIC
LEVEL 4:	39 OCCUPANTS
LEVEL 5:	39 OCCUPANTS
LEVEL 6:	56 OCCUPANTS
	831 TOTAL BUILDING OCCUPANTS (SEE PLANS)

LEVEL 1 = (618 OCC. X 0.2) = 123.6" REQUIRED	EXIT DOORS: #1, #2, #3, #4, #5, #6 & #7 = 512" PROVIDED
LEVEL 1 = (618 OCC. X 0.3) = 185.4" REQUIRED	STAIRS: ST1, ST2, ST3 & ST4 = 196" PROVIDED
LEVEL 2 = (79 OCC. X 0.2) = 15.8" (64" REQUIRED)*	EXIT DOORS: #1 & #2 = 67.5" PROVIDED
LEVEL 2 = (79 OCC. X 0.3) = 23.7 (72" REQUIRED)**	STAIRS: ST1 & ST2= 76" PROVIDED
LEVEL 4 = (39 OCC. X 0.2) = 7.8" (64" REQUIRED)*	EXIT DOORS: #1 & #2 = 67.5" PROVIDED
LEVEL 4 = (39 OCC. X 0.3) = 11.7" (72" REQUIRED)**	STAIRS: ST1 & ST2 = 76" PROVIDED
LEVEL 5 = (39 OCC. X 0.2) = 7.8" (64" REQUIRED)*	EXIT DOORS: #1 & #2 = 67.5" PROVIDED
LEVEL 5 = (39 OCC. X 0.3) = 11.7" (72" REQUIRED)**	STAIRS: ST1 & ST2 = 76" PROVIDED
LEVEL 6 = (56 OCC. X 0.2) = 11.2" (64" REQUIRED)*	EXIT DOORS: #1 & #2 = 67.5" PROVIDED
LEVEL 6 = (56 OCC. X 0.3) = 16.8" (72" REQUIRED)**	STAIRS: ST1 & ST2 = 76" PROVIDED

*IBC 1010.1.1 - THE REQUIRED CAPACITY OF EACH DOOR OPENING SHALL PROVIDE A MIN CLEAR OPENING WIDTH OF 32"
**IBC 1011.2 EXCEPTION 1 - STAIRWAYS SERVING OCCUPANT LOAD OF LESS THAN 50 SHALL HAVE A WIDTH OF NOT LESS THAN 36 INCHES

DRINKING FOUNTAINS REQUIREMENTS (IBC TABLE 2902.1)

	DRINKING FOUNTAIN
ASSEMBLY (A-3/LIBRARIES)	1 PER 500
BUSINESS	1 PER 100
EDUCATIONAL (CLASSROOMS)	1 PER 100
STORAGE (ACCESSORY)	1 PER 1000

PER IEBC 2021 601.2, 701.2, AND 801.2, THIS LEVEL 2 RENOVATION DOES NOT INCREASE OCCUPANT LOAD, RECONFIGURE OCCUPANCY, OR CHANGE OCCUPANCY CLASSIFICATION; THEREFORE, PLUMBING FIXTURE COUNTS PER IBC CH. 29 ARE NOT RECALCULATED, AND EXISTING FIXTURE COUNTS ARE MAINTAINED. SINCE THE DRINKING FOUNTAINS ARE BEING REPLACED AND SOME ARE BEING REMOVED, THE DRINKING FOUNTAINS CALCULATION IS SHOWN FOR EACH LEVEL TO DEMONSTRATE COMPLIANCE.

LIFE SAFETY - OCCUPANCY - LEVEL 1

NAME	AREA	FUNCTION OF SPACE	OCCUPANT LOAD FACTOR (MOST RESTRINGENT CODE)	OCC. LOAD
ASM. FIXED				
STUDY BOOTHS	221 SF	ASM. FIXED	0 SF - 2LF. SEE SECTION 1004.6	30
	221 SF			30
ASM. UNCONC.				
BREAKROOM AND KITCHENETTE	465 SF	ASM. UNCONC.	15 SF - NET	31
GS 1 (LS)	135 SF	ASM. UNCONC.	15 SF - NET	10
GS 2 (LS)	136 SF	ASM. UNCONC.	15 SF - NET	10
GS 3 (LS)	135 SF	ASM. UNCONC.	15 SF - NET	10
GS 4 (LS)	136 SF	ASM. UNCONC.	15 SF - NET	10
GS 5	135 SF	ASM. UNCONC.	15 SF - NET	10
GS 6	131 SF	ASM. UNCONC.	15 SF - NET	9
LOUNGE ROOM (LS)	468 SF	ASM. UNCONC.	15 SF - NET	32
MAIN OPEN STUDY FIRST FLOOR	1,077 SF	ASM. UNCONC.	15 SF - NET	72
OPEN STUDY 1	537 SF	ASM. UNCONC.	15 SF - NET	36
PERIODICALS	152 SF	ASM. UNCONC.	15 SF - NET	11
	3,509 SF			241
BUSINESS				
ADMINISTRATIVE HALLWAY	713 SF	BUSINESS	150 SF - GROSS	5
ASSISTIVE TECHNOLOGY	80 SF	BUSINESS	150 SF - GROSS	1
BUSINESS AREA	5,624 SF	BUSINESS	150 SF - GROSS	38
ELEVATOR LOBBY	1,881 SF	BUSINESS	150 SF - GROSS	13
JAN.	59 SF	BUSINESS	150 SF - GROSS	1
OFFICE	145 SF	BUSINESS	150 SF - GROSS	1
OFFICE	140 SF	BUSINESS	150 SF - GROSS	1
OFFICE (NIC)	140 SF	BUSINESS	150 SF - GROSS	1
OFFICE (NIC)	188 SF	BUSINESS	150 SF - GROSS	2
OFFICE (NIC)	197 SF	BUSINESS	150 SF - GROSS	2
OFFICE LOBBY (NIC)	363 SF	BUSINESS	150 SF - GROSS	3
SERVICE DESK & WORK AREA	683 SF	BUSINESS	150 SF - GROSS	5
VESTIBULE	1,111 SF	BUSINESS	150 SF - GROSS	8
WORKROOM	367 SF	BUSINESS	150 SF - GROSS	3
	11,691 SF			84
CLASS RM.				
CLASSROOM 1	1,177 SF	CLASS RM.	20 SF - NET	59
CLASSROOM 2	1,216 SF	CLASS RM.	20 SF - NET	61
CLASSROOM (NIC)	958 SF	CLASS RM.	20 SF - NET	48
COMPUTER LAB	1,815 SF	CLASS RM.	20 SF - NET	91
	5,167 SF			259
STORAGE				
AV CLOSET	118 SF	STORAGE	300 SF - GROSS	1
CART STORAGE	157 SF	STORAGE	300 SF - GROSS	1
ELEC.	101 SF	STORAGE	300 SF - GROSS	1
IT IDF	167 SF	STORAGE	300 SF - GROSS	1
	542 SF			4
	21,130 SF			618

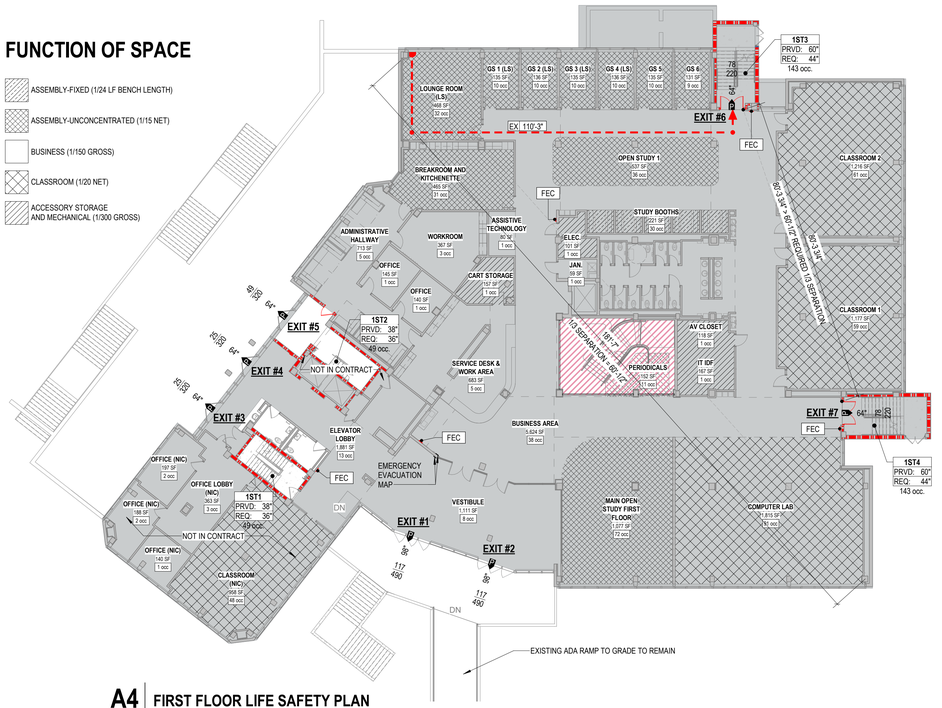
PLUMBING FIXTURE CALCULATION

LEVEL 1:

	OCC.	D-FOUNT
A-3	271	0.54
B	84	0.84
EDUCATIONAL	260	2.60
STORAGE/MECH	4	0.00
TOTAL	618	3.99
REQUIRED		4
EXISTING		6
NEW		0
TOTAL PROVIDED		6

FUNCTION OF SPACE

ASSEMBLY-FIXED (1/24 LF BENCH LENGTH)
ASSEMBLY-UNCONCENTRATED (1/15 NET)
BUSINESS (1/150 GROSS)
CLASSROOM (1/20 NET)
ACCESSORY STORAGE AND MECHANICAL (1/300 GROSS)

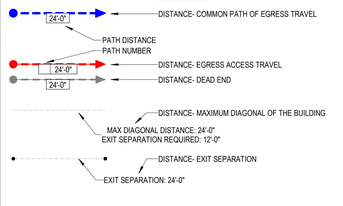


TRUE NORTH
PROJECT NORTH

A4 FIRST FLOOR LIFE SAFETY PLAN
GL.101 1/16" = 1'-0"

LEGEND - LIFE SAFETY PLANS

DISTANCES



NON-RATED
EXISTING PARTITION TO REMAIN
TEMPORARY PARTITION
PROPOSED PARTITION

TAG	RATED	PROTECTION TYPE	OPENING RATING
SP	0 HR	SPRINKLERS & DRAFT CURTAINS (NFPA 13 8.15.4)	N/A
1/2FP	1/2 HR	FIRE PARTITION	20 MIN
1FB / 1FP / 1SB / 1EXT	1 HR	FIRE BARRIER FIRE PARTITION SMOKE BARRIER EXTERIOR	60 MIN 20 MIN CORRIDORS / 45 MIN OTHER 20 MIN 45 MIN
2FW / 2FB / 2EXT	2 HR	FIRE WALL FIRE BARRIER EXTERIOR	90 MIN 90 MIN 90 MIN

DOORS (REFER TO DOOR SCHEDULE FOR RATING)

STAIRS

FIRE PROTECTION

AREA TAG

GENERAL NOTES - LIFE SAFETY PLANS

1. FIRE RESISTANCE RATINGS SHOWN ARE MINIMUM RATINGS REQUIRED. REFER TO PARTITION TYPES ON A-011, AND SPECIFICATIONS, FOR MORE INFORMATION
2. FIRE RESISTANCE RATINGS IN PARTITIONS ARE SHOWN WHERE PARTITIONS ARE NOT CUT BY DOORS, WINDOWS, STOREFRONTS, OR OTHER OBJECTS. RATED PARTITION MAY EXIST ABOVE OBJECTS.
3. THE LIFE SAFETY SHEETS ARE INTENDED TO BE VIEWED IN FULL COLOR: GREYSCALE VERSIONS MAY NOT CONTAIN FULL INFORMATION.

PLAN LEGEND

AREAS NOT IN CONTRACT

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MC PROJECT # FP24-021 / BUILDING # 206

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Project Number: 225012.00
Drawn By: FT
Checked By: MF

Drawing
CODE INFO. & FIRST FLOOR LIFE SAFETY PLAN

GL.101

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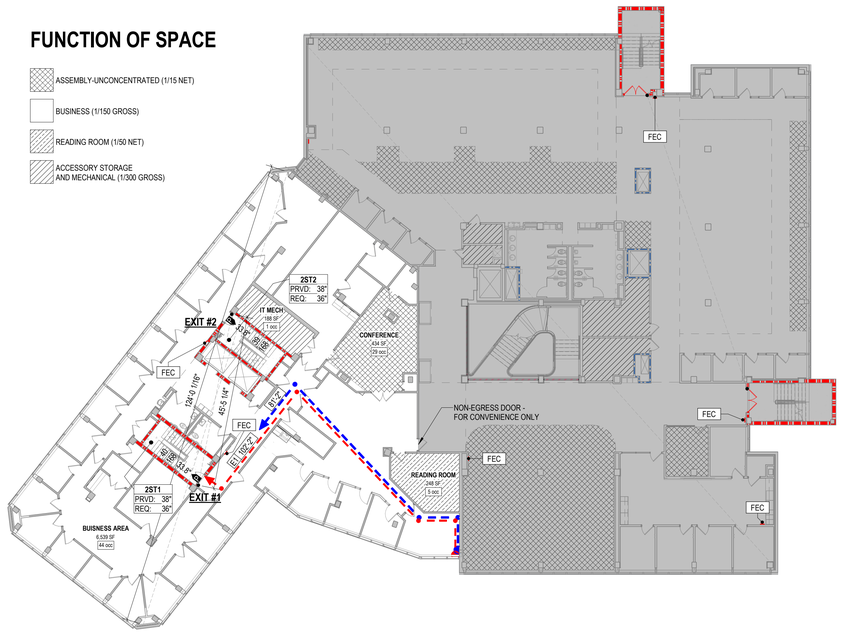
FUNCTION OF SPACE



LIFE SAFETY-OCCUPANCY - LEVEL 2				
NAME	AREA	FUNCTION OF SPACE	OCCUPANT LOAD FACTOR	OCC. LOAD
ASM. UNCONC.				
CONFERENCE	434 SF	ASM. UNCONC.	15 SF - NET	29
	434 SF			29
BUSINESS				
BUISNESS AREA	6,539 SF	BUSINESS	150 SF - GROSS	44
	6,539 SF			44
READING RM.				
READING ROOM	248 SF	READING RM.	50 SF - NET	5
	248 SF			5
STORAGE				
IT MECH	188 SF	STORAGE	300 SF - GROSS	1
	188 SF			1
	7,408 SF			79

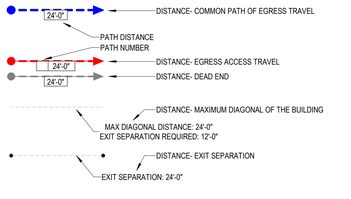
DRINKING FOUNTAIN CALCULATION

LEVEL 2:

	OCCUPANTS	D-FOUNT
A-3	34	0.07
B	44	0.44
STORAGE/MECH	1	0.00
TOTAL	79	0.51
REQUIRED		1
PROVIDED		1

LEGEND - LIFE SAFETY PLANS

DISTANCES



NON-RATED

EXISTING PARTITION TO REMAIN
TEMPORARY PARTITION
PROPOSED PARTITION

TAG	RATED	PROTECTION TYPE	OPENING RATING
SP	0 HR	SPRINKLERS & DRAFT CURTAINS (NFPA 13 8.15.4)	N/A
1/2FP	1/2 HR	FIRE PARTITION	20 MIN
1FD	1 HR	FIRE BARRIER	60 MIN
1FP		FIRE PARTITION	20 MIN CORRIDORS / 45 MIN OTHER
1SB		SMOKE BARRIER	20 MIN
1EXT		EXTERIOR	45 MIN
2FW	2 HR	FIRE WALL	90 MIN
2FB		FIRE BARRIER	90 MIN
2EXT		EXTERIOR	90 MIN

DOORS (REFER TO DOOR SCHEDULE FOR RATING)

UNRATED RATED
100 150 — OCCUPANTS EGRESSING
168 168 — DOOR CAPACITY
P — PANIC HARDWARE
D — DELAYED EGRESS LOCKS

STAIRS

1SA — STAIR RUN MARK
PRVD: 48" — STAIR WIDTH PROVIDED
REQ: 47.8" — STAIR WIDTH REQUIRED BASED ON OCCUPANTS EGRESSING
240 occ. — OCCUPANTS EGRESSING
UP

FIRE PROTECTION

FEC — FIRE EXTINGUISHER CABINET

AREA TAG

NAME — AREA NAME
1,234 SF — AREA SQUARE FOOTAGE
25 occ — OCCUPANT LOAD

GENERAL NOTES - LIFE SAFETY PLANS

1. FIRE RESISTANCE RATINGS SHOWN ARE MINIMUM RATINGS REQUIRED. REFER TO PARTITION TYPES ON A-011, AND SPECIFICATIONS, FOR MORE INFORMATION
2. FIRE RESISTANCE RATINGS IN PARTITIONS ARE SHOWN WHERE PARTITIONS ARE NOT CUT BY DOORS, WINDOWS, STOREFRONTS, OR OTHER OBJECTS. RATED PARTITION MAY EXIST ABOVE OBJECTS.
3. THE LIFE SAFETY SHEETS ARE INTENDED TO BE VIEWED IN FULL COLOR: GREYSCALE VERSIONS MAY NOT CONTAIN FULL INFORMATION.

PLAN LEGEND

AREAS NOT IN CONTRACT

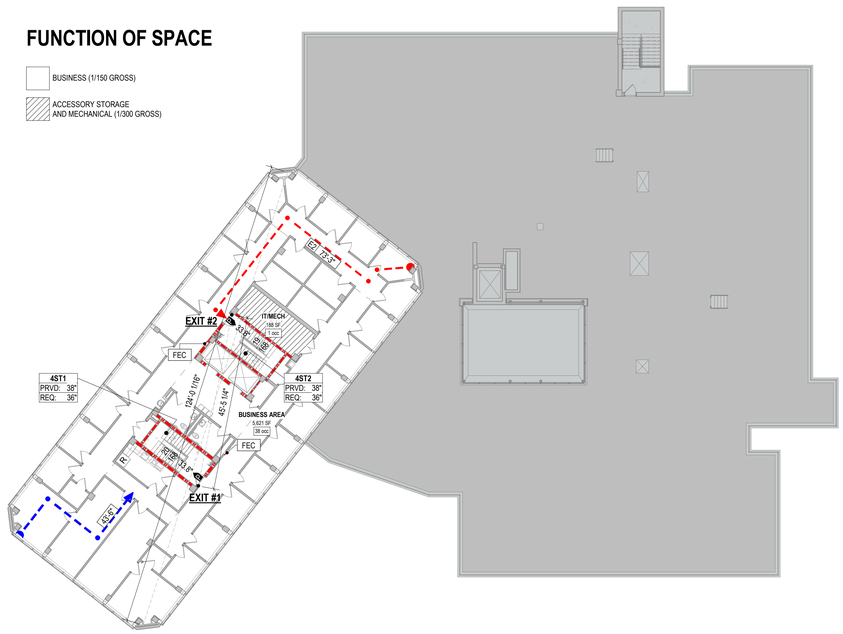
LIFE SAFETY-OCCUPANCY - LEVEL 4				
NAME	AREA	FUNCTION OF SPACE	OCCUPANT LOAD FACTOR	OCC. LOAD
BUSINESS				
BUSINESS AREA	5,621 SF	BUSINESS	150 SF - GROSS	38
	5,621 SF			38
STORAGE				
IT/MECH	188 SF	STORAGE	300 SF - GROSS	1
	188 SF			1
	5,809 SF			39

DRINKING FOUNTAIN CALCULATION

LEVEL 4:

	OCCUPANTS	D-FOUNT
B	38	0.38
STORAGE/MECH	1	0.00
TOTAL	39	0.38
REQUIRED		1
PROVIDED		1

FUNCTION OF SPACE



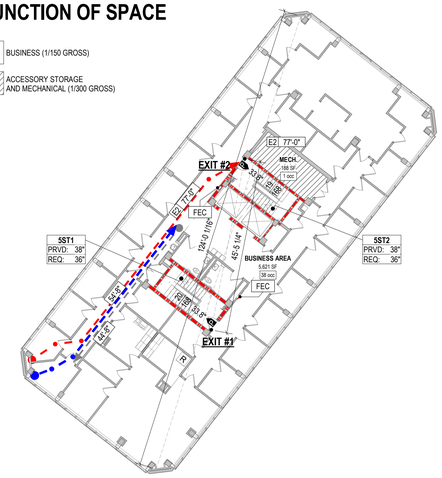
LIFE SAFETY-OCCUPANCY - LEVEL 5				
NAME	AREA	FUNCTION OF SPACE	OCCUPANT LOAD FACTOR	OCC. LOAD
BUSINESS				
BUSINESS AREA	5,621 SF	BUSINESS	150 SF - GROSS	38
	5,621 SF			38
STORAGE				
MECH.	188 SF	STORAGE	300 SF - GROSS	1
	188 SF			1
	5,809 SF			39

DRINKING FOUNTAIN CALCULATION

LEVEL 5:

	OCCUPANTS	D-FOUNT
B	38	0.38
STORAGE/MECH	1	0.00
TOTAL	39	0.38
REQUIRED		1
PROVIDED		1

FUNCTION OF SPACE



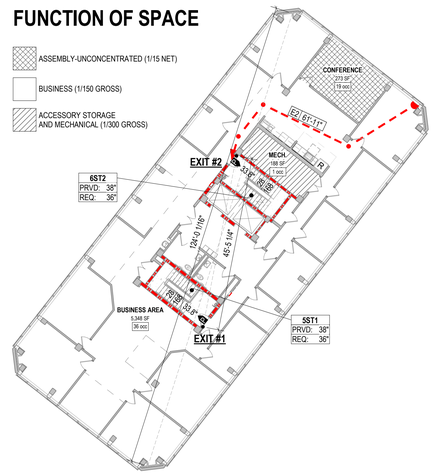
LIFE SAFETY-OCCUPANCY - LEVEL 6				
NAME	AREA	FUNCTION OF SPACE	OCCUPANT LOAD FACTOR	OCC. LOAD
ASM. UNCONC.				
CONFERENCE	273 SF	ASM. UNCONC.	15 SF - NET	19
	273 SF			19
BUSINESS				
BUSINESS AREA	5,348 SF	BUSINESS	150 SF - GROSS	36
	5,348 SF			36
STORAGE				
MECH.	188 SF	STORAGE	300 SF - GROSS	1
	188 SF			1
	5,809 SF			56

DRINKING FOUNTAIN CALCULATION

LEVEL 6:

	OCCUPANTS	D-FOUNT
A-3	19	0.04
B	36	0.36
STORAGE/MECH	1	0.00
TOTAL	56	0.40
REQUIRED		1
PROVIDED		1

FUNCTION OF SPACE



TRUE NORTH
PROJECT NORTH

A1 FOURTH FLOOR LIFE SAFETY PLAN
GL.102 | 1/16" = 1'-0"

A3 FIFTH FLOOR LIFE SAFETY PLAN
GL.102 | 1/16" = 1'-0"

A4 SIXTH FLOOR LIFE SAFETY PLAN
GL.102 | 1/16" = 1'-0"

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Drawn By: FT
Checked By: MF

Drawing
SECOND THROUGH SIXTH FLOOR LIFE SAFETY PLAN

GL.102

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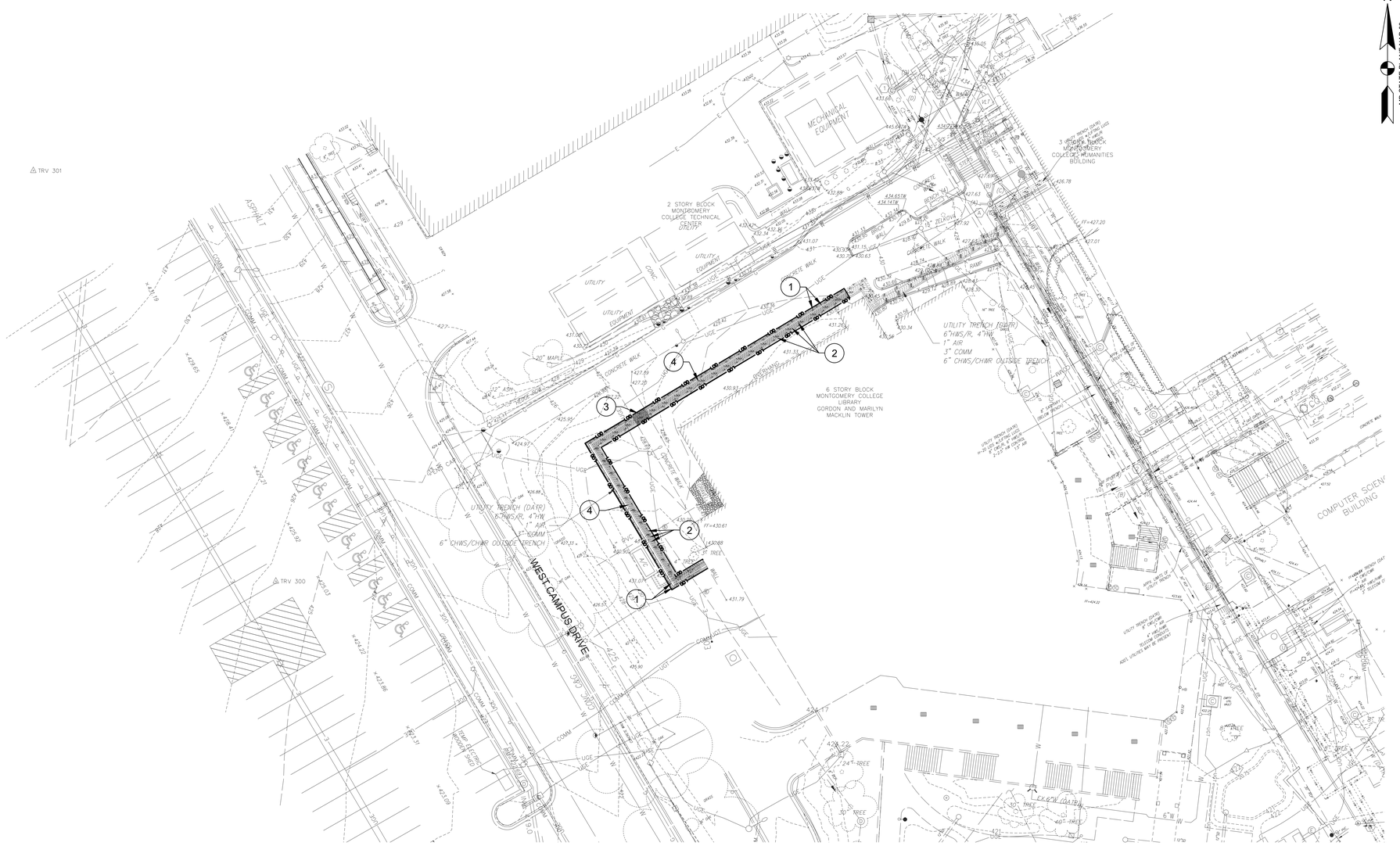

DEMOLITION KEYNOTES

1. REMOVE EXISTING DIRECT–BURIED CHILLED WATER SERVICE AND RETURN PIPING
2. REMOVE EXISTING HOT WATER SERVICE AND RETURN PIPING FROM EXISTING CONCRETE TRENCH
3. REMOVE EXISTING CONCRETE PAVING ABOVE EXISTING CONCRETE TRENCH
4. REMOVE EXISTING COMPRESSED AIR PIPING

DEMOLITION LEGEND

- PIPE TO BE REMOVED
- LOD — LIMITS OF REMOVAL
- REMOVE EXISTING CONCRETE

0 10' 20' 40'
SCALE: 1"=20'

PLOT ONE SQUARE MUST BE EXACTLY ONE INCH LONG AT THIS SIZE'S ORIGINAL IMAGE SIZE

THE SQUARES ABOVE ARE COLOR WITH BLACK AND WHITE LETTERS, IF PRINTED CORRECTLY

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Drawn By:	MCW
Checked By:	MCW
Sheet Issue Date:	2025-08-29

Drawing
DEMOLITION PLAN

CD-101

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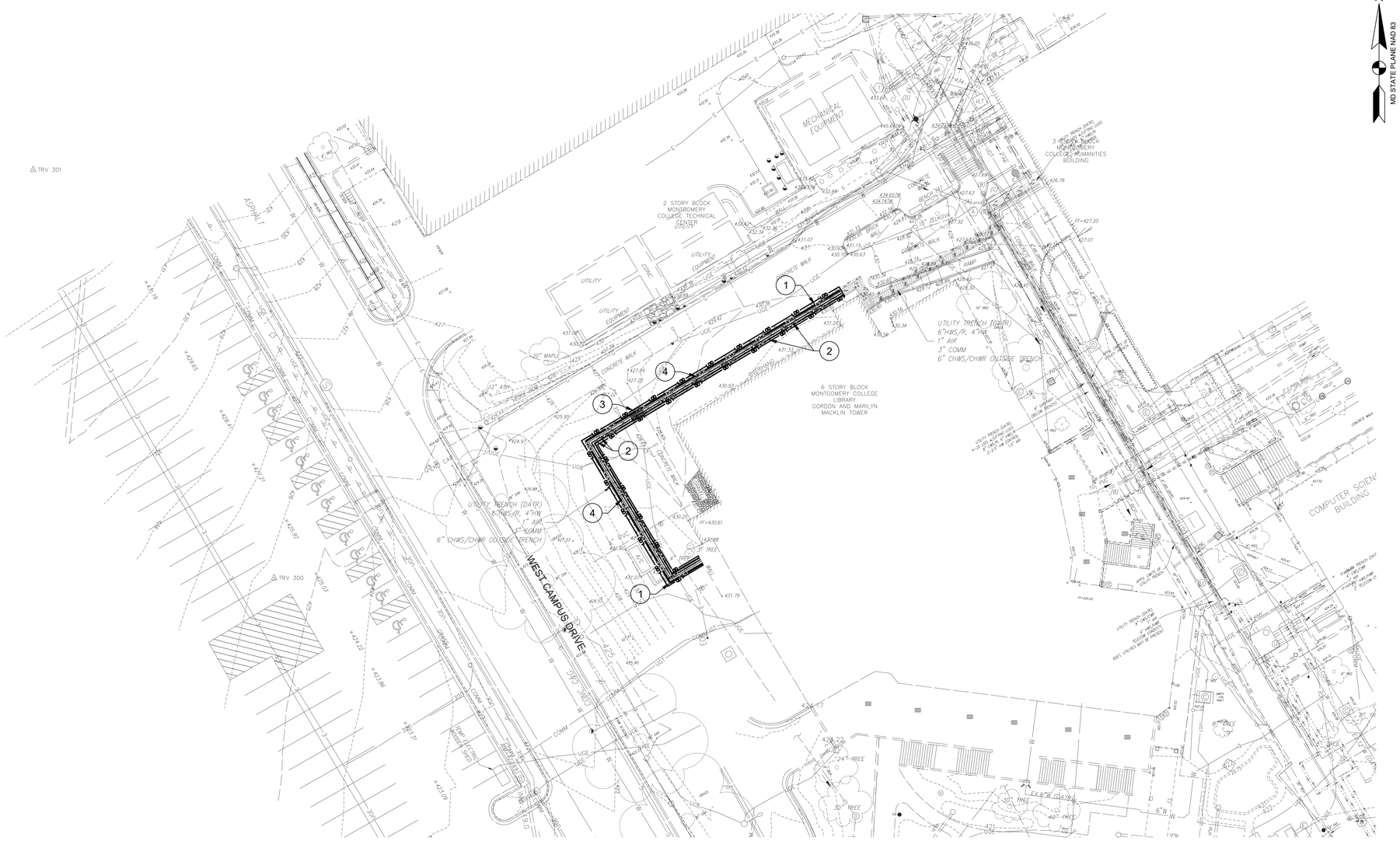
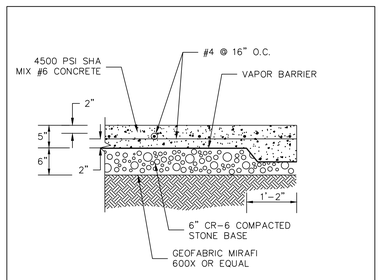
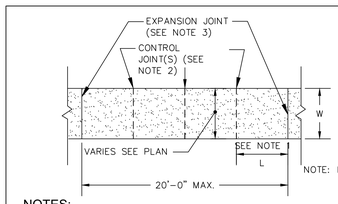




1 PEDESTRIAN CONCRETE PAVEMENT SECTION
NOT TO SCALE



NOTES:

1. CONTROL JOINTS SHALL BE EQUALLY SPACED. IF SIDEWALK WIDTH IS GREATER THAN 8' WIDE, THEN ADD A LONGITUDINAL CONTRACTION JOINT ALONG LENGTH OF SIDEWALK.
2. CONTROL JOINTS SHALL BE FORMED, 1" DEEP BY ¼" WIDE.
3. PROVIDE 1/2" (NON-EXTRUDING) EXPANSION JOINT EVERY 20' O.C. MAX. AND WHERE SIDEWALK ABUTS ANY CONC. CURB OR OTHER RIGID STRUCTURE(S).
4. CAULK SEAL ALL CONCRETE TO CONCRETE AND CONCRETE TO ASPHALT JOINTS.
5. SAW-CUT CONTRACTION JOINTS ARE SPECIFICALLY EXCLUDED AND NOT ALLOWED ON THIS PROJECT.

2 CONCRETE SIDEWALK DETAIL
NOT TO SCALE

UTILITY/RESTORATION KEYNOTES

1. INSTALL NEW DIRECT-BURIED CHILLED WATER SERVICE AND RETURN PIPING (36" MIN. COVER)
2. INSTALL NEW HOT WATER SERVICE AND RETURN PIPING IN EXISTING CONCRETE TRENCH
3. REPAIR/REPLACE CONCRETE PAVING PER DETAILS ON THIS SHEET
4. INSTALL NEW COMPRESSED AIR PIPING.

UTILITY/RESTORATION LEGEND

LOD	LIMITS OF REMOVAL
	REPAIR/REPLACE CONCRETE PAVING
CWS/R	CHILLED WATER SUPPLY/RETURN
HWS/R	HOT WATER SUPPLY/RETURN
	COMPRESSED AIR SUPPLY/RETURN

UTILITY/RESTORATION NOTES

1. REFER TO MECHANICAL DRAWINGS FOR NEW COMPRESSED AIR AND NEW HOT AND CHILLED WATER PIPE SIZES AND DETAILS.

0 10' 20' 40'
SCALE: 1"=20'

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ROCKVILLE, MD 20850

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Δ	DATE	DESCRIPTION

Project Number:	224112.00
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Checked By:	MCW
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Drawing
SITE DEVELOPMENT PLAN
CS-101

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08/29/2025
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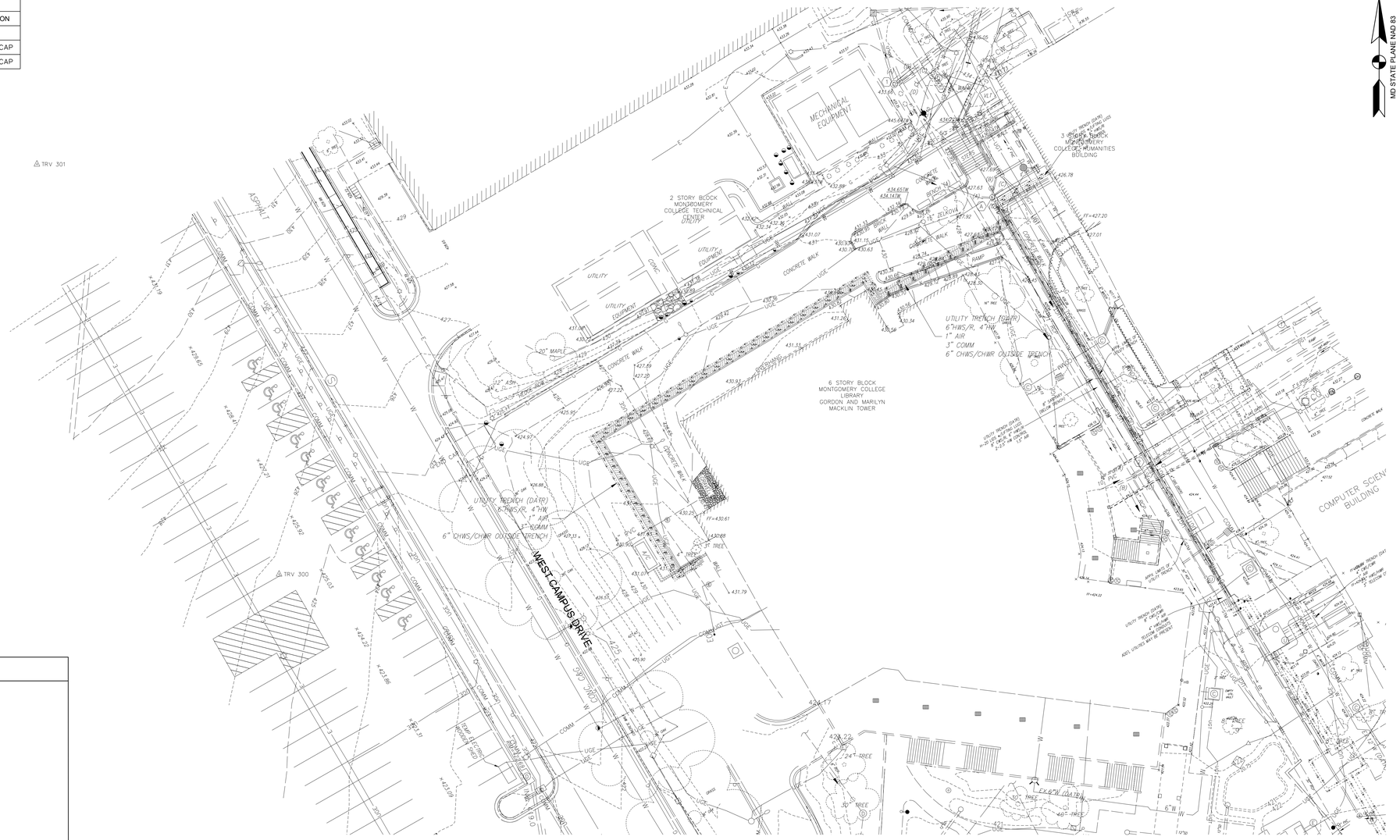
IF THE SCRYN MEASURES EXACTLY ONE INCH LONG AT THIS SIZE IS ORIGINAL PAPER SIZE

TRAVERSE DATA:				
NO	NORTHING	EASTING	ELEV	DESCRIPTION
50	521381.9445	1266730.1913	433.06	NAIL
300	521200.3219	1266452.9606	426.62	REBAR & CAP
301	521371.5519	1266351.8318	434.44	REBAR & CAP



EXISTING CONDITIONS LEGEND

- BUSH
- STORM MANHOLE
- SINGLE POST SIGN
- BOLLARD
- LIGHT POLE
- POWER POLE
- LAMP
- TELEPHONE JUNCTION BOX
- COMUNICATION MANHOLE
- SANITARY SEWER MANHOLE
- CLEAN OUT
- WATER VALVE
- FIRE HYDRANT
- WATER MANHOLE
- WATER METER
- CABLE TV JUNCTION BOX
- GAS VALVE
- POST
- MAILBOX
- TRAVERSE
- BENCHMARK
- CURB AND GUTTER
- CURB WITH (NO GUTTER)
- EDGE OF PAVEMENT
- EDGE OF GRAVEL
- EDGE OF SIDEWALK
- WHITE LINE SOLID (PAINT MARKING)
- DOUBLE YELLOW LINE (PAINT MARKING)
- W — WATERLINE PAINT
- FO — UNDERGROUND FIBER OPTIC LINE PAINT
- COMM — UNDERGROUND COMMUNICATION LINE PAINT
- OHT — OVERHEAD TELEPHONE LINE
- OHE — OVERHEAD ELECTRIC LINE
- UGE — UNKNOWN OVERHEAD ELECTRIC
- OHU — UNKNOWN OVERHEAD UTILITY
- G — GAS LINE PAINT
- SANITARY SEWER LINE
- STORM DRAIN PIPES
- CHAIN LINK FENCE
- WOOD FENCE
- HEDGE
- CONCRETE
- RIP-RAP

ABBREVIATIONS

VLT = VAULT
EQUIP. = EQUIPMENT
FF = FINISHED FLOOR

STORM CHART

(1) MANHOLE
TOP = 433.21
INV IN (A) = 427.84 (15" RCP)
INV IN (B) = 427.65 (18" HDPE)
INV IN (C) = 427.45 (18" HDPE)
INV OUT (D) = 426.53

MANHOLE
TOP = NO DATA
INV IN (A) = 419.09
INV IN (B) = 419.85
INV IN (C) = 419.52
INV OUT (D) = 417.97

SEWER CHART

(A) MANHOLE
TOP = 427.25
INV IN (A) = 414.99 (6" PVC)
INV IN (B) = 423.12 (6" PVC)
INV IN (C) = 414.90 (PIPE)
INV OUT (D) = 414.91 (PIPE)

(B) MANHOLE
TOP = 421.81
NO INVERT DATA

GENERAL NOTES

1. HORIZONTAL DATUM: MARYLAND STATE PLANE NAD 83/2011 VERTICAL DATUM: NAVD 88 U.S SURVEY FEET BASED ON RTK GPS OBSERVATIONS.
2. "TW" AS SHOWN HEREON DENOTES TOP OF WALL ELEVATIONS.
3. CURB ELEVATIONS SHOWN HEREON ARE TO THE TOP OF CURB.
4. THE TERM "TOP" AS SHOWN HEREON DENOTES THE ELEVATION OF THE HIGHEST POINT OF MANHOLE RIMS AND THE STORM DRAIN STRUCTURE GRATES OF CURB INLETS, CATCH BASINS, DROP INLETS AND YARD INLETS.
5. THE LOCATION AND DIRECTION OF ANY STORM DRAIN OR SANITARY SEWER PIPES SHOWN HEREON THAT ARE NOT CONNECTED TO A STRUCTURE ARE APPROXIMATE, UNLESS OTHERWISE NOTED.
6. SURVEY COMPLETED BY AMT, FEBRUARY, 2025.

0 10' 20' 40'
SCALE: 1"=20'

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Project Number:	224112.00
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Drawing
EXISTING CONDITIONS PLAN
VF-101

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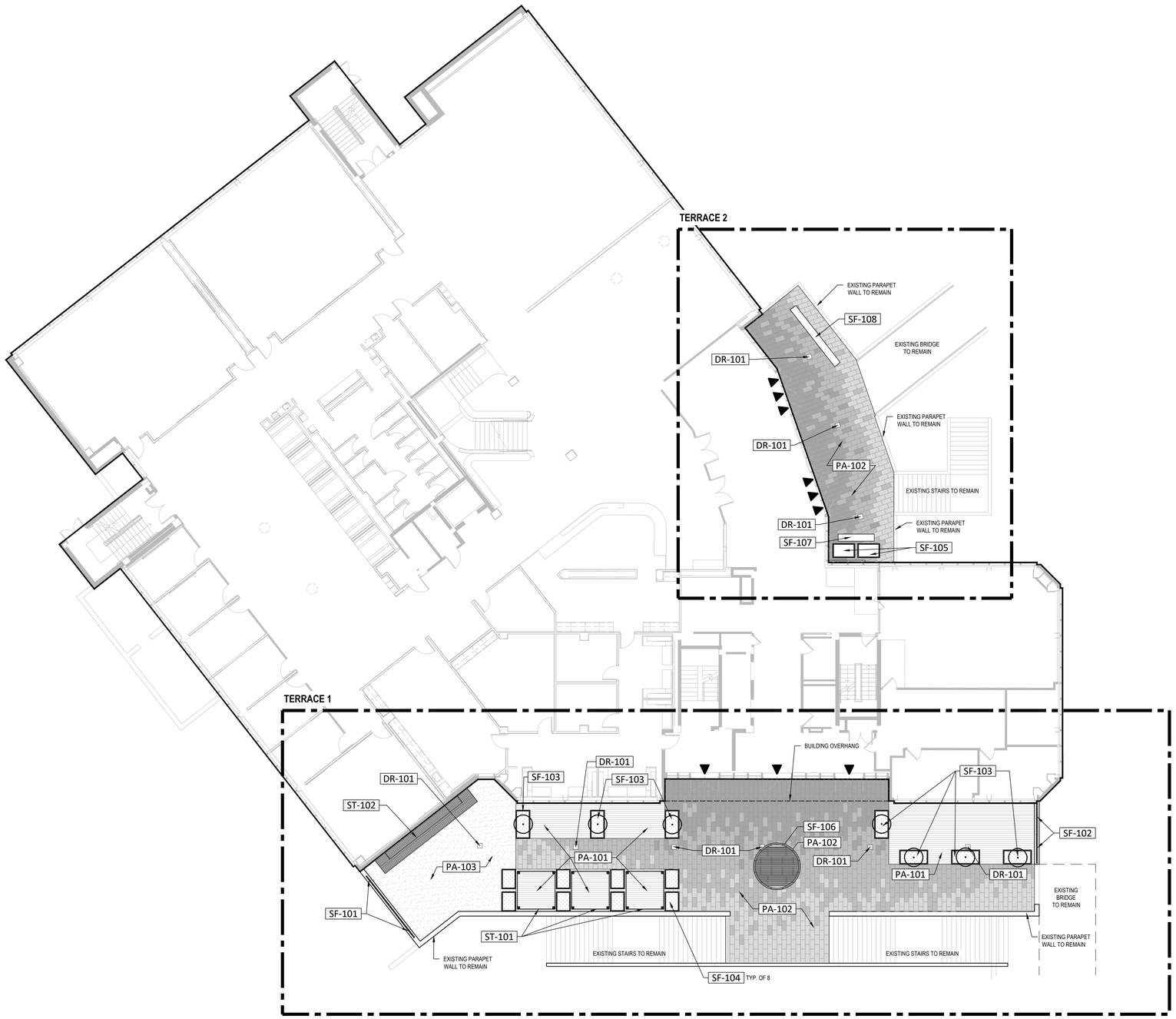
PETUNE BOYKIN MARCH 5, EXACTLY ONE INCH LONG AT THIS SIZE ON ORIGINAL PAPER SIZE

THE SQUARES ABOVE ARE COLOR WITH BLACK AND WHITE LETTERS, IF PRINTED CORRECTLY



01 SITE MATERIALS PLAN

10' = 1'-0"

REFERENCE NOTES SCHEDULE

CODE	DESCRIPTION	DETAIL
DRAINAGE		
DR-101	EXISTING TWO-STAGE DRAIN TO BE REPLACED	SEE ROOF ARCHITECT DWGS.
PAVING		
PA-101	WOOD LOOK PORCELAIN PAVER	1/L-300
PA-102	CONCRETE UNIT PAVER	2/L-300
PA-103	ARTIFICIAL TURF	3/L-300
SITE FURNISHINGS		
SF-101	DECORATIVE SCREEN PANEL A	1&3/L-301
SF-102	DECORATIVE SCREEN PANEL B	2&3/L-301
SF-103	RECTANGULAR PLANTER TYPE A	7/L-300
SF-104	RECTANGULAR PLANTER TYPE B	8/L-300
SF-105	RECTANGULAR PLANTER TYPE C	9/L-300
SF-106	CIRCULAR BENCH	1/L-304
SF-107	BACKED BENCH	4/L-301
SF-108	BACKLESS BENCH	5/L-301
STRUCTURE		
ST-101	CABANA	1/L-303
ST-102	LINEAR WOOD TERRACE	1/L-302

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Drawing
SITE MATERIALS PLAN

L-200

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E D C B A

1 2 3 4 5 6

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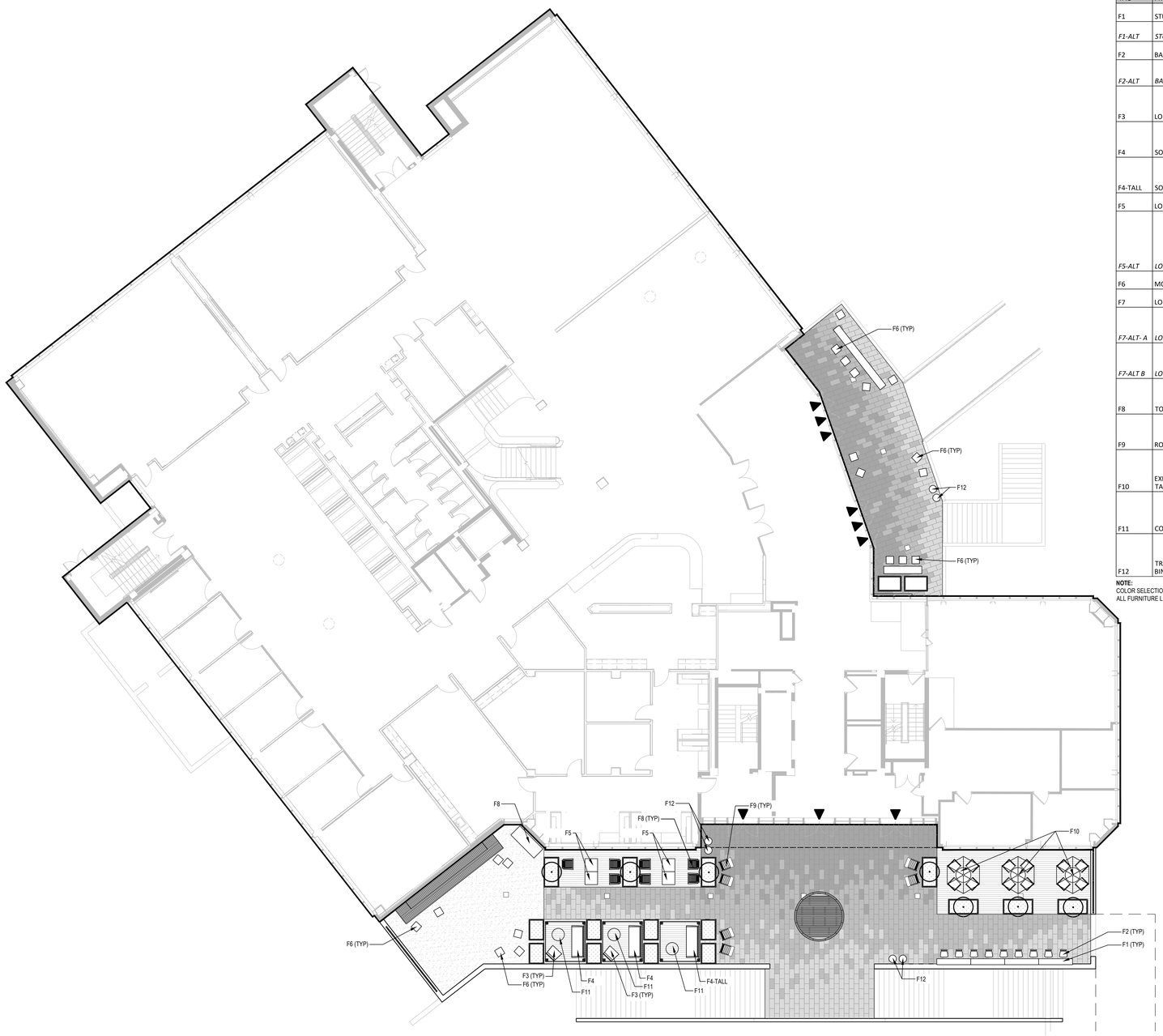

FURNITURE SCHEDULE

TAG	PRODUCT	MANUFACTURER	MANUFACTURING LOCATION	MODEL	SIZE	MATERIAL	WOOD TYPE	FINISH	COLOR
F1	STUDY BAR	VESTRE	NORWAY & SWEDEN	BLOC Bar Table	67.9" x 24.8" x 42.5"ht.	METAL + WOOD	FSC NORDIC PINE	METAL: POWDER COAT	SEE NOTE
F1-ALT	*STUDY BAR*	*SITE PIECES*	*USA*	*MONOLINE High Top Table*	*82" L x 23" x 42"*	*METAL + WOOD*	*THERMALLY MODIFIED ASH*	*METAL: POWDER COAT*	SEE NOTE
F2	BAR HEIGHT CHAIR	VESTRE	NORWAY & SWEDEN	BLOC Bar Chair	18.1" x 24.8" x 28.3"ht.	METAL + WOOD	FSC NORDIC PINE	METAL: POWDER COAT	SEE NOTE
F2-ALT	*BAR HEIGHT CHAIR*	*SITE PIECES*	*USA*	*MONOLINE Open Stool with Foot Rest*	*20" L x 20" x 30"*	*METAL + WOOD*	*THERMALLY MODIFIED ASH*	*METAL: POWDER COAT*	SEE NOTE
F3	LOUNGE CHAIR	LOLL DESIGNS	USA	LAGO Lounge Chair		RECYCELD HIGH DENSITY POLYETHYLENE (HDPE)			
F4	SOFA	LOLL DESIGNS	USA	LOLLYGAGER Sofa 77		RECYCELD HIGH DENSITY POLYETHYLENE (HDPE)			SEE NOTE
F4-TALL	SOFA	LOLL DESIGNS	USA	TALL LOLLYGAGER Sofa 77		RECYCELD HIGH DENSITY POLYETHYLENE (HDPE)			SEE NOTE
F5	LOUNGE TABLE	VESTRE	NORWAY & SWEDEN	BLOC Lounge Table	30.5" x 31.4" x 11.8"ht.	METAL + WOOD	FSC NORDIC PINE	METAL: POWDER COAT	SEE NOTE
F5-ALT	*LOUNGE TABLE*	*SITE PIECES*	*USA*	*MONOLINE Open Stool (to be used as a table)*	*44.8" L x 44.8" x 16"*	*METAL + WOOD*	*THERMALLY MODIFIED ASH*	*METAL: POWDER COAT*	SEE NOTE
F6	MOVEABLE CUBES	HELLER GEHRY	USA	LEFT TWIST CUBE	18"W x 18" D x 17" H	POLYETHYLENE			SEE NOTE
F7	LOUNGE Chair	VESTRE	NORWAY & SWEDEN	BLOC Chair		METAL + WOOD	FSC NORDIC PINE	METAL: POWDER COAT	SEE NOTE
F7-ALT- A	*LOUNGE CHAIR*	*LOLL DESIGNS*	*USA*	*LOLLYGAGER Lounge Chair*		*RECYCELD HIGH DENSITY POLYETHYLENE (HDPE)*			*SEE NOTE*
F7-ALT B	*LOUNGE CHAIR*	*SITE PIECES*	*USA*	*MONOLINE Lounge Chair w/WIDE SLATS*	*25" L x 30.8" x 44"*	*METAL + WOOD*	*THERMALLY MODIFIED ASH- Wide Slats*	*METAL: POWDER COAT*	SEE NOTE
F8	TOY BOX	Biohort		LeisureTime Box	200 GAL.				SEE NOTE
F9	ROCKING CHAIR	LOLL DESIGNS	USA	LOLLYGAGER ROCKER		RECYCELD HIGH DENSITY POLYETHYLENE (HDPE)			SEE NOTE
F10	EXISTING 4-TOP TABLE & CHAIRS	LANDSCAPE FORMS	N/A			EXISTING POWDER COATED METAL		EXISTING TO BE STRIPPED, SANDED, PRIMED AND PAINTED OR POWDER COATED	SEE NOTE
F11	COCKTAIL TABLE	LOLL DESIGNS	USA	LOLLYGAGER COCKTAIL TABLE (ROUND)	30" Dia. x 12.75" ht.	RECYCELD HIGH DENSITY POLYETHYLENE (HDPE)			SEE NOTE
F12	TRASH & RECYCLING BINS	*SITE PIECES*	*USA*	*MONOLINE 36 gallon Square Litter Bin; Add Symbol & Text: "TRASH" and "RECYCLING"*	*19" L x 19" x 42" (36 gal)*	*METAL*		*METAL: POWDER COAT*	SEE NOTE

NOTE:
COLOR SELECTION - COLOR FOR ALL SITE FURNITURE TO BE SELECTED BY LANDSCAPE ARCHITECT FROM FULL RANGE OF MANUFACTURER'S STANDARD COLORS.
ALL FURNITURE LISTED SHALL BE OWNER PURCHASED/CONTRACTOR INSTALLED

01 FURNITURE PLAN
1" = 10'-0"

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MC PROJECT # FP24-0021 / BUILDING # 206

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Drawing
FURNITURE PLAN

L-201

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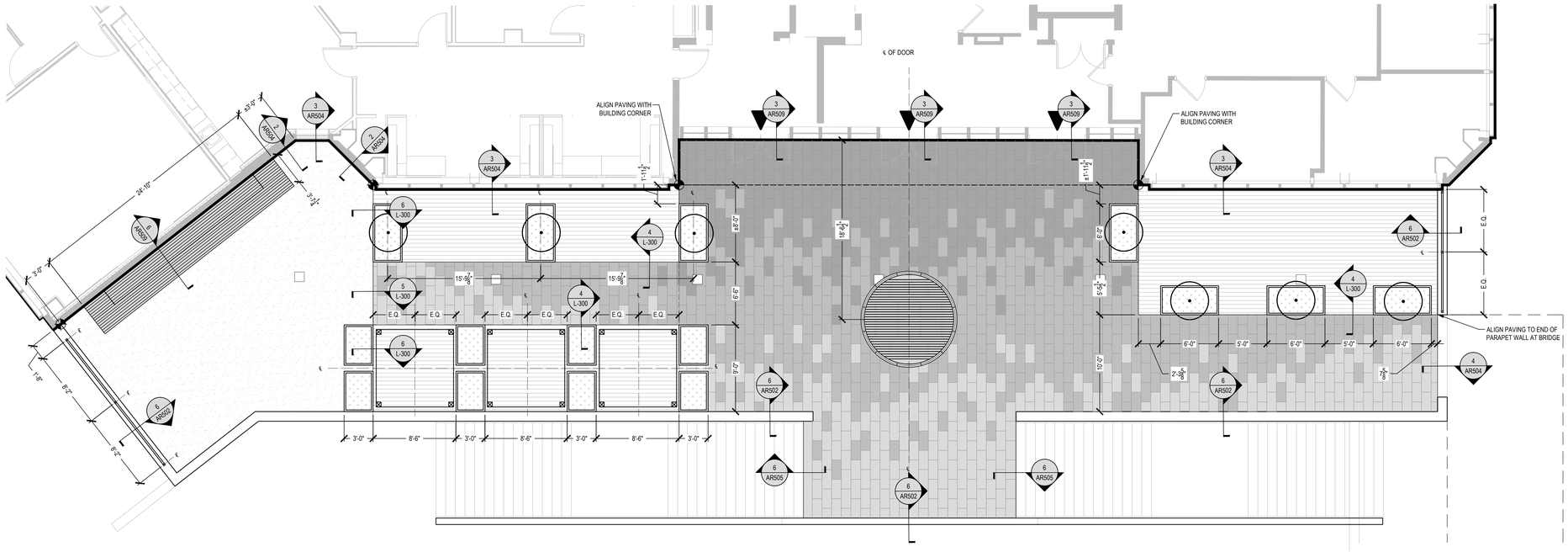
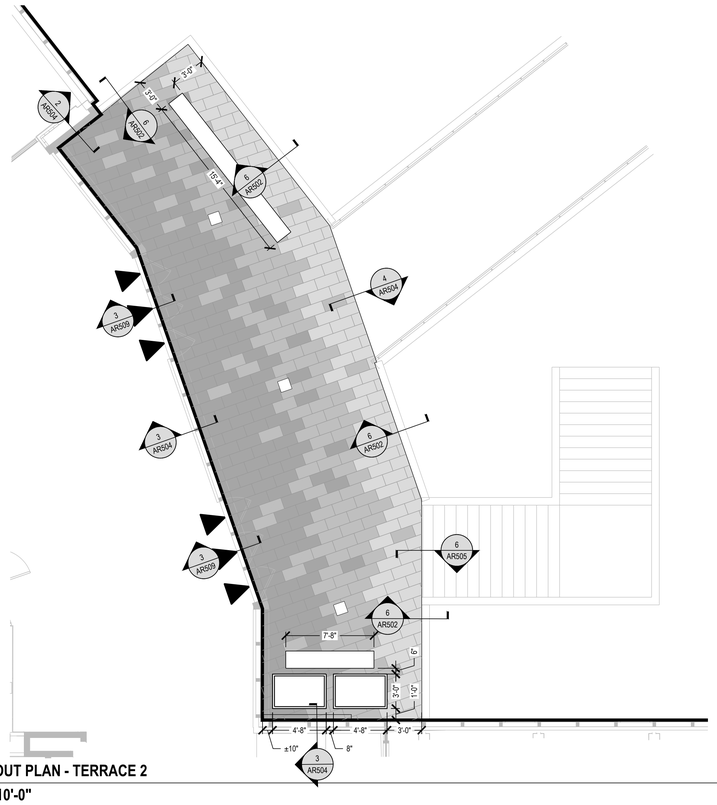


01 CONCRETE UNIT PAVER LAYOUT - TERRACE 1

3/16" = 1'-0"



02 LAYOUT PLAN - TERRACE 2

1" = 10'-0"

GENERAL NOTES:

1. ALL WORK SHALL BE DONE IN A WORKMANLIKE MANNER AND IN CONFORMANCE WITH MANUFACTURERS' REQUIREMENTS.
2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL AUTHORITIES, RULES, AND REGULATIONS.
3. PLANS WERE DEVELOPED USING AVAILABLE INFORMATION; VERIFY ALL AS-BUILT CONDITIONS AND DIMENSIONS IN THE FIELD AT THE START OF THE PROJECT AND REPORT ANY DISCREPANCIES TO THE OWNER AND LANDSCAPE ARCHITECT.
4. REPORT ANY UNFORSEEN OR UNCLEAR CONDITIONS TO THE OWNER AND LANDSCAPE ARCHITECT PRIOR TO PROCEEDING WITH THE WORK.
5. PROJECT AND SITE LOGISTICS INCLUDING SCHEDULE, PHASING, SITE ACCESS, LAYDOWN/STORAFE AREAS, ETC. SHALL BE COORDINATED WITH THE OWNER.
6. COORDINATE WORK AND COOPERATE WITH SEPARATE CONTRACTORS ON THE SITE TO FACILITATE EXECUTION OF THE WORK.
7. PRIOR TO DEMOLITION, MEET WITH THE OWNER FOR THE PURPOSE OF DETERMINING MATERIALS THAT ARE TO BE SALVAGED AND RETURNED TO THE OWNER.
8. TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING ELEMENTS TO REMAIN; ANY DAMAGE TO EXISTING ELEMENTS NOT DESIGNATED FOR REMOVAL, RELOCATION, OR REPLACEMENT, SHALL BE REPAIRED AND/OR REPLACED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.

LAYOUT NOTES:

1. LAYOUT AND DIMENSIONS SHOWN ON LAYOUT PLAN ARE FOR PURPOSES OF ILLUSTRATING DESIGN INTENT. ALL DIMENSIONS SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR.
2. WRITTEN DIMENSIONS WILL PREVAIL ON THIS LAYOUT PLAN. DO NOT SCALE FROM THIS PLAN.
3. IMMEDIATELY REPORT DISCREPANCIES FOUND BETWEEN PLAN DIMENSIONS AND ACTUAL FIELD CONDITIONS TO THE OWNER AND LANDSCAPE ARCHITECT.
4. CONTRACTOR SHALL STAKE AND/OR PAINT OVERALL LAYOUT OF PLAN ELEMENTS FOR APPROVAL BY THE OWNER AND LANDSCAPE ARCHITECT.
5. VERIFY THE CORRECT LOCATION OF ANY/ALL UTILITIES IN THE FIELD PRIOR TO CONSTRUCTION.

GRADING & DRAINAGE NOTES:

1. ISOLATED TEST PITS WERE PERFORMED TO UNDERSTAND AND EVALUATE THE EXISTING PAVING SECTION DOWN TO THE EXISTING STRUCTURAL SLAB. THE CONTRACTOR SHALL VERIFY CONDITIONS, DIMENSIONS/DEPTHS ACROSS THE ENTIRETY OF THE TERRACES AND CONFIRM COMPATIBILITY WITH PROPOSED ELEMENTS AND PRODUCTS DURING DEMOLITION.
   ALL OF THE EXISTING TWO-STAGE DRAINS ARE TO BE REPLACED IN-PLACE AND IN-KIND; SEE DRAWINGS BY OTHERS.
2. A CURRENT TOPOGRAPHICAL SURVEY WITH SPOT ELEVATIONS IS NOT AVAILABLE FOR THIS PROJECT. THE CONTRACTOR SHALL DOCUMENT EXISTING GRADES / SPOT ELEVATIONS WITH A TOPOGRAPHIC SURVEY PRIOR TO DEMOLITION TO THE EXTENT NECESSARY TO ACHIEVE THE DESIGN INTENT OF MATCHING THE EXISTING GRADES AND DRAINAGE PATTERNS.
3. THE CONTRACTOR SHALL COORDINATE WITH WATERPROOFING AND DRAINAGE PLANS AND DETAILS BY OTHERS TO ENSURE THAT THE TERRACES DRAIN PROPERLY.
4. THE CONTRACTOR SHALL SCHEDULE AN ON-SITE MEETING WITH THE OWNER AND LANDSCAPE ARCHITECT TO REVIEW THE FINAL GRADES AND PAVING LAYOUT INTENT AFTER SETTING GRADES WITH STRING LINES AND PRIOR TO INSTALLING PAVERS.
5. PAVING GRADES MUST COMPLY WITH ALL APPLICABLE ACCESSIBILITY STANDARDS, INCLUDING ADA.

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MC PROJECT # FP24-0021 / BUILDING # 206

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Drawing
LAYOUT PLAN

L-202

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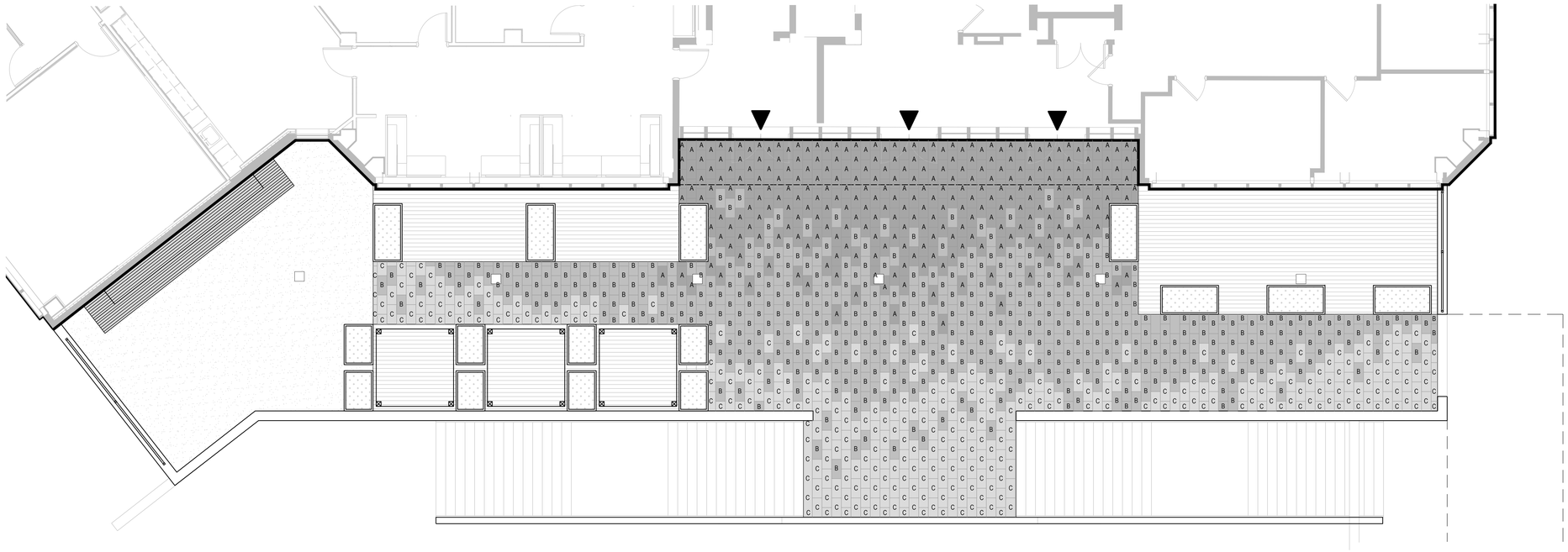
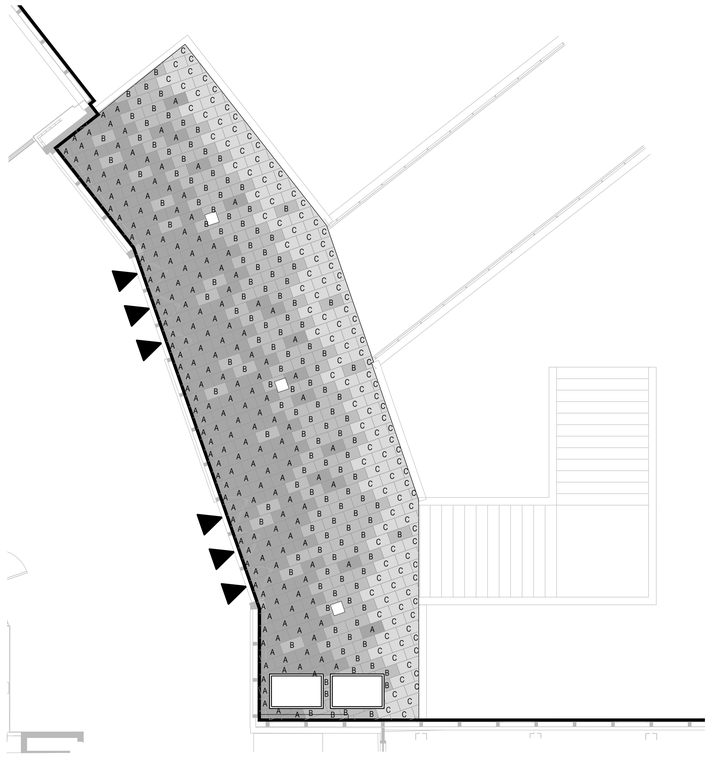


01 CONCRETE UNIT PAVER LAYOUT - TERRACE 1

3/16" = 1'-0"



02 CONCRETE UNIT PAVER LAYOUT - TERRACE 2

3/16" = 1'-0"

LEGEND

- CONCRETE UNIT PAVER - TYPE A
- CONCRETE UNIT PAVER - TYPE B
- CONCRETE UNIT PAVER - TYPE C

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PAVING LAYOUT

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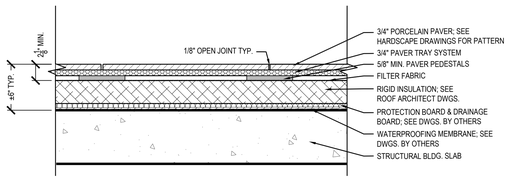
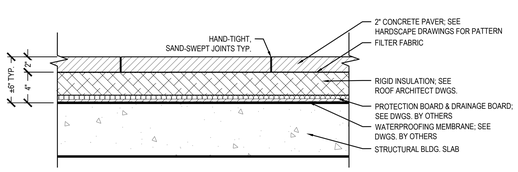


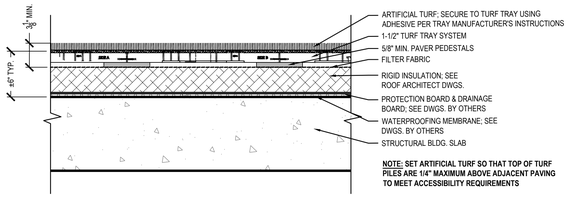
01 PORCELAIN PAVER

L-300 | 1-1/2" = 1'-0"



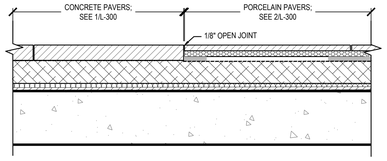
02 CONCRETE PAVER

L-300 | 1-1/2" = 1'-0"



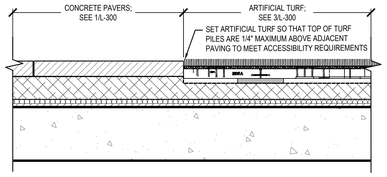
03 ARTIFICIAL TURF

L-300 | 1-1/2" = 1'-0"



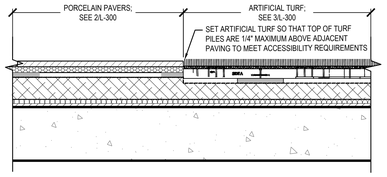
04 TRANSITION DETAIL - CONCRETE PAVER TO PORCELAIN PAVER

L-300 | 1-1/2" = 1'-0"



05 TRANSITION DETAIL - CONCRETE PAVER TO ARTIFICIAL TURF

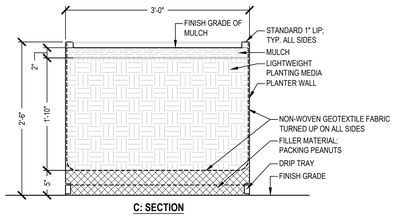
L-300 | 1-1/2" = 1'-0"



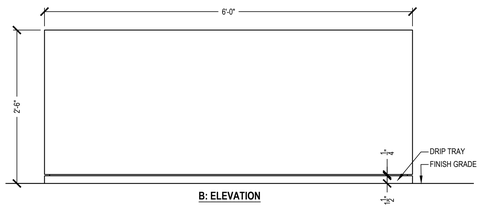
06 TRANSITION DETAIL - PORCELAIN PAVER TO ARTIFICIAL TURF

L-300 | 1-1/2" = 1'-0"

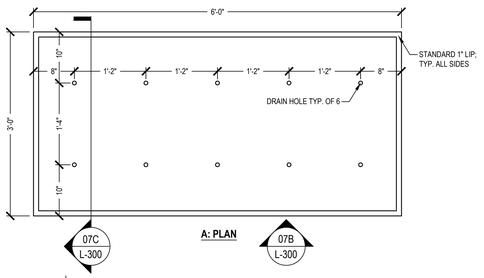
SPECIFICATION:
MANUFACTURER: GREEN THEORY (844-747-9283)
PRODUCT NAME: STOCK TROUGH
SIZE: 6'-0" L X 3'-0" W X 2'-6" H (CUSTOM DIMENSIONS)
MATERIAL: ALUMINUM
FINISH: POWDERCOAT (COLOR TO-BE-DETERMINED)



C: SECTION



B: ELEVATION

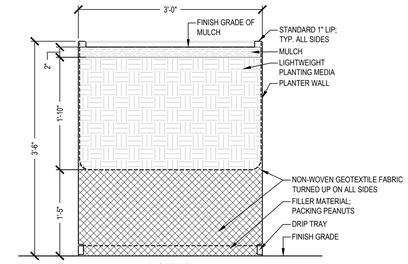


A: PLAN

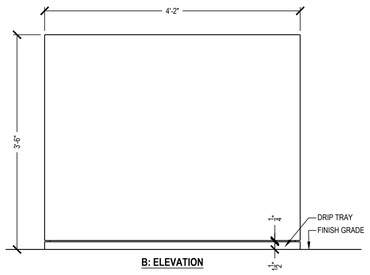
07 RECTANGULAR PLANTER TYPE A

L-300 | 1" = 1'-0"

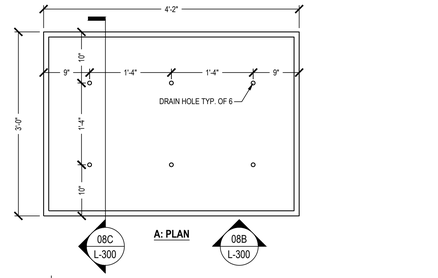
SPECIFICATION:
MANUFACTURER: GREEN THEORY (844-747-9283)
PRODUCT NAME: STOCK TROUGH
SIZE: 4'-2" L X 3'-0" W X 3'-6" H (CUSTOM DIMENSIONS)
MATERIAL: ALUMINUM
FINISH: POWDERCOAT (COLOR TO-BE-DETERMINED)



C: SECTION



B: ELEVATION

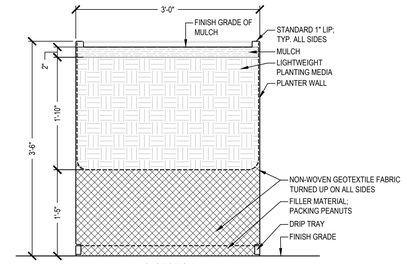


A: PLAN

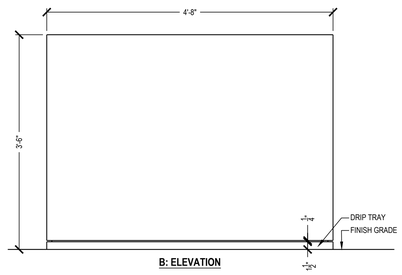
08 RECTANGULAR PLANTER TYPE B

L-300 | 1" = 1'-0"

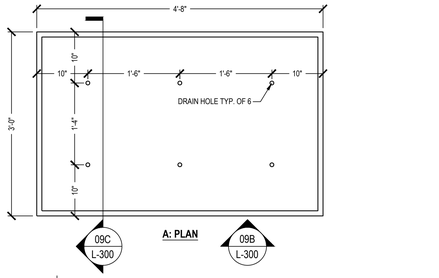
SPECIFICATION:
MANUFACTURER: GREEN THEORY (844-747-9283)
PRODUCT NAME: STOCK TROUGH
SIZE: 4'-8" L X 3'-0" W X 3'-6" H (CUSTOM DIMENSIONS)
MATERIAL: ALUMINUM
FINISH: POWDERCOAT (COLOR TO-BE-DETERMINED)



C: SECTION



B: ELEVATION



A: PLAN

09 RECTANGULAR PLANTER TYPE C

L-300 | 1" = 1'-0"

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MC PROJECT # FP24-0021 / BUILDING # 206

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LANDSCAPE ARCHITECTURE
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INTERIOR DESIGN

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Drawn By:	SM
Checked By:	PW
Sheet Issue Date:	08/29/2025

Drawing
SITE DETAILS

L-300

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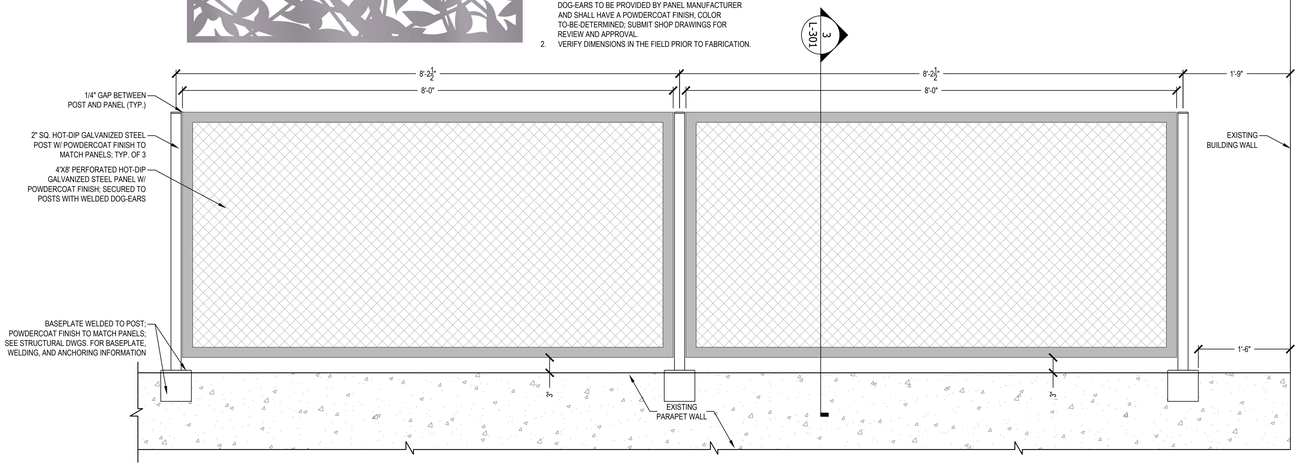
PANEL SPECIFICATION:
MANUFACTURER: ARTISAN PANELS (714-351-3234)
PATTERN: 81 - BRANCHES & LEAVES (SHOWN ABOVE)
SIZE: 4'-0" X 8'-0"
MATERIAL: HOT-DIP GALVANIZED STEEL
FINISH: POWDERCOAT (COLOR TO-BE-DETERMINED)

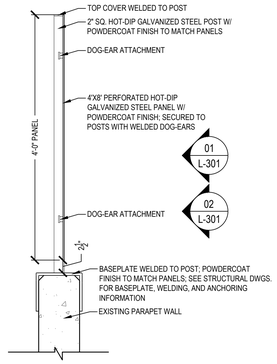
NOTES:
1. PANELS AND POSTS WITH WELDED BASEPLATES AND DOG-EARS TO BE PROVIDED BY PANEL MANUFACTURER AND SHALL HAVE A POWDERCOAT FINISH, COLOR TO-BE-DETERMINED; SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL.
2. VERIFY DIMENSIONS IN THE FIELD PRIOR TO FABRICATION.



01 DECORATIVE SCREEN PANEL A - FRONT ELEVATION
L-301 | 1" = 1'-0"

Decorative panels "side" mounted to post with welded dog-ears

INSTALLATION METHOD

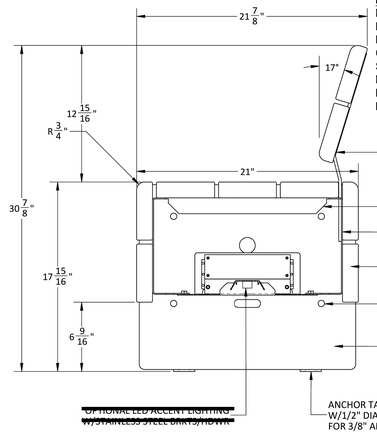


03 DECORATIVE SCREEN PANEL A & B - SECTION
L-301 | 1" = 1'-0"

PANEL SPECIFICATION:
MANUFACTURER: ARTISAN PANELS (714-351-3234)
PATTERN: 81 - BRANCHES & LEAVES (SHOWN ABOVE)
SIZE: 4'-0" X 6'-0"
MATERIAL: HOT-DIP GALVANIZED STEEL
FINISH: POWDERCOAT (COLOR TO-BE-DETERMINED)

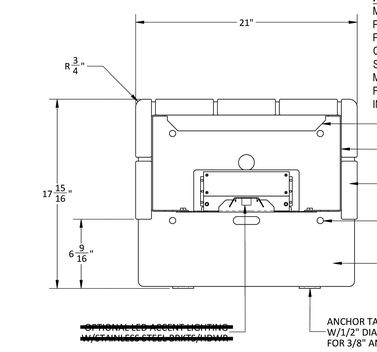
NOTES:
1. PANELS AND POSTS WITH WELDED BASEPLATES AND DOG-EARS TO BE PROVIDED BY PANEL MANUFACTURER AND SHALL HAVE A POWDERCOAT FINISH, COLOR TO-BE-DETERMINED; SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL.
2. VERIFY DIMENSIONS IN THE FIELD PRIOR TO FABRICATION.

02 DECORATIVE SCREEN PANEL B - FRONT ELEVATION
L-301 | 1" = 1'-0"



PANEL SPECIFICATION:
MANUFACTURER: TOURNESOL (877-479-1963)
PRODUCT: CAMINO BACKED BENCH, STRAIGHT, STANDALONE
PRODUCT CODE: CB-90-0 (BENCH) & CBK-90-0 (BACK, STRAIGHT, NO ARMRESTS)
QUANTITY: 1
SIZE: 92"L X 21"W X 18"H (BENCH) & 89L X 5"W X 13"H (BACK)
MATERIAL: STEEL (FRAME) & THERMALLY-MODIFIED HARDWOOD (SLATS)
FINISH: POWDERCOAT (FRAME); COLOR TO-BE-DETERMINED
INSTALLATION: FREESTANDING

04 BACKED BENCH
L-301 | 2" = 1'-0"



PANEL SPECIFICATION:
MANUFACTURER: TOURNESOL (877-479-1963)
PRODUCT: CAMINO BACKLESS BENCH, STRAIGHT, 1 JOINER
PRODUCT CODE: CB-90-1 (BENCH)
QUANTITY: 2
SIZE: 92"L X 21"W X 18"H (BENCH)
MATERIAL: STEEL (FRAME) & THERMALLY-MODIFIED HARDWOOD (SLATS)
FINISH: POWDERCOAT (FRAME); COLOR TO-BE-DETERMINED
INSTALLATION: FREESTANDING

05 BACKLESS BENCH
L-301 | 2" = 1'-0"

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MC PROJECT # FP24-0021 / BUILDING # 206

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INTERIOR DESIGN

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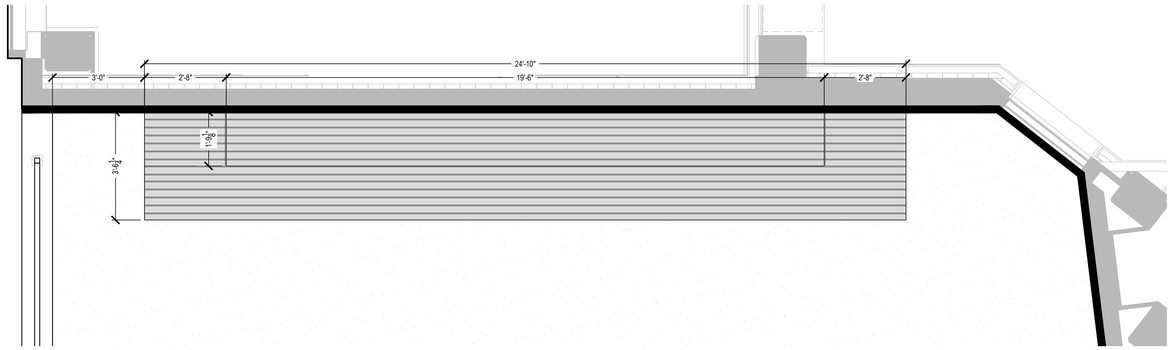
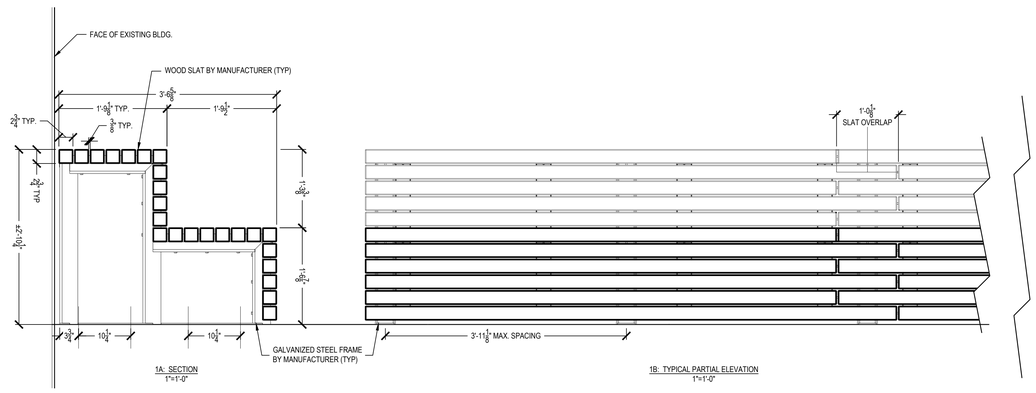
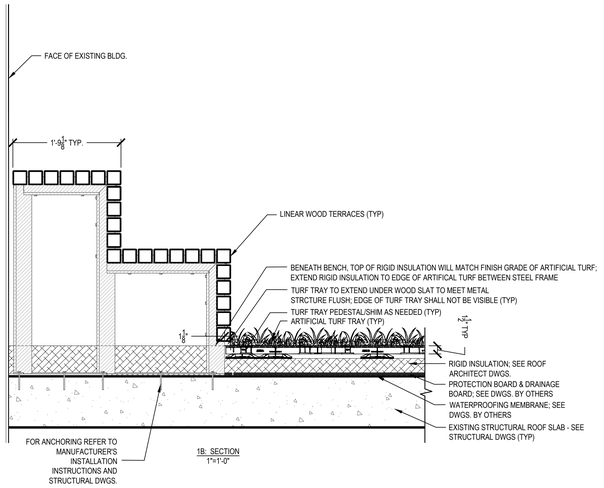
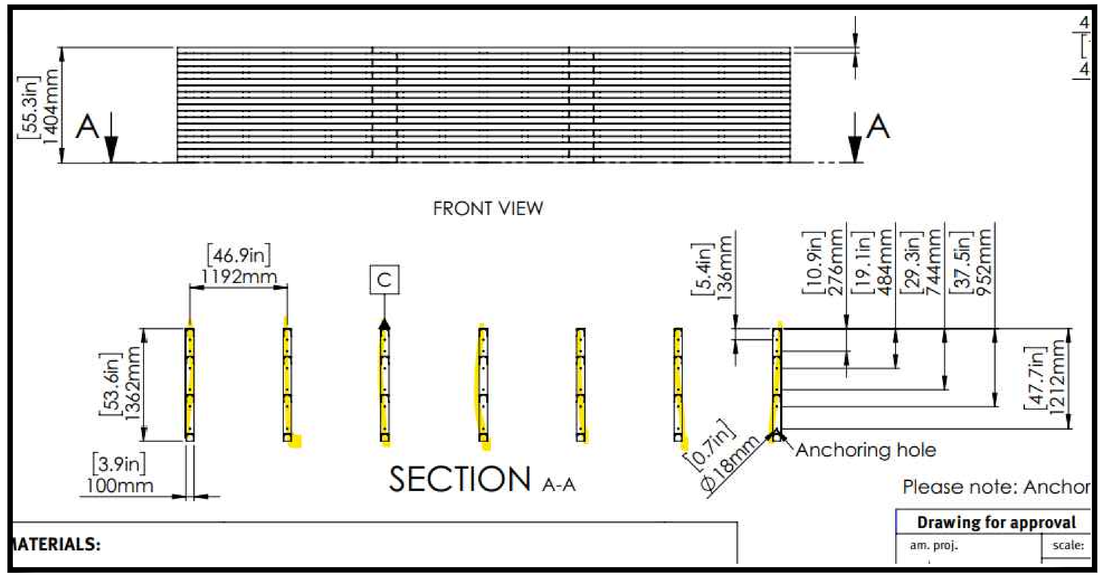


PLAN
$\frac{3}{4}$" = 1'-0"



NOTES:
1. INSTALLATION PER MANUFACTURER'S RECOMMENDATION.
2. WOOD TO BE ACOYA PER MANUFACTURER'S RECOMMENDATION.
3. PROVIDE POWDER COATED METAL END PANELS - QTY: 2.
4. LOCATION OF WOOD SLAT OVERLAP PER MANUFACTURER'S RECOMMENDATION. MAXIMUM SLAT LENGTH 112.2"/9.35'.
5. PROVIDE SHOP DRAWINGS FOR APPROVAL BY LANDSCAPE ARCHITECT.





MANUFACTURER'S DETAIL CUT SHEET IS FOR REFERENCE ONLY. REFER TO DRAWINGS FOR ACTUAL PRODUCT SPECIFICATIONS AND DIMENSIONS

01 LINEAR WOOD TERRACE
L-302 | 1" = 1'-0"

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SITE DETAILS

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E D C B A

1 2 3 4 5 6

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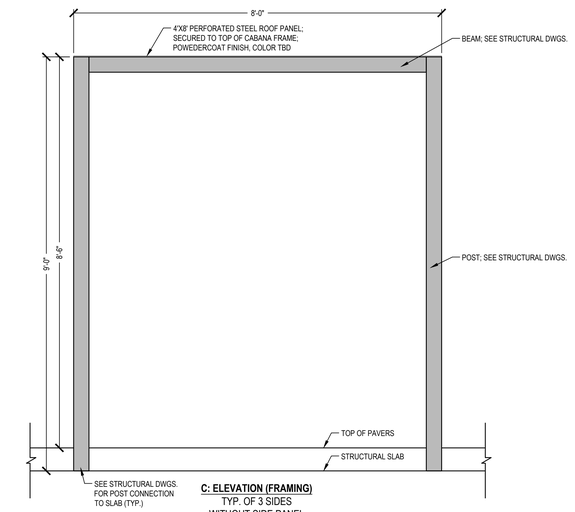
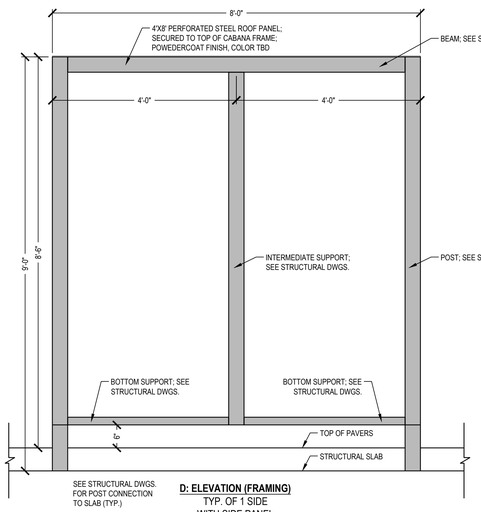
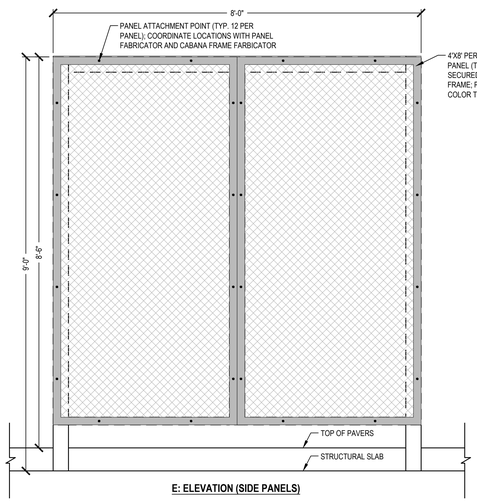


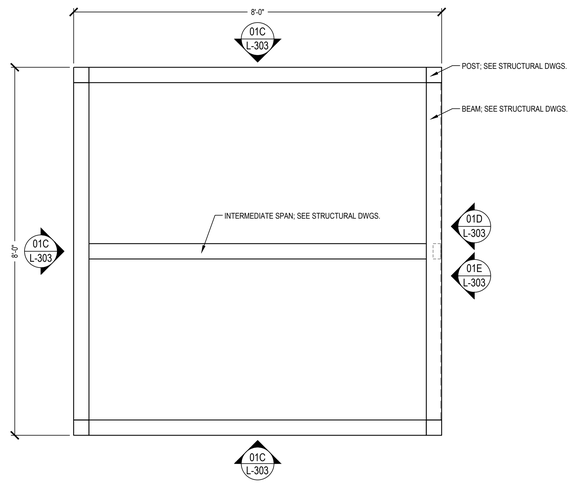
C: ELEVATION (FRAMING)
TYP. OF 3 SIDES
WITHOUT SIDE PANEL



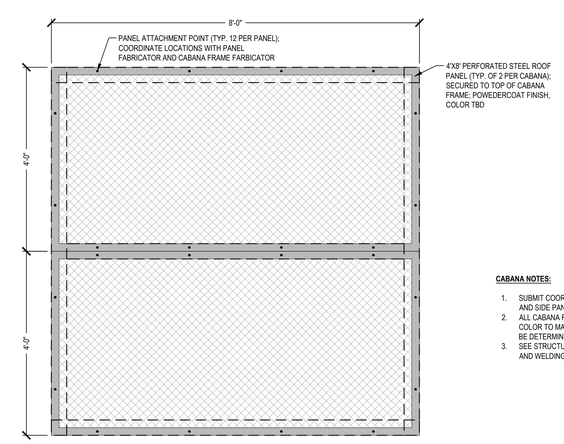
D: ELEVATION (FRAMING)
TYP. OF 1 SIDE
WITH SIDE PANEL



E: ELEVATION (SIDE PANELS)



A: PLAN (FRAMING)



B: PLAN (ROOF PANELS)

SPECIFICATION:

MANUFACTURER:	ARTISAN PANELS (714-351-3234)
PATTERN:	81 - BRANCHES & LEAVES (SHOWN ABOVE)
SIZE:	4'-0" X 8'-0"
MATERIAL:	HOT DIPPED GALVANIZED STEEL
FINISH:	POWDERCOAT (COLOR TO-BE-DETERMINED)

E: ROOF PANEL & SIDE PANEL SPECIFICATION

CABANA NOTES:

1. SUBMIT COORDINATED SHOP DRAWINGS FOR CABANA FRAMING, ROOF PANELS, AND SIDE PANELS SHOWING ALL ATTACHMENT TYPES AND LOCATIONS.
2. ALL CABANA FRAMING ELEMENTS SHALL RECEIVE HIGH-PERFORMANCE COATING; COLOR TO MATCH COLOR OF POWDERCOATED ROOF AND SIDE PANELS - COLOR TO BE DETERMINED
3. SEE STRUCTURAL DWGS. FOR CABANA FABRICATION, ATTACHMENT, ANCHORING, AND WELDING INFORMATION AND DETAILS.

01 CABANA
L-303 | 3/4" = 1'-0"

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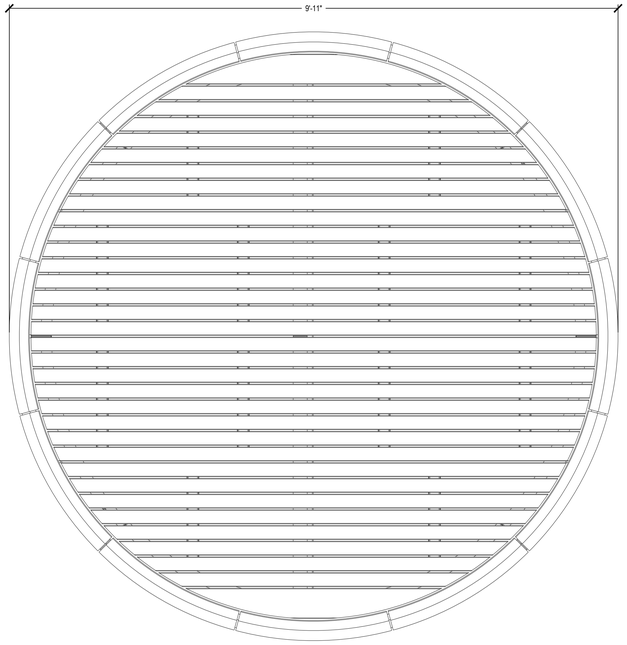
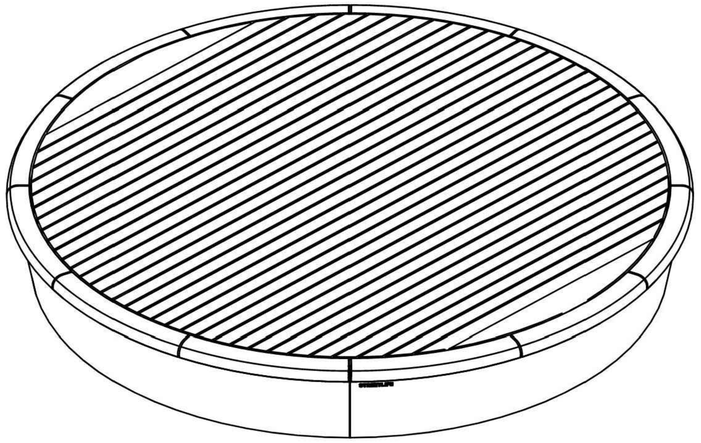


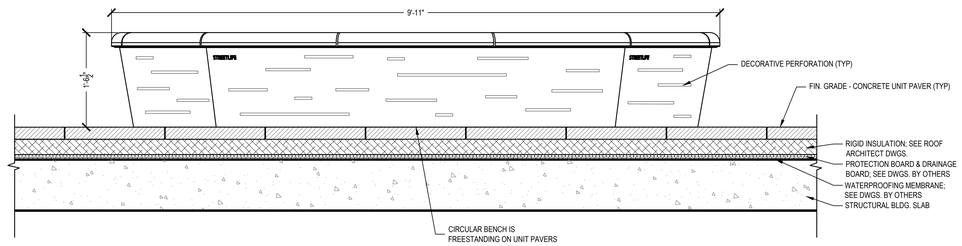
FRONT SIDE (FACING STAIRS)

PLAN
1"=1'-0"



AXONOMETRIC VIEW

PRODUCT PHOTO



SECTION/ELEVATION
1"=1'-0"

01 **CIRCULAR BENCH**

L-304 **1" = 1'-0"**

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INTERIOR DESIGN

CHRIS SCHEIN MD LICENSE NO 694

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Drawing
SITE DETAILS

L-304

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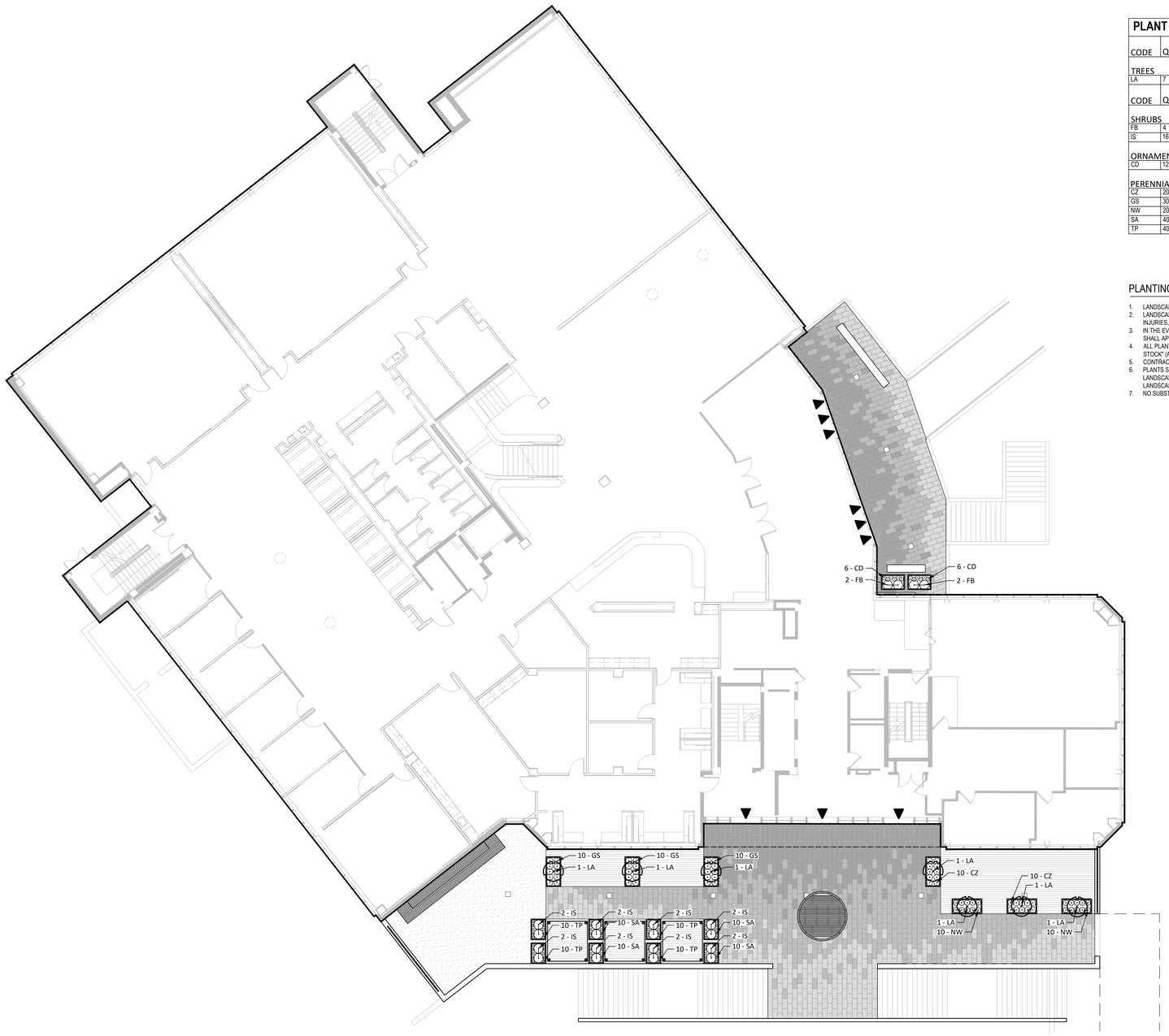

PLANT SCHEDULE

CODE	QTY	BOTANICAL / COMMON NAME	CONT	SIZE		REMARKS
TREES						
LA	7	LAGERSTROEMIA INDICA X FAURIEI 'HOPI' / HOPI CRAPE MYRTLE	B&B	5' HT MIN		MATCHING, 4 TO 6 CANES
CODE	QTY	BOTANICAL / COMMON NAME	CONT	SIZE	SPACING	REMARKS
SHRUBS						
FB	4	FOTHERGILLA X INTERMEDIA 'BLUE SHADOW' / BLUE SHADOW FOTHERGILLA	-	24" HT MIN	24" o.c.	
IS	16	ILEX CRENATA 'SOFT TOUCH' / SOFT TOUCH JAPANESE HOLLY	-	18" HT MIN	24" o.c.	
ORNAMENTAL GRASSES						
CD	12	CAREX OSHIMENSIS 'FEATHER FALLS' / FEATHER FALLS JAPANESE SEDGE	2 GAL		10" o.c.	
PERENNIALS						
CZ	20	COREOPSIS VERTICILLATA 'ZAGREB' / ZAGREB TICKSEED	1 GAL		15" o.c.	
GS	30	GAURA LINDHEIMERI 'SO WHITE' / SO WHITE GAURA	1 GAL		15" o.c.	
NW	20	NEPETA X FAASSENII 'WALKER'S LOW' / WALKER'S LOW CATMINT	1 GAL		15" o.c.	
SA	40	SEDUM RUPESTRE 'ANGELINA' / ANGELINA STONECROP	1 GAL		6" o.c.	
TP	40	THYMUS PSEUDOLANUGINOSUS / WOOLLY THYME	1 GAL		6" o.c.	

PLANTING NOTES:

1. LANDSCAPE ARCHITECT TO APPROVE GENUS, SPECIES, VARIETY, CULTIVAR, SIZE AND QUALITY OF ALL PLANT MATERIAL PRIOR TO INSTALLATION.
2. LANDSCAPE ARCHITECT RETAINS THE RIGHT TO OBSERVE TREES AND SHRUBS FOR SIZE AND CONDITION OF BALLS AND ROOTS SYSTEMS, PESTS, DISEASE SYMPTOMS, INJURIES, AND LATENT DEFECTS AND TO REJECT UNSATISFACTORY OR DEFECTIVE MATERIAL AT ANY TIME DURING PROGRESS OF WORK.
3. IN THE EVENT OF A DISCREPANCY BETWEEN QUANTITIES SHOWN ON THE DRAWINGS AND QUANTITIES SHOWN ON THE PLANT LIST, THE QUANTITIES ON THE DRAWINGS SHALL APPLY. REPORT DISCREPANCIES TO THE LANDSCAPE ARCHITECT FOR CLARIFICATION PRIOR TO BIDDING.
4. ALL PLANTS SHALL CONFORM TO THE SIZES GIVEN IN THE PLANT LIST AND SHALL BE NURSERY GROWN IN ACCORDANCE WITH THE "AMERICAN STANDARD FOR NURSERY STOCK" (ANSI Z60.1), LATEST EDITION.
5. CONTRACTOR SHALL PROVIDE PHOTOGRAPHS OF PLANT MATERIAL FOR APPROVAL BY LANDSCAPE ARCHITECT AS REQUESTED.
6. PLANTS SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. PRIOR TO PLANTING, THE CONTRACTOR SHALL LOCATE ALL PLANTS IN THE FIELD FOR REVIEW BY THE LANDSCAPE ARCHITECT. LANDSCAPE ARCHITECT SHALL MAKE ADJUSTMENTS IN THE FIELD AS NECESSARY. ALL FINAL PLANT LOCATIONS ARE TO BE APPROVED BY THE LANDSCAPE ARCHITECT. FOR LAYOUT REVIEW, CONTRACTOR SHALL NOTIFY LANDSCAPE ARCHITECT A MINIMUM OF ONE WEEK IN ADVANCE.
7. NO SUBSTITUTIONS SHALL BE MADE WITHOUT WRITTEN CONSENT OF THE LANDSCAPE ARCHITECT.

01 PLANTING PLAN

10' = 1'-0"

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MONTGOMERY COLLEGE
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ROCKVILLE, MD 20850
MC PROJECT # FP24-0021 / BUILDING # 206

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PLANTING PLAN

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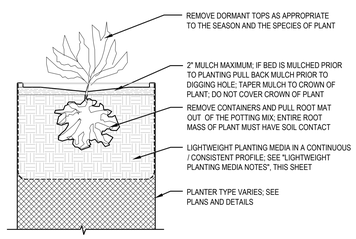
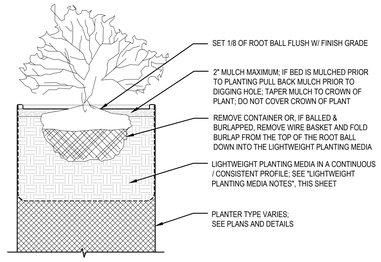


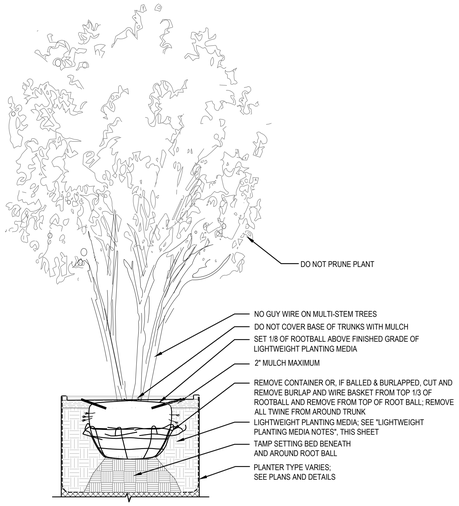
01 PERENIAL & ORNAMENTAL GRASS PLANTING DETAIL

3/4" = 1'-0"



02 SHRUB PLANTING DETAIL

3/4" = 1'-0"



03 MULTI-STEM TREE PLANTING DETAIL

3/4" = 1'-0"

LIGHTWEIGHT PLANTING MEDIA NOTES:

1. LIGHTWEIGHT PLANTING MEDIA DEFINITION: MANUFACTURERD, LIGHTWEIGHT SOIL MIXTURE THAT PROMOTES GOOD GROWING CONDITIONS FOR SPECIFIC VARIETIES OF PLANTS.
2. BASIS OF DESIGN: STALITE ROOF GARDEN PLANTING MEDIA (INTENSIVE GREEN ROOF MEDIA); COMPONENTS INCLUDE 40% STALITE 5/16" EXPANDED SHALE, 20% STALITE FINES, 10% USGA ROOT ZONE SAND, 15% ORGANIC COMPOST, AND 15% PINE BARK FINES; DRY WEIGHT 63-65 PCF; SATURATED COMPACTED DRAINED WEIGHT: 78-80 PCF
3. SUBMITTALS: PRODUCT DATA AND PHYSICAL SAMPLE (MINIMUM 1 QUART IN SEALED PLASTIC BAG LABELED WITH CONTENT AND SOURCE) FOR LIGHTWEIGHT PLANTING MEDIA; SAMPLE SHALL BE TYPICAL OF THE LOTS OF GROWING MEDIA TO BE FURNISHED, PROVIDE AN ACCURATE REPRESENTATION OF TEXTURE AND COMPOSITION.
4. GENERAL CONDITION AT TIME OF PLANTING: FREE OF AGGREGATES 1/2 INCH OR LARGER IN ANY DIMENSION; FREE OF ROOTS, PLANTS, CLODS, POCKETS OF SAND; PAINT, BUILDING DEBRIS, OILS, SOLVENTS, ROOGING MATERIALS, AND OTHER EXTRANEOUS MATERIALS HARMFUL TO PLANT GROWTH; FREE OF WEEDS, DISEASE-CAUSING PLANT PATHOGENS, AND OTHER UNDESIRABLE ORGANISMS.
5. MINIMUM MEDIA WATER RETENTION: ASTM E 2399, 40% BY VOLUME FOR BASIC GROWING-MEDIUM MIXTURE AT MAXIMUM MEDIA DENSITY.
6. INSTALLATION: INSTALL ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
7. PLANTING: PERFORM PLANTING ACCORDING TO LIGHTWEIGHT PLANTING MEDIA MANUFACTURER'S WRITTEN INSTRUCTIONS; UNIFORMLY MOISTEN AN EXCESSIVELY DRY GROWING MEDIUM THAT IS TOO DUSTY OR UNWORKABLE.

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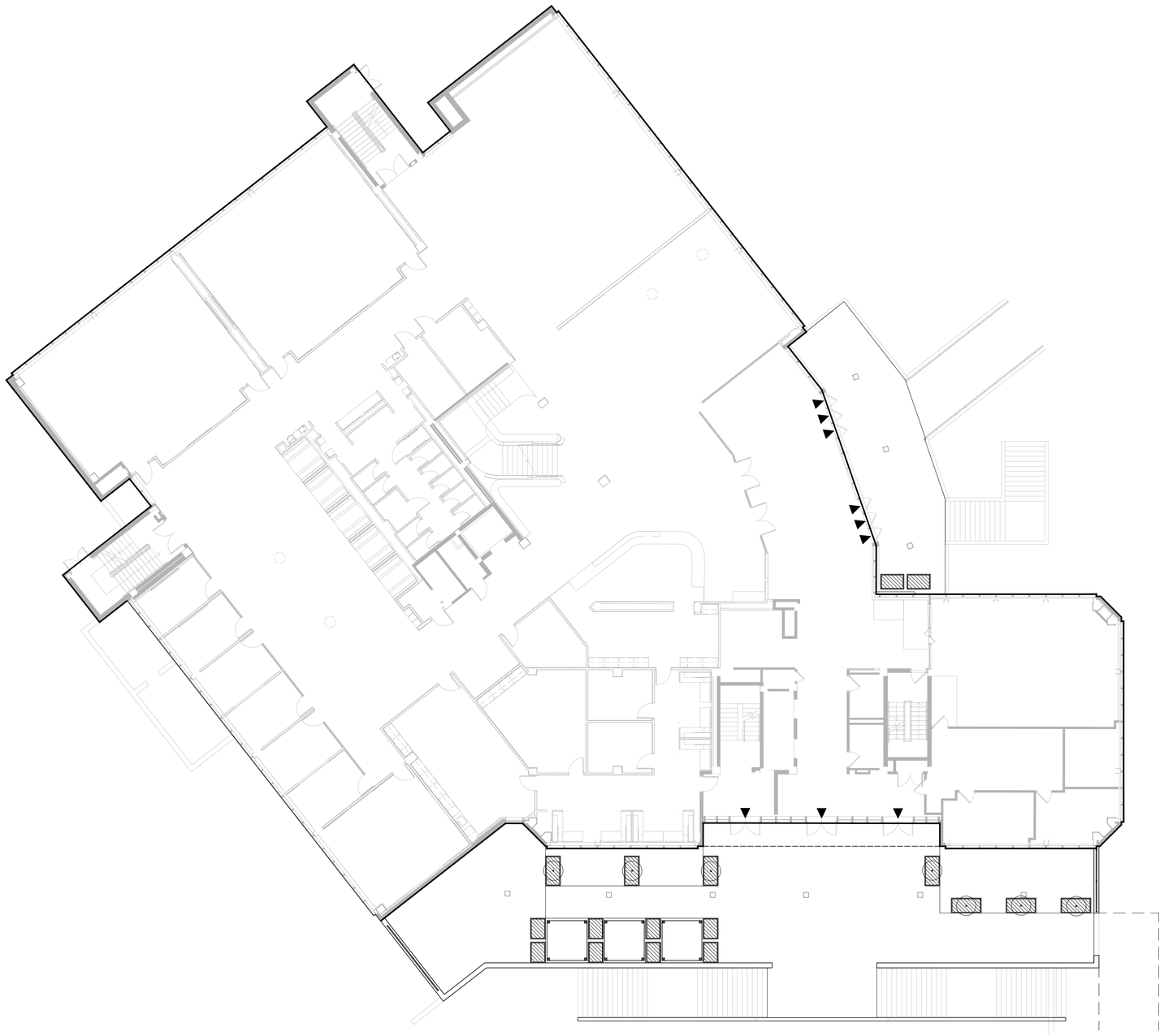

IRRIGATION KEY

DRIP IRRIGATION

IRRIGATION NOTES:

1. IRRIGATION SYSTEM SHALL INCLUDE HIGH-EFFICENCY EQUIPMENT AND CLIMATE-BASED CONTROLLERS
2. LANDSCAPE CONTRACTOR TO PROVIDE DESIGN AND INSTALLATION OF IRRIGATION SYSTEM, INCLUDING ALL PIPING, VALVES, SPRINKLERS, DRIP EQUIPMENT, CONTROLS AND WIRING FOR AUTOMATIC SYSTEM. PROVIDE PERMANENT IRRIGATION TO ALL RAISED PLANTERS. PROVIDE SHOP DRAWING SHOWING LAYOUT, LOCATION, AND MATERIAL SPECIFICATION OF ALL SYSTEM COMPONENTS.
3. PROVIDE PVC SLEEVES BELOW PAVING WHERE IRRIGATED AREAS ARE SEPARATED BY PAVING. FINAL LOCATIONS TO BE DETERMINED BASED ON IRRIGATION LAYOUT.
4. PROVIDE IRRIGATION TO ALL NEW RAISED PLANTERS WITH SUFFICIENT ZONES TO MAINTAIN EVEN WATER PRESSURE / COVERAGE TO ALL PLANTING.

01 IRRIGATION PLAN

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THE SQUARES ABOVE ARE SOLID: WITH BLACK AND WHITE LETTERS IF PRINTED CORRECTLY

A. CODES AND STANDARDS

1. Overall Design Codes
   a. Maryland Building Performance Standards 2021 – IBC 2021
   b. ICC IEBC-21 "International Existing Building Code"
   c. ASCE 7-16 "Minimum Design Loads and Associated Criteria for Buildings"
2. Concrete Construction
   a. ACI 301-16 "Specifications for Structural Concrete"
   b. ACI 315-18 "Detailing of Concrete Reinforcement"
   c. ACI 318-19 "Building Code Requirements for Structural Concrete"
3. Steel Construction
   a. AISC 15th Edition "Steel Construction Manual"
   b. AWS D1.1-2015 "Structural Welding Code – Steel"
   c. AWS D1.5-2020 "Bridge Welding Code"
4. General Standards
   a. ASTM American Society For Testing And Materials (Current Edition Per Section)
   b. UL Underwriters Laboratories (Current Edition Per Assembly)

B. PROJECT SCOPE

RENOVATION TO EXTERIOR TERRACES AT MACKLIN TOWER, MONTGOMERY COLLEGE ROCKVILLE CAMPUS

C. DESIGN LOADS

1. Risk category: II

2. Live loads
   - Exterior Terrace Areas: 100 psf
   - Interior Library: 150 psf
   - Flat roof: 30 psf (County code overrides ASCE 7)

3a. Material dead loads
   - Normalweight Concrete: 150 pcf
   - Structural Steel: 490 pcf

3b. Superimposed dead loads (sdl)
   - Typical Terrace Pavers: 25 psf
   - Floor above mechanical room: 30 psf

4. Snow loads
   - Ground snow load: pg = 30 psf (County code overrides ASCE 7)
   - Snow importance factor: I = 1.0
   - Snow exposure factor: Ce = 1.0
   - Snow thermal factor: Ct = 1.2
   - Flat roof snow load: pf = 26 psf
   - Snow drift / slope calculation: per ASCE 7 (in excess of flat roof live load)

   Design criterion – at each location, worst case of:
   a. Uniformly distributed 30 psf snow
   b. Calculated flat roof snow load plus drift / slope effects

5. Wind loads design data
   - Ultimate design wind speed: 115 mph (County code overrides ASCE 7)
   - Nominal design wind speed: 89 mph
   - Wind exposure: B
   - Internal pressure coeff.: +/- 0.18
   - Components & Cladding press. (based on 32 sf area)
   - Walls: 29 psf
   - Roofs: 49 psf

6. Earthquake load design data
   - Seismic import. Factor: 1.0
   - Seismic site class: D
   - Mapped spectral resp. acc.: Ss= 0.150 S1= 0.043 (County code overrides ASCE 7)
   - Design spectral response coeff.: Sds= 0.160 Sd1= 0.069
   - Seismic design category: B
   - Seismic force resist. System: Ordinary Reinforced Concrete Moment Frames
   - Response modification factor: R= 3
   - Seismic response coefficient: Cs= 0.054
   - Seismic analysis procedure: Equivalent lateral force

7. Governing lateral load for LFRS design: WIND

8. Serviceability:
   Floor deflections due to Live Loads are limited to L/360
   Roof deflections due to Live Loads are limited to L/240
   Perimeter beams deflections due to Live Loads are limited to 1/2 inch
   Building drifts due to wind are limited to H/400
   Drifts & Deflections due to wind are based on a 50 year MRI wind speed

9. No part of the building shall be used as a staging area resulting in a load (under the limited loaded area) that exceeds the design live load.

D. GENERAL

1. ALL DETAILS, SECTIONS & NOTES SHOWN ON DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR CONDITIONS ELSEWHERE UNLESS OTHERWISE INDICATED.
2. DO NOT SCALE DRAWINGS. WHERE BEAM / JOIST SPACINGS ARE NOT DIMENSIONED IT IS PERMISSIBLE TO ASSUME EQUAL SPACING BETWEEN DIMENSIONED POINTS. ANY ASSUMPTIONS MADE MUST BE HIGHLIGHTED ON SHOP DRAWINGS FOR REVIEW.
3. STRUCTURAL ELEMENTS SHOWN AT GRID LINES ARE INTENDED TO BE LOCATED ON THOSE GRID LINES U.O.N.
4. NO CHANGE IN SIZE, DIMENSIONS OR POSITION OF STRUCTURAL ELEMENTS SHALL BE MADE, NOR SHALL ANY OPENINGS OR SLEEVES BE PERMITTED THROUGH ANY STRUCTURAL ELEMENT WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER, UNLESS THEY ARE DETAILED AND SPECIFICALLY NOTED AS "CHANGES TO THE CONTRACT DOCUMENTS", ON THE (REVIEWED AND ACCEPTED) STRUCTURAL SHOP DRAWINGS OF THE AFFECTED ELEMENTS.
   PROVIDE SEPARATE SHOP DRAWINGS INDICATING ALL PENETRATIONS THROUGH THE STRUCTURAL ELEMENTS FOR APPROVAL BY THE STRUCTURAL ENGINEER PRIOR TO OR CONCURRENT WITH THE SUBMISSION OF THE SHOP DRAWINGS OF THE AFFECTED ELEMENTS.
5. REFER TO ARCHITECTURAL& M.E.P. DRAWINGS FOR LOCATIONS AND DIMENSIONS OF CHASES, INSERTS, OPENINGS, SLEEVES, DRIPS, REVEALS, FINISHES, DEPRESSIONS, PARTITIONS, DOORS, EXP. JOINT FILLER MATERIAL, EXTENT OF EXCAVATION, DEWATERING AND OTHER SUCH PROJECT REQUIREMENTS NOT SHOWN ON THE STRUCTURAL DRAWINGS.
6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE STARTING CONSTRUCTION AND/OR SUBMITTING SHOP DRAWINGS FOR APPROVAL. ANY DISCREPANCIES MUST BE REPORTED TO THE ARCHITECT.
7. THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO PROTECT EXISTING AND NEW UTILITIES AND SHALL ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE DURING CONSTRUCTION.
8. THE CONTRACTOR IS SOLELY AND COMPLETELY RESPONSIBLE FOR THE SAFETY AT THE JOB SITE AND SHALL COMPLY WITH THE DEPARTMENT OF LABOR SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION PROMULGATED UNDER THE OCCUPATIONAL SAFETY AND HEALTH ACT.
9. THE CONTRACTOR SHALL DESIGN, PROVIDE AND MAINTAIN ANY TEMPORARY SHORING AND BRACING NECESSARY TO PROPERLY AND SAFELY CONSTRUCT THE BUILDING AND UNDERGROUND UTILITIES. TEMPORARY SHORING AND BRACING MUST REMAIN IN PLACE UNTIL STRUCTURAL MEMBERS AFFECTED ARE PROPERLY CURED, ALIGNED, AND CONNECTED (AS APPLICABLE).THE CONTRACTOR IS SOLELY AND COMPLETELY RESPONSIBLE FOR SEQUENCING AND SITE COORDINATION. THIS ALSO INCLUDES TIMELY NOTIFICATION AND PROVIDING ACCESS FOR ANY REQUIRED INSPECTIONS.
10. THE SIZE OF SEVERAL EXISTING STRUCTURAL ELEMENTS COULD NOT BE CONFIRMED AT THE TIME OF THE DESIGN. THESE STRUCTURAL DOCUMENTS HAVE BEEN PREPARED BASED ON REASONABLE ASSUMPTIONS THAT ARE LISTED ON THE DRAWINGS. THE CONTRACTOR MUST VERIFY THESE ASSUMPTIONS PRIOR TO PROCEEDING WITH THE CONSTRUCTION OF THE NEW WORK. ANY DISCREPANCIES MUST BE REPORTED TO THE ARCHITECT.
11. EXISTING STRUCTURAL ELEMENTS HAVE NOT BEEN CHECKED TO CONFIRM THAT THEY CAN SUPPORT THE CODE SPECIFIED LOADS, EXCEPT THOSE THAT ARE DIRECTLY AFFECTED AND LOADED BY THE ADDITION AND RENOVATION SCOPE OF WORK INDICATED IN THESE STRUCTURAL DRAWINGS.

E. DEMOLITION

1. THE CONTRACTOR IS FULLY RESPONSIBLE FOR MEANS AND METHODS OF DEMOLITION, INCLUDING THE INTEGRITY AND STABILITY OF THE EXISTING STRUCTURE DURING DEMOLITION OPERATIONS.
2. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRS TO ANY STRUCTURAL ELEMENTS NOT INTENDED TO BE DEMOLISHED THAT HAVE BEEN DAMAGED DURING THE DEMOLITION PROCESS. THESE REPAIRS SHALL BE AT NO ADDITIONAL COST TO THE OWNER. ALL REPAIR WORK SHALL BE DESIGNED AND INSPECTED BY A LICENSED PROFESSIONAL ENGINEER IN THE PROJECT'S JURISDICTION. REPAIR MEASURES MUST BE SUBMITTED TO THE DESIGN TEAM FOR REVIEW PRIOR TO COMMENCEMENT OF REPAIR WORK.
3. ALL ELEMENTS NOT SPECIFICALLY NOTED TO BE DEMOLISHED SHALL REMAIN IN THEIR CURRENT CONDITION.
4. ALL EXISTING FRAMING IS INDICATED FOR REFERENCE ONLY AND SHALL BE VERIFIED IN FIELD BY THE CONTRACTOR. DETERMINE EXACT NATURE AND EXTENT OF DEMOLITION ON SITE BY COMPARING EXISTING CONSTRUCTION TO CONTRACT DOCUMENT REQUIREMENTS, AND REPORT ANY DISCREPANCIES TO THE DESIGN TEAM.
5. THE CONTRACTOR SHALL USE QUALIFIED, EXPERIENCED PERSONNEL FOR DEMOLITION AND REMOVAL OPERATIONS. PERFORM ALL DEMOLITION AND REMOVAL IN A CAREFUL AND ORDERLY MANNER.
6. DO NOT PERMIT UNCONTROLLED FALL OF DEBRIS OR PORTIONS OF THE STRUCTURE SCHEDULED FOR REMOVAL. ALL WASTE REMOVAL MUST BE HANDLED TO AVOID IMPACT LOADING ON ADJACENT OR LOWER STRUCTURAL ELEMENTS.
7. PRIOR TO THE START OF WORK, VERIFY THAT SCOPE OF DEMOLITION INDICATED ON CONTRACT DOCUMENTS DOES NOT DAMAGE, CUT, OR DISRUPT SERVICES OR UTILITIES NOTED TO REMAIN IN OPERATION. VERIFY THAT ANY SERVICES OR UTILITIES TO BE REMOVED HAVE BEEN PROPERLY CAPPED / DISCONNECTED PRIOR TO REMOVAL.
8. WHERE NEW OPENINGS IN EXISTING CONCRETE SLABS OR WALLS ARE TO BE CUT, CORE HOLES AT CORNERS OF THE NEW OPENING AND CONNECT HOLES WITH SAW CUTS. DO NOT PERFORM SAW CUTS PRIOR TO INSTALLATION OF ALL REQUIRED NEW STRUCTURAL FRAMING AND/OR REINFORCING NOTED ON THE PLAN / SECTION. SAW CUTTING SHALL BE PERFORMED IN STRAIGHT LINES ONLY, AND SHALL NOT EXTEND PAST THE BOUNDARIES OF THE NEW OPENING.
9. IF ELEMENTS ARE NOT SPECIFICALLY NOTED FOR DEMOLITION ON STRUCTURAL DRAWINGS, REVIEW DEMOLISHED ELEMENTS CAREFULLY DURING OPERATIONS. IF SIGNS OF STRUCTURAL UTILITY ARE OBSERVED, STOP DEMOLITION OPERATIONS IMMEDIATELY, SHORE THE AFFECTED ELEMENTS, AND CONSULT DESIGN TEAM FOR FURTHER DIRECTION. SIGNS OF STRUCTURAL UTILITY INCLUDE BUT ARE NOT LIMITED TO EMBEDDED ANCHOR BOLTS, STEEL REINFORCING IN CONCRETE OR MASONRY ELEMENTS, EMBEDDED STEEL SHAPES WITHIN NON-STRUCTURAL MATERIALS, AND ANY EXCESSIVE MOVEMENT / CRACKING OF ELEMENTS ABOVE.

F. CONCRETE AND REINFORCING STEEL

1. ALL CONCRETE SHALL BE CONTROLLED CONCRETE, NORMAL WEIGHT WITH 5000 PSI COMPRESSIVE STRENGTH UON.
2. ALL CONCRETE SHALL INCLUDE REINFORCEMENT. IF REINFORCEMENT IS NOT SPECIFICALLY INDICATED ON THE DRAWING VERIFY WITH THE STRUCTURAL ENGINEER.
3. REINFORCEMENT NOTED SHALL BE 60 KSI CONFORMING TO ASTM A615 UON.
4. COMPLY WITH ACI 301 FOR PLACEMENT OF CONCRETE. COMPLY WITH HOT-WEATHER PLACEMENT SPECIFICATIONS IN ACI 305.1. COMPLY WITH COLD-WEATHER PLACEMENT SPECIFICATIONS IN ACI 306.1.
5. REPAIR ANY DAMAGED CONCRETE USING AN APPROPRIATE PRE-MIXED REPAIR MORTAR WITH 28-DAY STRENGTH NO LESS THAN 1000 PSI GREATER THAN THE MIX BEING REPAIRED. CUT ALL REPAIR AREAS SQUARE TO A MINIMUM DEPTH OF 1/2" AND REMOVE ANY LOOSE CONCRETE PRIOR TO REPAIRING.
6. DOWELS SHALL MATCH SIZE AND SPACING OF MAIN REINFORCEMENT, UON.
7. UON ON STRUCTURAL DRAWINGS, PROVIDE MINIMUM CONCRETE PROTECTION FOR REINFORCING, AS FOLLOWS:
   CAST AGAINST EARTH:3"
   EXPOSED TO EARTH OR WEATHER
   #5 AND SMALLER BARS AND WWF:1-1/2"
   #6 AND LARGER BARS:2"
   NOT EXPOSED TO EARTH OR WEATHER
   SLABS AND WALLS:3/4"
   COLUMNS, PEDESTALS, BEAMS:1-1/2"
8. ALL WELDED WIRE FABRIC SHALL BE PROVIDED IN FLAT SHEETS ONLY, WITH SPLICES LAPPED 6" AND LACED WITH WIRE.

G. STRUCTURAL STEEL.

1. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING ASTM SPECIFICATIONS:
   W SHAPES: ASTM A992 (FY=50 KSI)
   CHANNELS, ANGLES & PLATES: ASTM A36
   HOLLOW STRUCTURAL SECTIONS: ASTM A500 GRADE C.
   SUBSITUTION WITH HIGHER STRENGTH MATERIAL IS PERMITTED.
   MILL TEST REPORTS FOR ALL ELEMENTS MUST BE SUBMITTED TO THE COTR FOR RECORD.
2. HIGH STRENGTH STEEL BOLTS SHALL CONFORM TO ASTM F3125. NUTS AND WASHERS SHALL CONFORM TO ASTM A563 AND F436.
3. ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GRADE 36 UON.
4. BOLTS USED SHALL NOT BE SMALLER THAN 3/4" IN DIAMETER. (spec)
5. THE MINIMUM PLATE THICKNESS SHALL BE ¼" (U.O.N.),
   THE MINIMUM BOLT DIAMETER SHALL BE ¾" (U.O.N.)
   THE MINIMUM WELD THROAT SHALL BE 3/16" (U.O.N.)
6. WELDING ELECTRODES SHALL CONFORM TO AWS E70XX. WELDING PROCEDURES SHALL CONFORM TO APPLICABLE AWS D1 STANDARDS. WELDS PERMANENTLY EXPOSED TO WEATHER SHALL COMPLY WITH AWS D1.5.
7. ALL STRUCTURAL STEEL NOT RECEIVING SPRAY-ON FIREPROOFING SHALL BE SHOP PAINTED WITH A RUST INHIBITIVE GRAY PRIMER. NO ASPHALTIC PAINT IS PERMITTED. ANY PAINT USED ON OTHER STEEL MUST BE COMPATIBLE WITH SPRAY-ON FIREPROOFING. ALL STEEL EXPOSED TO WEATHER OR NOT EXPOSED BUT IN A NON-CONDITIONED SPACE SHALL BE PROTECTED WITH A HIGH-PERFORMANCE COATING COMPLYING WITH SPECIFICATIONS.
8. FABRICATE BEAMS WITH THE NATURAL CAMBER UP.
9. SPLICING OF STRUCTURAL STEEL MEMBERS WHERE NOT DETAILED IS PROHIBITED.
10. ANY BOLTED CONNECTION INDICATED ON DRAWINGS CAN BE SUBSTITUTED WITH A WELDED ONE (SHOP OR FIELD) OF EQUAL CAPACITY IF BOLTING CLEARANCES REQUIRE SO. SUBSTITUTION SHALL BE AT NO EXTRA COST TO THE OWNER AND ONLY AFTER THE APPROVAL OF SER.
11. SEE ARCHITECTURAL DRAWINGS FOR STAIR AND RAILING LOCATIONS, CONFIGURATIONS AND DETAILS.
12. PROVIDE SHOP DRAWINGS FOR ALL STEEL ELEMENTS. SHOP DRAWING PREPARATION MUST BE UNDER THE SUPERVISION OF A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE JURISDICTION OF THE PROJECT LOCATION. SHOP DRAWING SUBMISSIONS MUST INCLUDE SEQUENCING OF ERECTION. INCLUDE 3D SHOP DRAWINGS FOR ALL STAIRS AND RAILING.

H. POST-INSTALLED ANCHORS AND REBARS

1. ASIDE FROM NOTED PRODUCTS BELOW, SUBSTITUTION REQUESTS WITH DETAILED SUPPORTING LITERATURE AND ICC-ES REPORTS MUST BE SUBMITTED FOR SER APPROVAL PRIOR TO PROCUREMENT. ACCEPTANCE OF SUBSTITUTION IS AT SER DISCRETION.
2. ALL ANCHORS AND REBARS INSTALLED IN HARDENED CONCRETE OR MASONRY CONSTRUCTION SHALL CONFORM TO THE FOLLOWING:
   A. REBARS SHALL BE EPOXY GROUTED USING ONE OF THE PRODUCTS BELOW. THE EMBEDMENT SHALL BE 'LTE' PER TABLE IN DOCUMENTS UON.
      I. HILTI HIT-RE-500-V3
      II. DEWALT PURE 110+
      III. ITW/REDHEAD C6+
   B. EPOXY ANCHORING SYSTEM IN CONCRETE SHALL BE ONE OF THE PRODUCTS BELOW, WITH EMBEDMENT OF 12 BAR DIAMETERS UON.
      I. HILTI HIT-HY-200
      II. DEWALT AC200+
      III. ITW/REDHEAD C6+.
   C. EPOXY ANCHORING SYSTEM IN SOLID GROUTED CMU OR CLAY MASONRY SHALL ONE OF THE PRODUCTS BELOW, WITH EMBEDMENT OF 12 BAR DIAMETERS UON. DO NOT ANCHOR TO HOLLOW CMU OR ACROSS UNMORTARED COLLAR JOINTS. USE SCREEN TUBES AS PER MANUFACTURER'S RECOMMENDATIONS.
      I. HILTI HIT-HY-270.
      II. DEWALT AC100+ GOLD
      III. ITW/REDHEAD A7+
   G. OTHER TYPES OF ANCHORS SHALL BE THE PRODUCT NOTED ON DRAWINGS. SUBSTITUTION MUST BE APPROVED BY SER.
3. FOR ALL EPOXY ANCHORS, STEEL ELEMENT SHALL BE CONTINUOUSLY THREADED ROD, COMPLYING WITH ASTM A36, A307, F1554-36, OR HILTI HAS-E. UON.
4. ALL ANCHORS MUST BE INSTALLED ACCORDING TO MANUFACTURER RECOMMENDATIONS, AS INCLUDED WITH THE ANCHOR PACKAGING.
5. ANCHORS HAVE BEEN DESIGNED FOR INSTALLATION IN HAMMER-DRILLED DRY HOLES UON. ANY OTHER INSTALLATION REQUIRES PRIOR APPROVAL FROM SER.

J. TESTING AND INSPECTIONS

A. THE OWNER MUST HIRE AN INDEPENDENT, QUALIFIED TESTING AND INSPECTION AGENCY TO PROVIDE INSPECTIONS AND MATERIAL TESTING AS REQUIRED BY THE APPLICABLE CODE.

B. THE ENGINEER MAY VISIT THE SITE TO GENERALLY OBSERVE THE CONSTRUCTION PROGRESS AND TO PROVIDE CONSTRUCTION ASSISTANCE. SUCH VISITS ARE NOT TO BE CONSTRUED AS MEETING THE INSPECTION REQUIREMENTS UNLESS THE ENGINEER STATES SO IN WRITING.

C. CAST AND TEST CYLINDERS AND CUBES OF ALL CONCRETE, MORTAR AND GROUT TO CONFIRM THE REQUIRED 28 DAY MINIMUM STRENGTH ACCORDING TO THE LATEST APPLICABLE ASTM SPECIFICATIONS.

D. ALL WELDS MUST BE VISUALLY INSPECTED. ANY FULL OR PARTIAL PENETRATION WELDS MUST BE 100% ULTRASONICALLY TESTED.

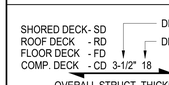
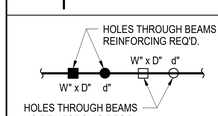
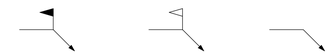
E. ALL CONCRETE AND MASONRY REINFORCING MUST BE INSPECTED IN PLACE PRIOR TO CONCRETE AND GROUT CASTING.

F. ALL STEEL FRAME ALIGNMENT AND PLUMBNESS MUST BE INSPECTED PRIOR TO FINAL BOLTING AND WELDING.

K. SUBMITTALS

1. SHOP DRAWINGS OF ALL STRUCTURAL ELEMENTS SHOWN ON THE CONTRACT DOCUMENTS MUST BE SUBMITTED BY THE CONTRACTOR FOR THE ENGINEER'S REVIEW.
2. FOR ALL ELEMENTS THAT REQUIRE DESIGN BY OR THE SUPERVISION OF A PROFESSIONAL ENGINEER, THE CONTRACTOR MUST SUBMIT A CERTIFICATION LETTER SIGNED AND SEALED BY THE PROFESSIONAL ENGINEER STATING THAT THE DESIGN AND DETAILING OF THE REFERENCED ELEMENTS MEET THE REQUIREMENTS OF THE CODE, APPLICABLE STANDARDS AND THE CONTRACT DOCUMENTS.
3. AT THE TIME THE SUBMITTAL IS SUBMITTED THE CONTRACTOR MUST INFORM THE ENGINEER IN WRITING OF ANY DEVIATIONS OR OMISSIONS FROM THE CONTRACT DOCUMENTS.
4. REPRODUCTION OF THE STRUCTURAL DOCUMENTS FOR USE AS SHOP DRAWINGS IS NOT PERMITTED.

SYMBOLS

SYMBOLS	DESCRIPTION
	LOCATION OF CONTROL JOINT IN WALL
	WELDED WIRE FABRIC
	VERTICAL LATERAL BRACING
	BEAM CONTINUOUS UNINTERRUPTED OVER/THRU COLUMN
	DECK TYPE / OVERALL DEPTH
	HOT DIP GALVANIZED
	MOMENT CONNECTION
	BEAM PENETRATION
	

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MC PROJECT # FP24-003 / BUILDING # 206
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GENERAL NOTES

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Schedule of Special Inspections – Macklin Library Renovation

Material / Activity	Description of Inspection	Y / N	Firm / Agent	Continuous	Periodic	Referenced Standard	IBC Reference
General							
Pre-Construction Conference	Meeting / Conference to discuss special inspections	Y			X		Ch. 17.
Concrete							
Adhesive anchors installed in hardened concrete	Field Inspection of type, size, location, installation procedure, etc.	Y		X		ACI 318	1705, Ch. 19.
Steel							
Fabricator's Quality Control	In-Plant inspection of quality control procedure and determination if Special Inspections at plant are required.	Y			X	AISC 360	1705.2
Material	Inspection of material certificates, identification markings for all shapes, plates, bolts, nuts, washers, etc.	Y			X	AISC 360, ASTM A6	1705, Ch. 22.
Bolted connections	Inspection of in-place size, assembly, configuration, tightening, tension indicators, etc.	Y			X	AISC 360	1705, Ch. 22.
Single pass fillet welds < 5/16"	Inspection and testing of in-place size, configuration, welding electrode, welder's certificate and ID, etc.	Y			X	AISC 360	1705, Ch. 22.
Multi-pass fillet, >5/16" fillet, all joint penetration & plug welds	Inspection and testing of in-place size, configuration, welding electrode, welder's certificate and ID, etc.	Y		X		AISC 360	1705, Ch. 22.
Steel Frame	Field Inspection of Size, Location, Orientation, Bearing, etc. of all steel elements and their connections.	Y			X	AISC 360	1705, Ch. 22.
Steel Frame alignment	Field Inspection of plumbness, levelness, camber, curvature, etc.	Y			X	AISC 360	1705, Ch. 22.
Structural details & connections	Field Inspection of structural details and connections.	Y			X	AISC 360	1705, Ch. 22.
Steel Deck	Field Inspection of size, profile, thickness, location, orientation, finish, etc.	Y			X	AISC 360	1705, Ch. 22.
Steel Deck Connections	Field Inspection of connectors' (screws, welds, etc.) type, size, location, spacing, finish, etc.	Y			X	AISC 360	1705, Ch. 22.
Notes / Definitions:							
1. "Continuous" Inspection - Full-time special inspection while the work is being executed							
2. "Periodic" Inspection – Part-time or Intermittent special inspection where the work has been or being executed. 100% of the work / material must be inspected regardless the frequency of inspections, unless lesser is permitted by the specific material specifications.							
3. "SER" - Structural Engineer of Record							
4. All inspections must be made to verify compliance with Contract Documents and any notes made by the SER on the approved shop drawings							
5. All items listed under "Description of Inspections" above are minimum requirements. Additional items per code and standard practice shall be included.							
6. Refer to project specifications, in addition to code references, for inspection and testing frequency, techniques, etc.							
7. See architectural documents for extents and specifications for all fire-resistive assemblies.							

ABBREVIATIONS

AB	=	Anchor Bolt
BTW	=	Between
BF	=	Bottom Face
BOD	=	Basis of Design
BW	=	Both Ways
CA	=	Column Above
CFRP	=	Carbon-Fiber-Reinforced Polymer
CJ	=	Control Joint
CL	=	Center Line
CLR	=	Clearance, Clear
CSRT	=	Contractor Select Repair Type
db	=	Reinforcing Bar Diameter
DBA	=	Deformed Bar Anchor
DL	=	Dead Load
EA	=	Each
EE	=	Each End
EF	=	Each Face
EF	=	Effective
EL	=	Elevation
ES	=	Each Side
EW	=	Each Way
EX	=	Existing
FF	=	Finished Floor
FOW	=	Face Of Wall
FS	=	Far Side
Ga	=	Gauge
HDG	=	Hot Dip Galvanized
HP	=	High Point
IF	=	Inside Face
JT	=	Joint
LG	=	Long
LP	=	Low Point
LTE	=	(Rebar) Embedment Length in Tension
LTS	=	(Rebar) Splice Length in Tension
LW	=	Long Way
MEP	=	Mechanical, Electrical, Plumbing, Fire Protection
NS	=	Near Side
NW	=	Normal Weight
OC	=	On Center
OF	=	Outside Face
SER	=	Structural Engineer of Record
SMP	=	Solid Masonry Pedestal/Pier
SP	=	Spacing
SS	=	Stainless Steel
SW	=	Short Way
TSA	=	Threaded Stud Anchor
VIF	=	Verify in Field
W/	=	With
W/O	=	Without
W.P.	=	Working Point
W.W.F.	=	Welded Wire Fabric

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SPECIAL INSPECTION SCHEDULE & ABBREVIATIONS

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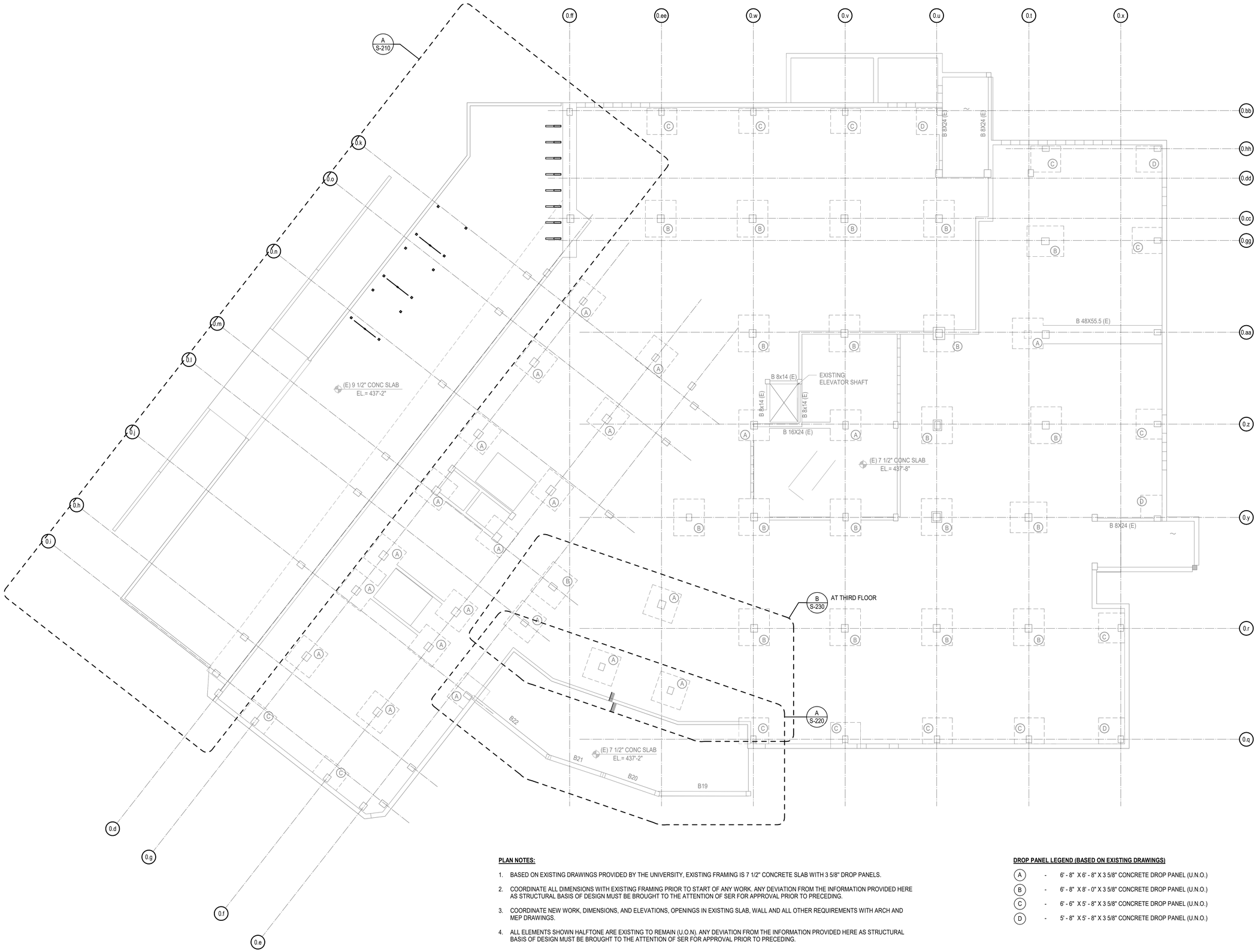

PLAN NOTES:

1. BASED ON EXISTING DRAWINGS PROVIDED BY THE UNIVERSITY, EXISTING FRAMING IS 7 1/2" CONCRETE SLAB WITH 3 5/8" DROP PANELS.
2. COORDINATE ALL DIMENSIONS WITH EXISTING FRAMING PRIOR TO START OF ANY WORK. ANY DEVIATION FROM THE INFORMATION PROVIDED HERE AS STRUCTURAL BASIS OF DESIGN MUST BE BROUGHT TO THE ATTENTION OF SER FOR APPROVAL PRIOR TO PRECEDING.
3. COORDINATE NEW WORK, DIMENSIONS, AND ELEVATIONS, OPENINGS IN EXISTING SLAB, WALL AND ALL OTHER REQUIREMENTS WITH ARCH AND MEP DRAWINGS.
4. ALL ELEMENTS SHOWN HALFTONE ARE EXISTING TO REMAIN (U.O.N). ANY DEVIATION FROM THE INFORMATION PROVIDED HERE AS STRUCTURAL BASIS OF DESIGN MUST BE BROUGHT TO THE ATTENTION OF SER FOR APPROVAL PRIOR TO PRECEDING.

DROP PANEL LEGEND (BASED ON EXISTING DRAWINGS)

- (A) - 6' - 8" X 6' - 8" X 3 5/8" CONCRETE DROP PANEL (U.N.O.)
- (B) - 6' - 8" X 8' - 0" X 3 5/8" CONCRETE DROP PANEL (U.N.O.)
- (C) - 6' - 6" X 5' - 8" X 3 5/8" CONCRETE DROP PANEL (U.N.O.)
- (D) - 5' - 8" X 5' - 8" X 3 5/8" CONCRETE DROP PANEL (U.N.O.)

A WORK LOCATION PLAN

1/8" = 1'-0"

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WORK LOCATION PLAN

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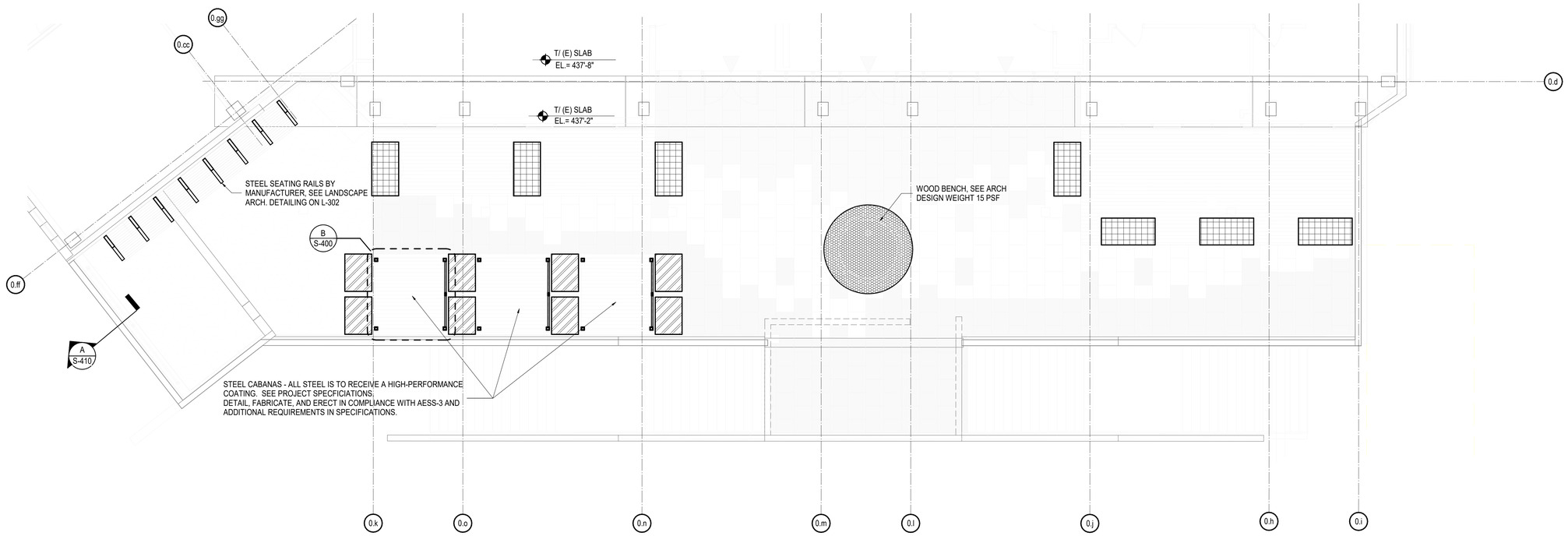

01 LEVEL FRAMING PLAN KEYNOTES

1. ▦ - RECTANGULAR PLANTER TYPE A. SEE LANDSCAPE ARCH DRAWINGS 4/L-300.
2. ▨ - RECTANGULAR PLANTER TYPE B. SEE LANDSCAPE ARCH DRAWINGS 5/L-300.
3. BOTH PLANTER TYPES ARE LIMITED TO 24" OF SOIL WITH A SATURATED WEIGHT OF 85 PCF.

(A) TERRACE 1 STRUCTURAL FRAMING PLAN

3/16" = 1'-0"

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TERRACE 1
STRUCTURAL
FRAMING PLAN

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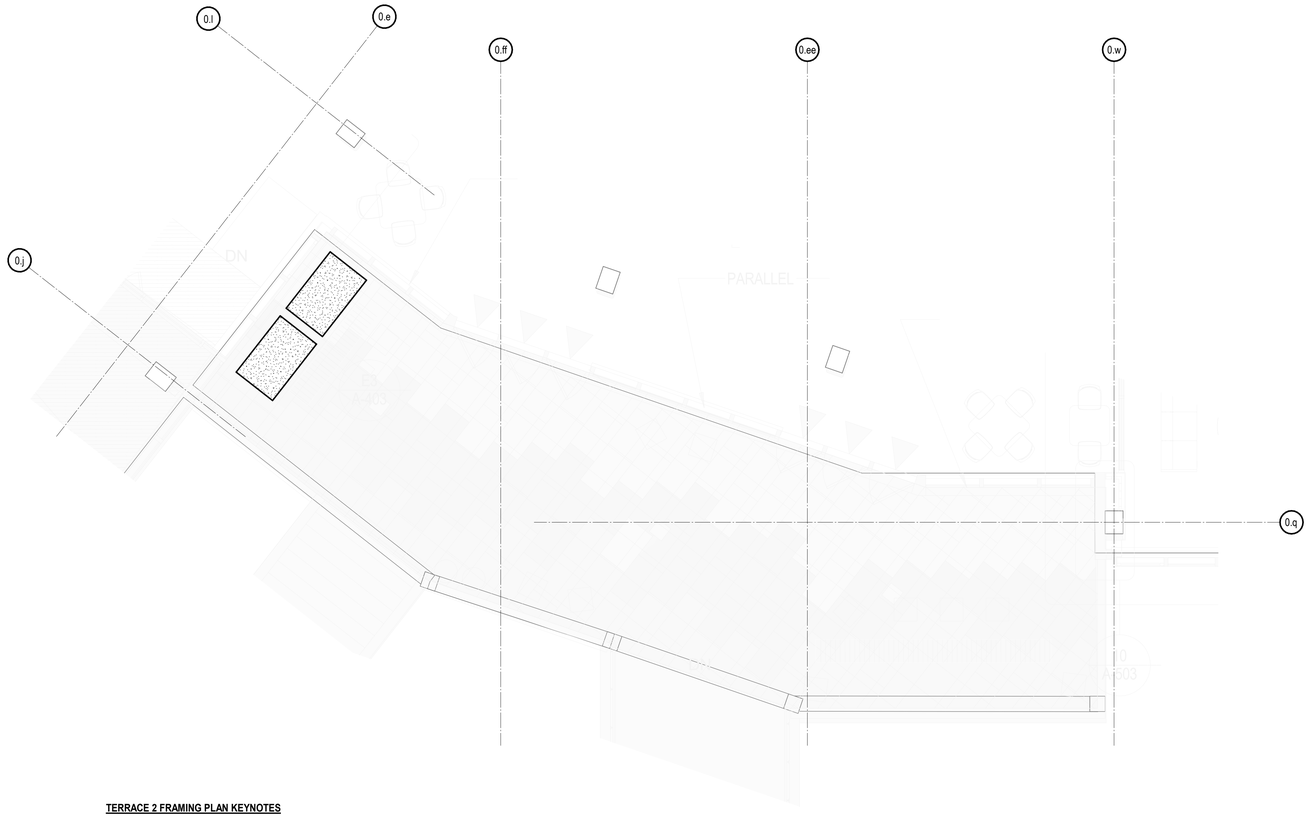

TERRACE 2 FRAMING PLAN KEYNOTES

1. ▭ - RECTANGULAR PLANTER TYPE C. SEE LANDSCAPE ARCH DRAWINGS 6/L-300.
2. PLANTER IS LIMITED TO 24" OF SOIL WITH A SATURATED WEIGHT OF 85 PCF.

A TERRACE 2 STRUCTURAL FRAMING PLAN

1/4" = 1'-0"

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TERRACE 2
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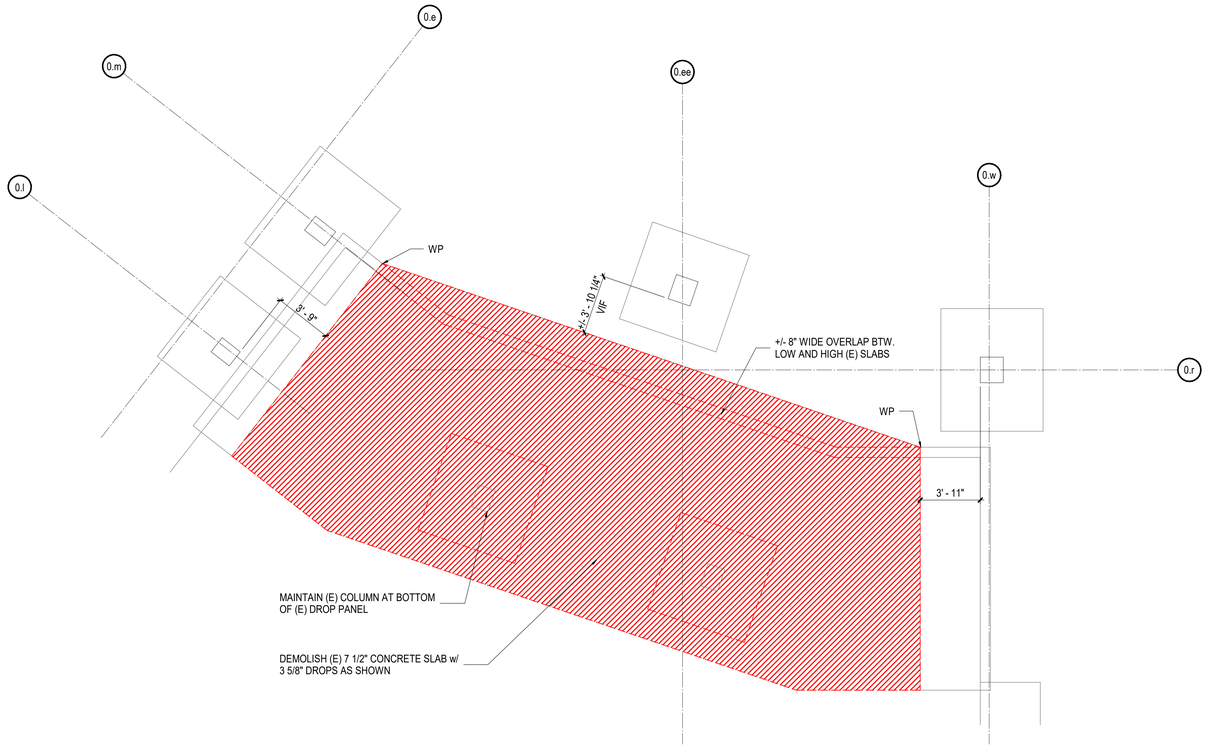
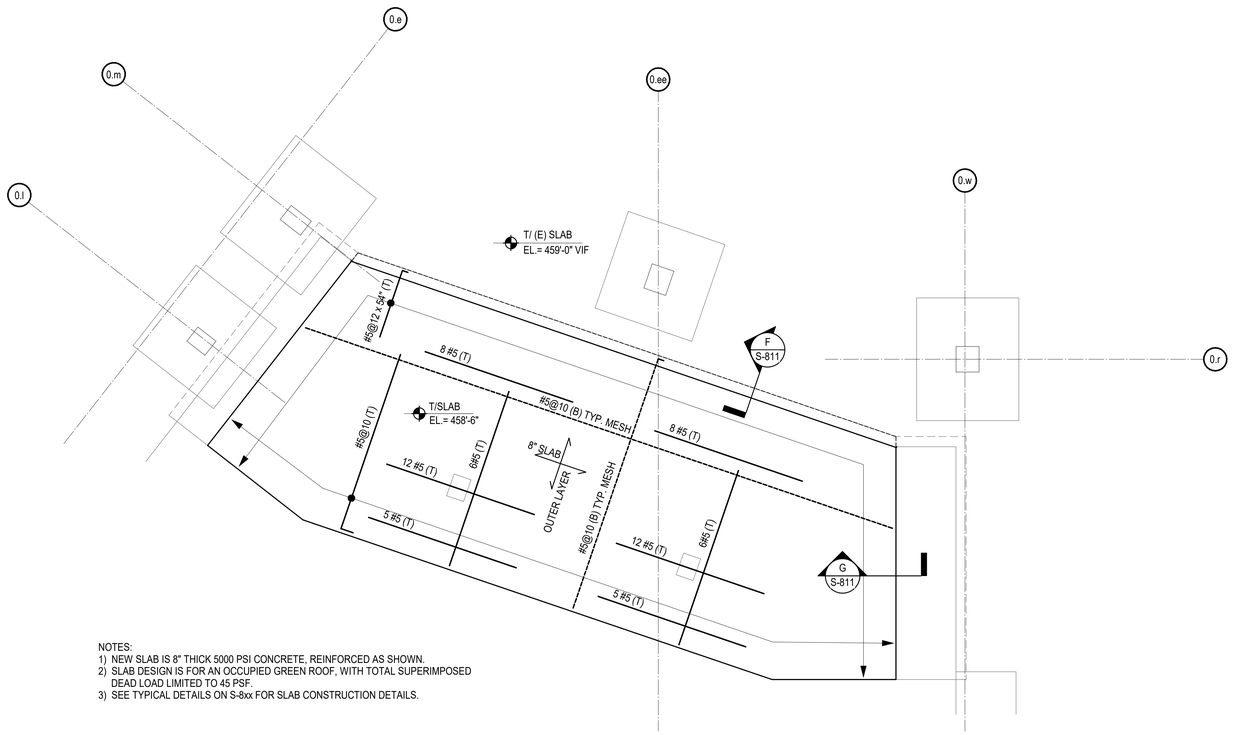


A TERRACE 3 STRUCTURAL DEMO PLAN

1/4" = 1'-0"



NOTES:
1) NEW SLAB IS 8" THICK 5000 PSI CONCRETE, REINFORCED AS SHOWN.
2) SLAB DESIGN IS FOR AN OCCUPIED GREEN ROOF, WITH TOTAL SUPERIMPOSED DEAD LOAD LIMITED TO 45 PSF.
3) SEE TYPICAL DETAILS ON S-8xx FOR SLAB CONSTRUCTION DETAILS.

B TERRACE 3 STRUCTURAL FRAMING PLAN

1/4" = 1'-0"

NOTE:
ALL WORK THIS SHEET SHOULD BE PRICED AS ALTERNATE #1.

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MC PROJECT # FP24-0003 / BUILDING # 206
MHEC PROJECT # 483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

PROFESSIONAL CERTIFICATION.
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ARCH NAME ARCH ##

Δ	DATE	DESCRIPTION

Project Number:	225012.00
Drawn By:	KE
Checked By:	JAM
Sheet Issue Date:	08/29/2025

Drawing
TERRACE 3
STRUCTURAL
FRAMING PLANS

S-230

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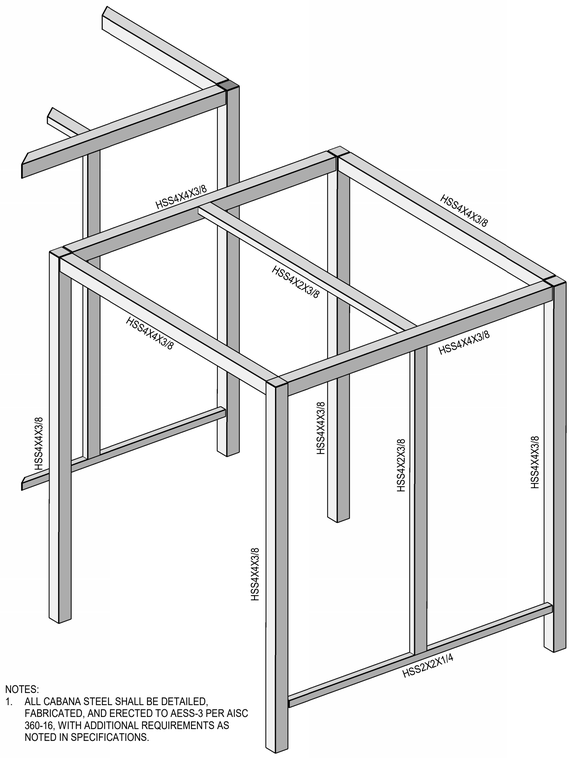
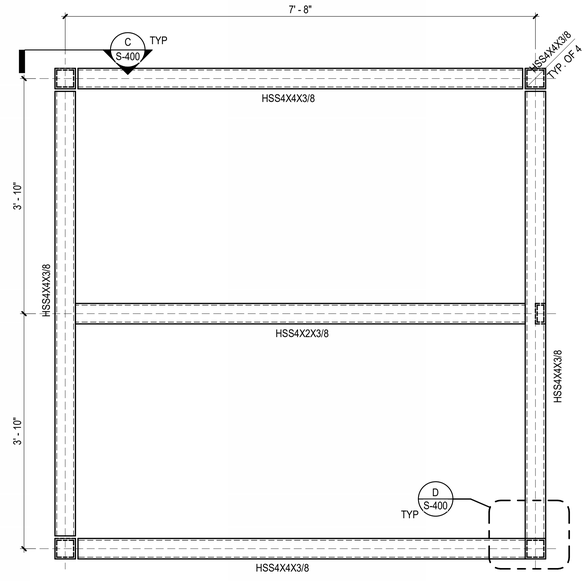
THE SQUARES ABOVE ARE COLOR, WITH BLACK AND WHITE LETTERS, IF PRINTED CORRECTLY



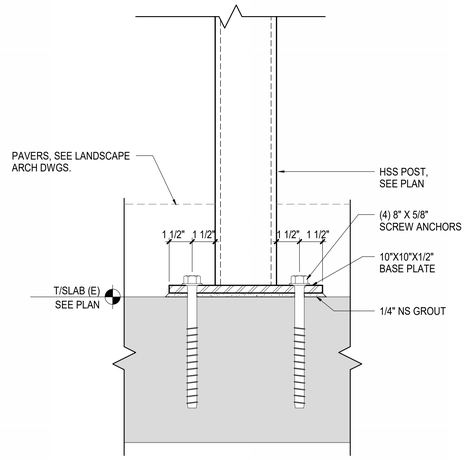
NOTES:
1. ALL CABANA STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED TO AESS-3 PER AISC 360-16, WITH ADDITIONAL REQUIREMENTS AS NOTED IN SPECIFICATIONS.

A CABANA AXONOMETRIC VIEW



B CABANA FRAMING PLAN

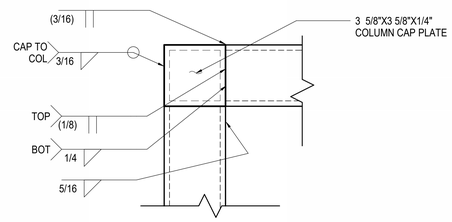
1" = 1'-0"



NOTES:
1. ALL STEEL (INCLUDING ELEMENTS BELOW TOP OF PAVERS) MUST BE PROTECTED FROM WEATHER. BASIS OF DESIGN IS A HIGH-PERFORMANCE COATING COMPLYING WITH ARCHITECTURAL SPECIFICATIONS.

C CABANA POST BASE DETAIL

3" = 1'-0"



NOTES:
1. ALL CORNERS SHALL BE SEAL WELDED TO PROVIDE A SMOOTH TRANSITION BETWEEN SIDES.
2. GRIND WELDS AS REQUIRED BASED ON AESS LEVEL AND PROJECT SPECIFICATIONS. WELD SIZING NOTED IS INTENDED TO BE THE THICKNESS IN THE FINISHED CONDITION.

D TYPICAL TOP CONNECTION DETAIL

3" = 1'-0"

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ARCH NAME ARCH ##

Δ	DATE	DESCRIPTION

Project Number:	225012.00
Drawn By:	KE
Checked By:	JAM
Sheet Issue Date:	08/29/2025

Drawing
CABANA STRUCTURAL FRAMING & DETAILS

S-400

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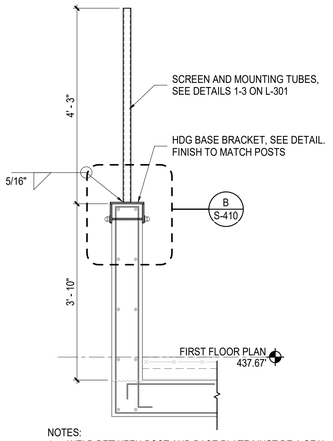
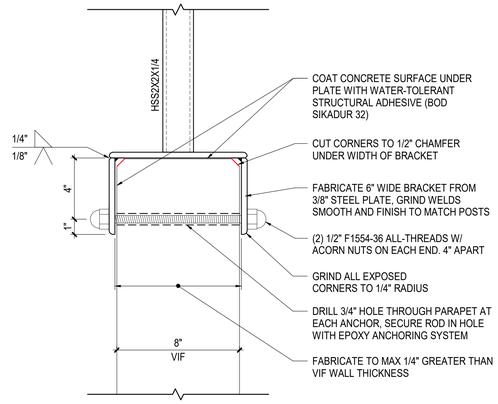


NOTES:
1. WELD BETWEEN POST AND BASE PLATE MUST BE A SEAL WELD. GRIND SMOOTH TO PRESENT A UNIFORM SURFACE FOR COATING.

A PARAPET SCREEN DETAIL
3/4" = 1'-0"



NOTE:
1. DETAIL, FABRICATE, AND ERECT IN CONFORMANCE WITH AESS-3 AND REQUIREMENTS IN PROJECT SPECIFICATIONS.

B PARAPET SCREEN BASE BRACKET DETAIL
3" = 1'-0"

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Project Number: 225012.00
Drawn By: KE
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SECTIONS AND DETAILS

S-410

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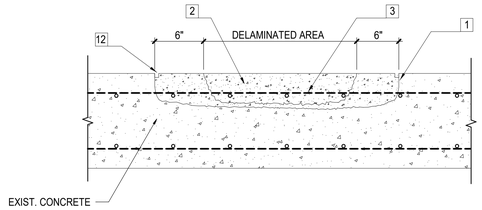
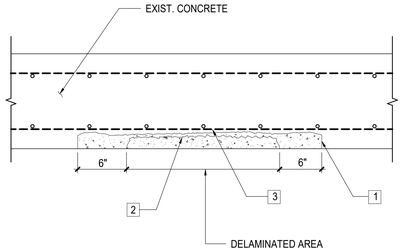


NOTES:

1. PERIMETER OF THE REPAIR AREA MUST BE SAW CUT TO 1/2" DEPTH IN RECTANGULAR SHAPE WITH MINIMAL RE-ENTRANT CORNERS. DO NOT OVER-CUT CORNERS.
2. THE CONCRETE INSIDE THE SAW CUT PERIMETER MUST BE REMOVED TO THE SAW CUT LINES TO A MINIMUM DEPTH OF 1/2".
3. APPLY "TYPICAL SPALLED CONCRETE & CORRODED REINF. BAR CLEANING DETAIL."
4. ENSURE THAT SUBSTRATE IS ROUGHENED TO 1/4" AMPLITUDE.
5. REMOVE ALL LAITANCE, DUST, AND DEBRIS BY PRESSURE WASHING WITH 3,000 PSI PRESSURE.
6. APPLY SIKA ARMATEC 110 EPOCEM (OR APPROVED EQUAL) BONDING COMPOUND TO THE EXISTING CONCRETE AND REBAR SURFACE.
7. APPLY "LAP SPLICE REBAR REPAIR" DETAIL WHERE REQUIRED.
8. APPLY PATCHING MATERIAL WITHIN THE TIME FRAME THAT THE BONDING COMPOUND IS STILL ACTIVE.
9. PATCHING MATERIAL SHALL BE APPLIED BY TROWEL IN THIN LAYERS TO ENSURE FULLY COVERAGE OF ALL VOIDS PARTICULARLY BEHIND ANY UNDERCUT REINFORCING BARS. ACCEPTABLE PATCHING MATERIALS ARE SIKATOP 123 PLUS OR APPROVED EQUAL.
10. CURE MATERIAL WITH WATER MIST OR WATER BASED CURING COMPOUND FOR AT LEAST 3 DAYS. THIS IS A VERY CRITICAL AND NECESSARY STEP TO MINIMIZE ANY SHRINKAGE CRACKS IN THE REPAIR MATERIAL.
11. APPLY "EDGE JOINT DETAIL BETWEEN NEW & EXISTING CONCRETE" DETAIL WHERE REQUIRED.
12. APPLY SIKA FERROGARD 903 AND SIKAGARD 701W.
13. COMPLY WITH MATERIAL MANUFACTURER RECOMMENDATIONS FOR MATERIAL THICKNESS APPLICATION, MATERIAL COMPATIBILITY, REPARATION, CURING, ETC.

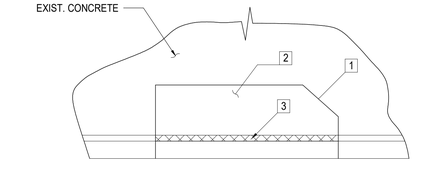
A TYPICAL PARTIAL DEPTH HORIZONTAL REPAIR
3/4" = 1'-0"



NOTES:

THE REPAIR SHALL BE MADE IN ACCORDANCE WITH ACI RAP-6 AND THE FOLLOWING NOTES AND REQUIREMENTS:
1. PERIMETER OF THE REPAIR AREA MUST BE SAW CUT TO 1/2" DEPTH IN RECTANGULAR SHAPE WITH MINIMAL RE-ENTRANT CORNERS. DO NOT OVER-CUT CORNERS.
2. THE CONCRETE INSIDE THE SAW CUT PERIMETER MUST BE REMOVED TO THE SAW CUT LINES TO A MINIMUM DEPTH OF 1/2".
3. APPLY "SPALLED CONCRETE & CORRODED REINF. BAR CLEANING" DETAIL.
4. ENSURE THAT SUBSTRATE IS ROUGHENED TO 1/4" AMPLITUDE.
5. REMOVE ALL LAITANCE, DUST, AND DEBRIS BY PRESSURE WASHING WITH 3,000 PSI PRESSURE.
6. APPLY BONDING COMPOUND TO THE EXISTING CONCRETE AND REBAR SURFACE. ACCEPTABLE BONDING COMPOUNDS ARE:
   a. SIKA ARMATEC 110 EPOCEM.
   b. DURALPREP BY EUCLID OR APPROVED EQUAL.
7. APPLY "LAP SPLICE REBAR REPAIR" DETAIL WHERE REQUIRED
8. APPLY PATCHING MATERIAL WITHIN THE TIME FRAME THAT THE BONDING COMPOUND IS STILL ACTIVE.
9. PATCHING MATERIAL SHALL BE APPLIED BY TROWEL IN THIN LAYERS TO ENSURE FULLY. COVERAGE OF ALL VOIDS PARTICULARLY BEHIND ANY UNDERCUT REINFORCING BARS. ACCEPTABLE GROUT MATERIALS ARE:
   a. SIKATOP 123 BY SIKA.
   b. VERTICOAT SUPREME BY EUCLID OR APPROVED EQUAL.
10. CURE MATERIAL WITH WATER MIST OR WATER BASED CURING COMPOUND FOR AT LEAST 3 DAYS THIS IS A VERY CRITICAL AND NECESSARY STEP TO MINIMIZE ANY SHRINKAGE CRACKS IN THE REPAIR MATERIAL.
11. APPLY SIKAGARD 701W SEALER ON VERTICAL
12. COMPLY WITH MATERIAL MANUFACTURER RECOMMENDATIONS FOR MATERIAL THICKNESS APPLICATION, MATERIAL COMPATIBILITY, REPARATION, CURING, ETC.

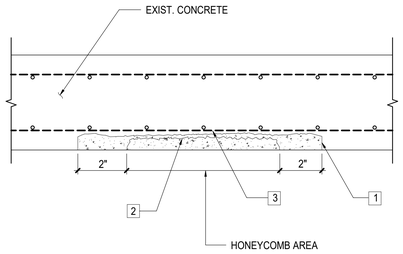
B TYPICAL VERTICAL OR OVERHEAD PATCH REPAIR
3/4" = 1'-0"



NOTES:

1. SAW CUT STRAIGHT LINES AROUND THE AREA TO BE REPAIRED. THE SAW CUT MUST BE 1/2" DEEP AND THE OVERALL CONFIGURATION MUST BE RECTANGULAR IN SHAPE.
2. WITHIN THE SAW CUT AREA REMOVE ALL CONCRETE TO SOUND CONCRETE USING POWER EQUIPMENT. THE DEPTH OF REMOVAL MUST BE AT LEAST 1/2" FROM THE ORIGINAL SURFACE OF THE AREA TO BE REPAIRED.
3. REMOVE ALL RUST FROM EXPOSED REINFORCING BARS TO CLEAN METAL. USE SANDBLASTING OR WIRE WHEEL BRUSH OR HAND STEEL BRUSH AS NECESSARY.
4. IF MORE THAN HALF THE REINFORCING BAR CIRCUMFERENCE IS EXPOSED AFTER CLEANING OR IF BONDING IN MORE THAN HALF THE CIRCUMFERENCE IS BROKEN, CHIP CONCRETE 1/2" AROUND THE BAR TO EXPOSE ITS ENTIRE CIRCUMFERENCE.
5. IF LESS THAN HALF OF THE REINFORCING BAR CIRCUMFERENCE IS EXPOSED AFTER CLEANING AND IF BONDING IN MORE THAN HALF THE CIRCUMFERENCE IS NOT BROKEN, LEAVE THE CONDITION AS IS.
6. PROVIDE ADDITIONAL REINFORCING IF REQUIRED BY THE ENGINEER.
7. COAT THE REINFORCING BARS WITH RUST INHIBITING PAINT. DO NOT COAT CONCRETE SURFACE WITH PAINT.
8. REPAIR LOST CONCRETE USING "FORM AND PUMP" OR "FORM & POUR" OR "OVERHEAD PATCH" REPAIR PROCEDURE ACCORDING TO ENGINEER'S DIRECTION FOR THE SPECIFIC LOCATION OF THE REPAIR.

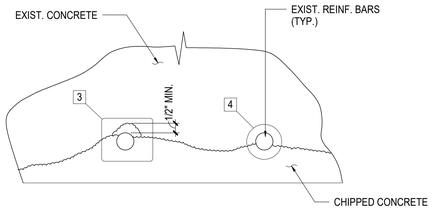
C CONCRETE REPAIR PARTIAL DEPTH OVERHEAD OR VERTICAL
3/4" = 1'-0"



NOTES:

THE REPAIR SHALL BE MADE IN ACCORDANCE WITH ACI RAP-6 AND THE FOLLOWING NOTES AND REQUIREMENTS:
1. PERIMETER OF THE REPAIR AREA MUST BE SAW CUT TO 1/2" DEPTH IN RECTANGULAR SHAPE WITH MINIMAL RE-ENTRANT CORNERS. DO NOT OVER-CUT CORNERS.
2. THE CONCRETE INSIDE THE SAW CUT PERIMETER MUST BE REMOVED TO SOUND CONCRETE TO A MINIMUM DEPTH OF 1/2".
3. IF MORE THAN 1/2 OF THE BAR PERIMETER IS EXPOSED, CHIP AROUND THE BAR TO A MINIMUM 1/2" GAP.
4. ENSURE THAT SUBSTRATE IS ROUGHENED TO 1/4" AMPLITUDE.
5. REMOVE ALL LAITANCE, DUST, AND DEBRIS BY PRESSURE WASHING WITH 3,000 PSI PRESSURE.
6. PREPARE EXISTING SURFACE TO SATURATED SURFACE DRY CONDITION
7. APPLY PATCHING MATERIAL BY TROWEL IN LAYERS TO ENSURE FULL COVERAGE OF ALL VOIDS PARTICULARLY BEHIND ANY UNDERCUT REINFORCING BARS. ACCEPTABLE GROUT MATERIALS ARE:
   a. SIKATOP 123 BY SIKA.
   b. VERTICOAT SUPREME BY EUCLID OR APPROVED EQUAL.
8. CURE MATERIAL WITH WATER MIST OR WATER BASED CURING COMPOUND FOR AT LEAST 3 DAYS THIS IS A VERY CRITICAL AND NECESSARY STEP TO MINIMIZE ANY SHRINKAGE CRACKS IN THE REPAIR MATERIAL.
9. COMPLY WITH MATERIAL MANUFACTURER RECOMMENDATIONS FOR MATERIAL THICKNESS APPLICATION, MATERIAL COMPATIBILITY, REPARATION, CURING, ETC.

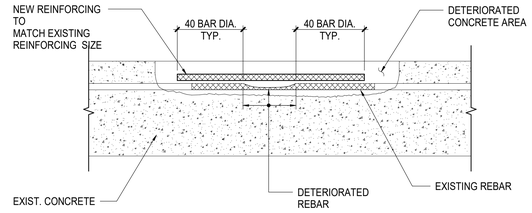
D TYPICAL HONEYCOMB PATCH REPAIR
3/4" = 1'-0"



NOTES:

1. CHIP LOOSE ALL CONCRETE TO SOUND MATERIAL.
2. REMOVE ALL RUST FROM EXPOSED REINF. BARS TO BARE METAL USING WIRE WHEEL BRUSH OR SAND BLASTING.
3. IF MORE THAN HALF OF REINF. BAR PERIMETER IS EXPOSED, OR BOND IS BROKEN, CHIP HALF OF CONCRETE AROUND TO EXPOSE THE ENTIRE BAR PERIMETER.
4. IF LESS THAN HALF OF REINF. BAR PERIMETER IS EXPOSED, LEAVE IT AS IT IS.

E SPALLED CONCRETE & CORRODED REINF. BAR CLEANING DETAIL
3/4" = 1'-0"



NOTES:

1. PROVIDE ADDITIONAL REINFORCING AS INDICATED ABOVE AT EVERY LOCATION WHERE THE EXISTING REBAR DIAMETER HAS BEEN REDUCED BELOW 90% OF ORIGINAL NOMINAL SIZE.
2. ENLARGE REPAIR AREA TO ALLOW FOR PROPER REBAR SPLICING AS ABOVE.
3. APPLY SIKA AMATEC 110 ANTI CORROSION COATING ON BOTH EXISTING & NEW REBAR.

F TYPICAL LAP SPLICE REBAR REPAIR
3/4" = 1'-0"

EMBEDMENT / SPLICE SCHEDULE

BAR SIZE	COMPRESSION		TENSION	
	EMBEDMENT/ DEVELOPMENT LENGTH	LAP SPLICE LENGTH	EMBEDMENT/ DEVELOPMENT LENGTH	LAP SPLICE LENGTH
#3	8	12	15	19
#4	10	15	19	25
#5	12	19	24	31
#6	15	23	29	37
#7	17	27	42	54
#8	19	30	48	62
NOTATION USED ON DRAWING	• LCE	• LCS	• LTE	• LTS

NOTES:
1. THE SCHEDULE INCLUDES SPLICE AND EMBEDMENT LENGTHS WHICH SATISFY PROJECT REQUIREMENTS AND THE FOLLOWING CRITERIA: fy = 60,000 psi, f'c = 4000 psi, WEIGHT = 150 pcf
2. USE TENSION SPLICE FOR ALL SPLICES (UNLESS OTHERWISE SHOWN).
3. WHERE BARS OF DIFFERENT SIZE ARE TO BE SPLICED, THE SPLICE LENGTH FOR ALL BARS SHALL BE THAT REQUIRED FOR THE LARGEST.

G SCHEDULE OF REINFORCING EMBEDMENT & SPLICE LENGTH
3/4" = 1'-0"

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ARCH NAME ARCH ##

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: KE
Checked By: JAM
Sheet Issue Date: 08/29/2025

Drawing
TYPICAL DETAILS

S-800

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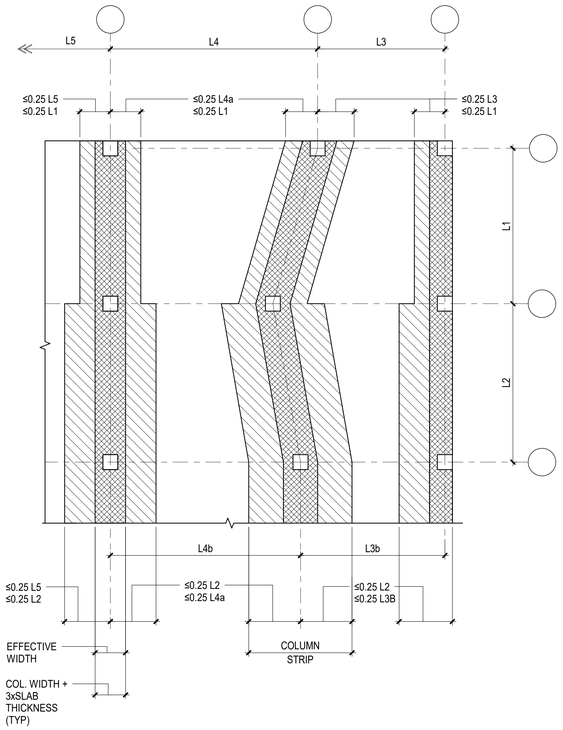
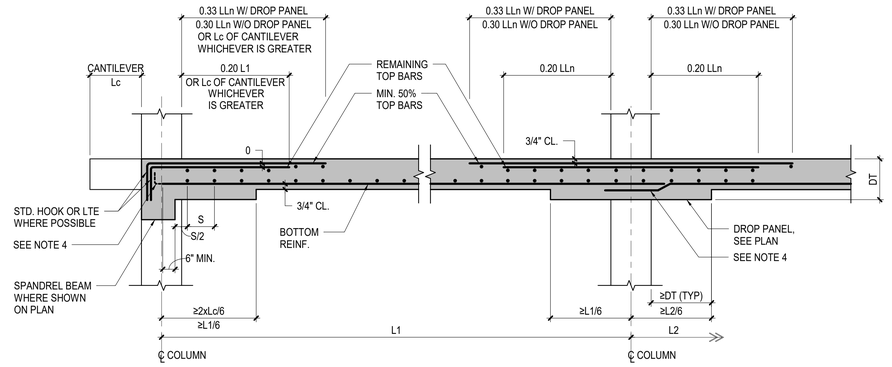
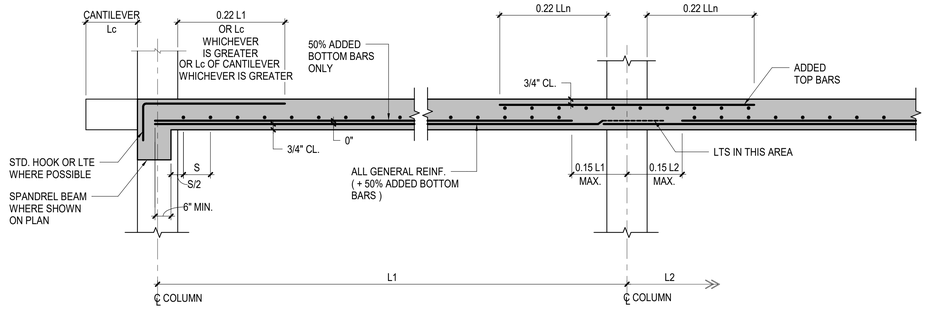


NOTES:
1. DETAIL IS APPLICABLE TO SLABS WITH OR WITHOUT DROP PANEL & BEAMS.
2. HATCHED AREA INDICATES COL. STRIPS. ONE DIRECTION SHOWN, OTHER IS SIMILAR.
3. CROSS HATCHED AREA INDICATED EFFECTIVE WIDTH (EW) OF COLUMN STRIP. PLACE MIN. 60% OF COL. STRIP REINF. WITHIN THIS WIDTH.

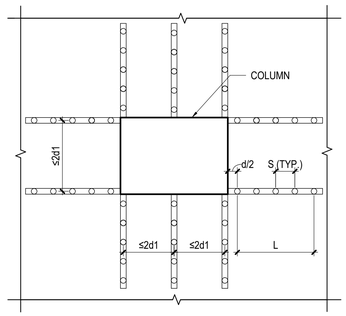
A1 TYPICAL REINFORCING STRIP IDENTIFICATION DETAIL
NOT TO SCALE



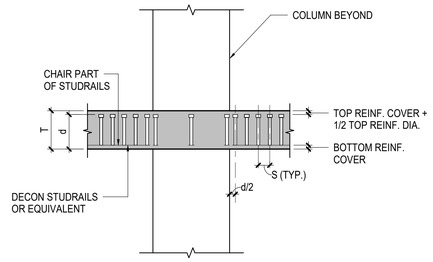
A2 TYPICAL COLUMN STRIP REINF. & DROP PANEL DETAILS
NOT TO SCALE



A3 TYPICAL MIDDLE REINF. DETAIL
NOT TO SCALE



PLAN DETAIL FOR STUDRAILS



SECTION DETAIL FOR STUDRAILS

STUD RAIL NOTES:
1. STUD RAIL LEGEND SHOWN ON PLANS
   SR4L48
   - LENGTH OF RAIL (IN) SEE PLANS
   - # OF STUDS / RAIL
2. # OF RAILS PER COLUMN SIDE SHALL BE SUCH THAT DISTANCE BETWEEN RAILS DOES NOT EXCEED 2d1.
3. PROVIDE RAILS TO ALL SIDES OF COLUMN. OMIT RAILS TO COLUMN SIDES THAT ARE LOCATED CLOSER THAN 4T TO EDGE OF SLAB.
4. IF RAIL LENGTH IS NOT INDICATED, PROVIDE STUD SPACING "S" OF 3" O.C.
5. 'd' - IS THE DISTANCE FROM BOTTOM OF SLAB TO CENTER OF OUTER LAYER TOP REINF.
   'd1' - IS THE DISTANCE FROM BOTTOM OF SLAB TO CENTER OF INNER LAYER TOP REINFORCING.
6. STUD DIA. SHALL BE:

SLAB THICKNESS	STUD DIA.
6" ≤ T < 8"	3/8"
8" ≤ T < 10"	1/2"
10" ≤ T < 12"	5/8"
12" ≤ T	3/4"

TYPICAL TWO WAY SLAB REINF NOTES:
1. LLn DENOTES LONGER OF ADJACENT SPANS (L1 / L2).
2. THE GENERAL OR CONTINUOUS REINFORCING (TOP & BOTTOM) CALLED ON PLAN SHALL BE CONTINUOUS UTILIZING THE LONGEST BARS PRACTICAL & SHALL BE SPLICED ONLY AS WHERE NEEDED AND FOLLOWS:
   a. ALL SPLICES SHALL BE CLASS B SPLICES.
   b. ALL TOP REINFORCING SHALL BE SPLICED AT MID POINT BETWEEN COLUMNS.
   c. ALL BOTTOM REINFORCING SHALL BE SPLICED AT COLUMN LINE LOCATIONS.
3. TOP BAR EXTENSION BEYOND FACE OF COLUMN SHALL BE LTS MINIMUM.
4. ALL BOTTOM BARS WITHIN THE COLUMN STRIPS SHALL BE CONTINUOUS OR SPLICED WITH LTS WITHIN THE INDICATED AREA. PROVIDE CONTINUOUS BOTTOM BARS @ 6" O.C. THROUGH COLUMN WIDTH (MINIMUM 2 BARS) & ANCHOR AT EXTERIOR SUPPORT W/ STD HOOK.
5. DROP PANEL SIZES SHOWN HERE ARE MINIMUM U.O.N. LARGER ON PLANS.
6. DROP PANEL SIZES INDICATED HERE OR ON PLANS ARE MINIMUM REQUIRED AND CAN BE ADJUSTED AS FOLLOWS TO FACILITATE CASE OF FORMWORK:
   PLAN DIMENSIONS +6", -0"
   DEPTH DIMENSIONS +1/2", -0"
7. EXTEND ALL TOP BARS TO SLAB CANTILEVER WHERE IT EXISTS & ANCHOR WITH STANDARD HOOK.
8. ALL ADDED TOP OR BOTTOM BARS SHALL BE PLACED AT EQUAL SPACING WITHIN THE CORRESPONDING STRIP.
9. REINFORCING COVER IS TYPICAL UON ON PLANS & NOTES FOR SPECIFIC SLAB LOCATION, USE, & EXPOSURE.
10. IF EPOXY COATED BARS ARE USED, INCREASE ALL BAR LENGTHS BY ADDING 50% OF LTE.

A4 TYPICAL STUDRAIL SHEAR REINFORCING DETAIL
NOT TO SCALE

A TYPICAL TWO WAY FLAT SLAB REINFORCING DETAIL
NOT TO SCALE

NOTE:
ALL WORK THIS SHEET SHOULD BE PRICED AS ALTERNATE #1.

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PROFESSIONAL CERTIFICATION.
I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NUMBER 24086, EXPIRATION DATE 02-01-2027.

ARCH NAME ARCH ##

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: KE
Checked By: JAM
Sheet Issue Date: 08/29/2025

Drawing
TYPICAL TWO-WAY SLAB DETAILS

S-810

NOT FOR CONSTRUCTION

08/29/2025
PERMIT/BID SET

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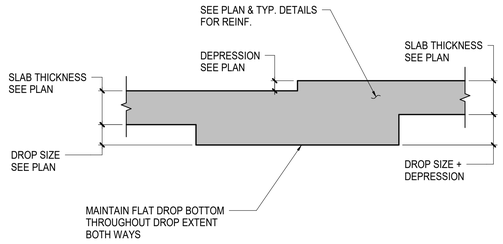
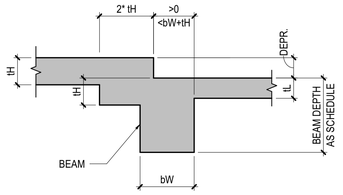
8/22/2025 3:33:40 PM

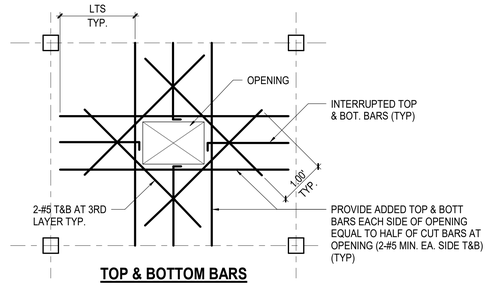
IF LINE SHOWN ABOVE IS EXACTLY ONE INCH LONG AT THIS SHEET'S ORIGINAL PAPER SIZE

THE SQUARES BESIDE ARE (FROM LEFT TO RIGHT) BLACK, YELLOW, MAGENTA, CYAN AND WHITE. LETTERS IF PRINTED CORRECTLY



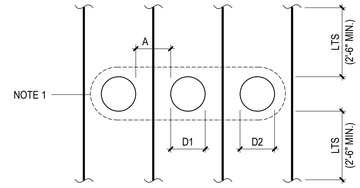


NOTES
1. FOR SLAB REINF. @ DEPRESSION SEE PLAN AND DETAILS



TOP & BOTTOM BARS

NOTES:
1. IF ADDITIONAL OPENINGS OTHER THAN THOSE CALLED ON PLAN ARE REQUIRED. THE CONTRACTOR SHALL SUBMIT A LAYOUT OF THOSE OPENINGS FOR APPROVAL PRIOR TO REINF STEEL SHOP DWGS.
2. DETAIL APPLIES TO RECTANGULAR, SQUARE, AND ROUND OPENINGS, SLEEVES & CONDUIT STUB - OUTS.
3. GROUP OF SLEEVES THAT INTERRUPT 2 OR MORE ADJACENT REBARS IN ANY DIRECTION SHALL BE TREATED & DETAILED AS A RECTANGULAR OPENING WITH SIZE THE OUTLINE OF THE SLEEVE GROUP.
4. ALL PENETRATIONS WITHIN 7'-0" OF COLUMN FACE MUST BE SUBMITTED FOR SER APPROVAL.

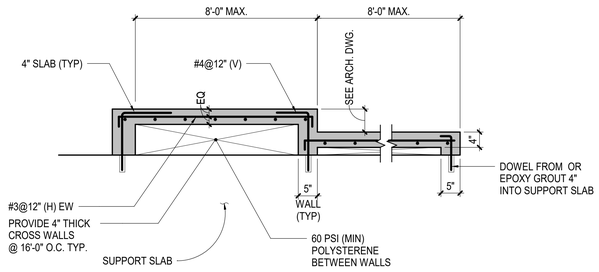


NOTES:
1. DETAILS APPLIES TO RECTANGULAR, SQUARE, AND ROUND OPENINGS, SLEEVES, AND CONDUIT STUBS-OUTS.
2. DETAIL APPLIES WHEN CLEAR CONCRETE DISTANCE A IS MORE THAN 3" AND MORE THAN 2 x (MAX D1, D2).
3. WHEN DISTANCE A DOES NOT MEET ABOVE LIMITS TREAT GROUP OF SLEEVES AS OPENING WITH SIZE AS SHOWN ABOVE AND FOLLOW DETAIL FOR SLAB OPENING.

B1 INDIVIDUAL OPENINGS
NOT TO SCALE

B2 GROUP OPENINGS
NOT TO SCALE

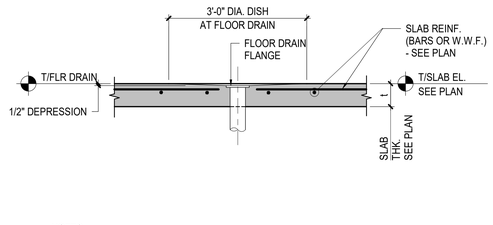
A TYPICAL DETAIL OF SLAB DEPRESSION @ DROP PANEL
NOT TO SCALE



NOTES:
1. USE LT WEIGHT CONCRETE WITH PEA GRAVEL FOR BUILT UP FLOOR OVER ELEVATED FLOORS.

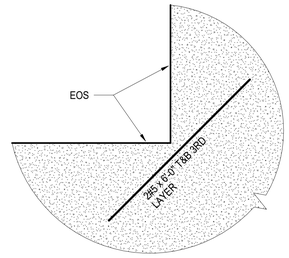
C TYPICAL BUILT UP FLOOR / RAMP / STEPS DETAIL
NOT TO SCALE

B TYPICAL SLAB OPENING REINFORCING DETAIL

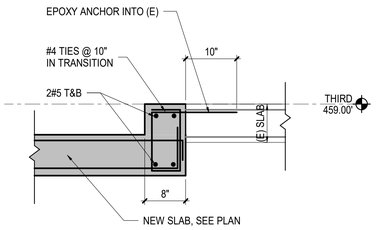


NOTES:
1. SEE ARCHITECTURAL, MECHANICAL AND PLUMBING DRAWINGS FOR LOCATIONS.

D TYP. FLOOR DRAIN SLAB DEPRESSION DETAIL
NOT TO SCALE

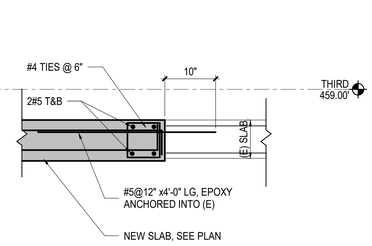


E TYP. EOS CORNER DETAIL
NOT TO SCALE



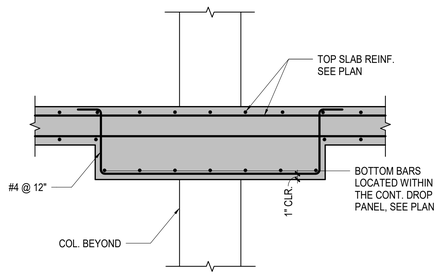
TRANSVERSE SLAB BARS NOT SHOWN FOR CLARITY

F SLAB TRANSITION REINFORCING DET.
1" = 1'-0"

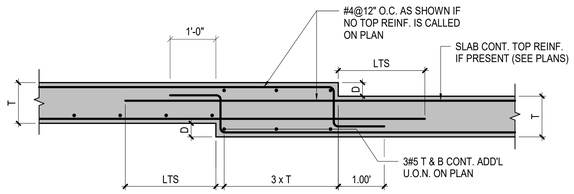


TRANSVERSE SLAB BARS NOT SHOWN FOR CLARITY

G EDGE DETAIL AT LOWERED (E) SLAB
1" = 1'-0"



H TYPICAL CONT. DROP PANEL REINF. DETAIL
NOT TO SCALE



FOR 2"≤D≤T

NOTES:
1. SEE SCHEDULE OF EMBEDMENT AND SPLICE LENGTHS.

J TYPICAL STEP IN SLAB DETAIL
NOT TO SCALE

NOTE:
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ARCH NAME ARCH ##

Δ	DATE	DESCRIPTION

Project Number:	225012.00
Drawn By:	KE
Checked By:	JAM
Sheet Issue Date:	08/29/2025

Drawing
TYPICAL TWO-WAY SLAB DETAILS

S-811

NOT FOR CONSTRUCTION

08/29/2025
PERMIT/BID SET

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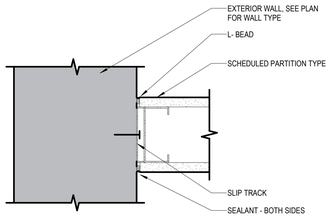
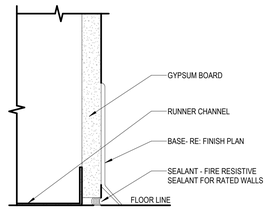
E D C B A

1 2 3 4 5 6

PARTITION TYPICAL DETAILS

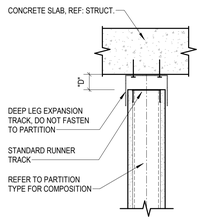


E1 PLAN DETAIL @ EXISTING WALL — A.011 — 3" = 1'-0"



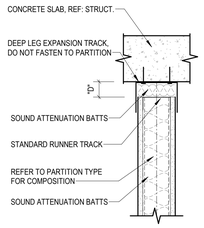
E5 TYPICAL BASE — A.011 — 6" = 1'-0"

PARTITION HEAD CONDITIONS



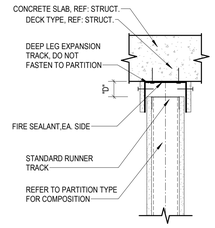
DIMENSION 'D' = 1 1/2" AT FLOOR DECK
DIMENSION 'D' = 1 1/2" AT ROOF DECK

G EXPANSION @ SLAB — A.011 — 1 1/2" = 1'-0"



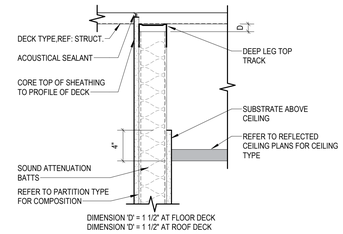
DIMENSION 'D' = 1 1/2" AT FLOOR DECK
DIMENSION 'D' = 1 1/2" AT ROOF DECK

H EXPANSION @ SLAB - ACOUSTIC RATED — A.011 — 1 1/2" = 1'-0"



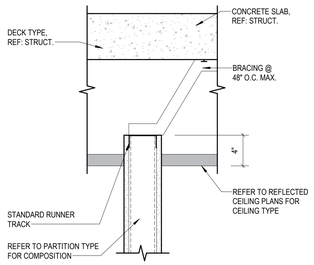
DIMENSION 'D' = 1 1/2" AT FLOOR DECK
DIMENSION 'D' = 1 1/2" AT ROOF DECK

K EXPANSION @ SLAB - FIRE RATED — A.011 — 1 1/2" = 1'-0"

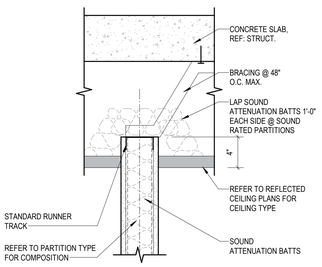


DIMENSION 'D' = 1 1/2" AT FLOOR DECK
DIMENSION 'D' = 1 1/2" AT ROOF DECK

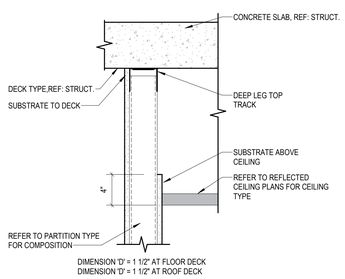
L TO SLAB- MIXED HEIGHT - ACOUSTIC RATED — A.011 — 1 1/2" = 1'-0"



A ABOVE CEILING — A.011 — 1 1/2" = 1'-0"



B ABOVE CEILING - ACOUSTIC RATED — A.011 — 1 1/2" = 1'-0"



DIMENSION 'D' = 1 1/2" AT FLOOR DECK
DIMENSION 'D' = 1 1/2" AT ROOF DECK

W TO SLAB - MIXED HEIGHT — A.011 — 1 1/2" = 1'-0"

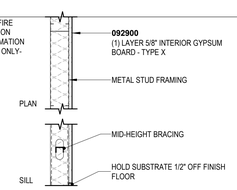
PARTITION TYPES

PARTITION M_F

REFER TO PARTITION TAG FOR FIRE RATING, HEIGHT / HEAD CONDITION DETAIL, AND INSULATION INFORMATION (SHOWN HERE FOR REFERENCE ONLY- MAY NOT EXIST)

HEAD CONDITION DETAILS

A / A-011	H / A-011
B / A-011	J / A-011
C / A-012	K / A-011
D / A-012	S / A-012
E / A-012	T / A-012
F / A-012	U / A-012
G / A-011	V / A-012



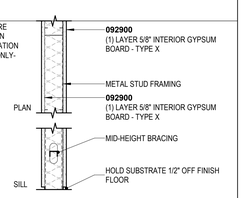
M_F		
TAG	STUD SIZE	OVERALL THICKNESS
M0F	0-7/8"	1 1/2"
M1F	1-5/8"	2 1/4"
M1F	1-5/8"	5 1/8"
M2F	2-1/2"	2"
M2F	2-1/2"	3 1/8"
M2F	2-1/2"	3 1/8"
M2F	2-1/2"	3 1/8"
M3F	3-5/8"	4 1/4"

PARTITION M_A

REFER TO PARTITION TAG FOR FIRE RATING, HEIGHT / HEAD CONDITION DETAIL, AND INSULATION INFORMATION (SHOWN HERE FOR REFERENCE ONLY- MAY NOT EXIST)

HEAD CONDITION DETAILS

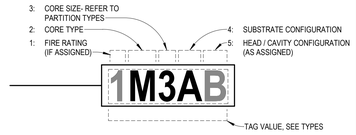
A / A-011	H / A-011
B / A-011	J / A-011
C / A-012	K / A-011
D / A-012	S / A-012
E / A-012	T / A-012
F / A-012	U / A-012
G / A-011	V / A-012



M_A		
TAG	STUD SIZE	OVERALL THICKNESS
M1A	1-5/8"	2 7/8"
M2A	2-1/2"	3 3/4"
M3A	3-5/8"	4 7/8"
M4A	4"	5 1/4"
M6A	6"	7 1/4"
M8A	8"	9 1/4"

REFER TO U419 / A-032 FOR FIRE RATING INFORMATION (IF NOTED)

PARTITION TYPE LEGEND



1: FIRE RATING

MARK	HOURS	MINUTES
	<NONE>	
1/3	1/3 HOUR	20 MIN
1/2	1/2 HOUR	30 MIN
1	1 HOUR	60 MIN
2	2 HOUR	120 MIN
3	3 HOUR	180 MIN
4	4 HOUR	240 MIN

2: CORE TYPE

MARK	CORE TYPE
C	CAST-IN-PLACE CONCRETE
G	CONCRETE MASONRY UNIT
M	METAL STUD FRAMING / METAL FURRING
MM	METAL STUD FRAMING (2 ROWS, PARALLEL WITH PRESCRIBED AIR GAP BETWEEN)
S	METAL STUD FRAMING (2 ROWS, PARALLEL WITH PRESCRIBED AIR GAP BETWEEN)
T	TILT-UP CONCRETE PANEL
W	WOOD STUD FRAMING / WOOD FURRING
WW	WOOD STUD FRAMING (2 ROWS, PARALLEL WITH PRESCRIBED AIR GAP BETWEEN)

3: CORE SIZE

MARK	CONCRETE	CMU	METAL	WOOD
0			7/8"	
1			1 5/8"	3/4"
2			2 1/2"	1 1/2"
3			3 5/8"	2 1/2"
4	4"	3 5/8"	4"	3 1/2"
6	6"	5 5/8"	6"	5 1/2"
8	8"	7 5/8"	8"	7 1/4"
10	10"	9 5/8"	10"	9 1/4"
12	12"	11 5/8"	12"	11 1/4"
14	14"	13 5/8"		
16	16"	15 5/8"		
18	18"			
20	20"			
22	22"			
24	24"			

4: SUBSTRATE CONFIGURATIONS

MARK	SIDE 1	SIDE 2
-	NONE	NONE
A	5/8" GYPSUM BOARD (1 LAYER)	5/8" GYPSUM BOARD (1 LAYER)
B	5/8" GYPSUM BOARD (1 LAYER)	5/8" GYPSUM BOARD (2 LAYERS)
C	5/8" GYPSUM BOARD (2 LAYERS)	5/8" GYPSUM BOARD (2 LAYERS)
D	5/8" GYPSUM BOARD (2 LAYERS)	5/8" GYPSUM BOARD (3 LAYERS)
E	5/8" GYPSUM BOARD (3 LAYERS)	5/8" GYPSUM BOARD (3 LAYERS)
F	NONE	5/8" GYPSUM BOARD (1 LAYER)
G	NONE	5/8" GYPSUM BOARD (2 LAYERS)
H	NONE	5/8" GYPSUM BOARD (3 LAYERS)
J	5/8" GYPSUM BOARD (1 LAYER)	3/4" PLYWOOD (1 LAYER)
K	5/8" GYPSUM BOARD (1 LAYER)	1/2" PLYWOOD (1 LAYER)
L	5/8" GYPSUM BOARD (1 LAYER)	5/8" GYPSUM BOARD, LEAD LINED (1 LAYER)
M	NONE	5/8" GYPSUM BOARD, LEAD LINED (1 LAYER)
N	5/8" GYPSUM BOARD (1 LAYER)	3/4" PLYWOOD (1 LAYER) + 5/8" GYPSUM BOARD (1 LAYER)
P	5/8" GYPSUM BOARD (1 LAYER)	1/2" PLYWOOD (1 LAYER) + 5/8" GYPSUM BOARD (1 LAYER)
Q	5/8" GYPSUM BOARD (1 LAYER)	5/8" GYPSUM BOARD (1 LAYER) + 3/4" PLYWOOD (1 LAYER)
R	5/8" GYPSUM BOARD (1 LAYER)	1" GYPSUM SHAFT LINER (1 LAYER)
S	5/8" GYPSUM BOARD (2 LAYERS)	1" GYPSUM SHAFT LINER (1 LAYER)
T	5/8" GYPSUM BOARD (3 LAYERS)	1" GYPSUM SHAFT LINER (1 LAYER)
U	5/8" GYPSUM BOARD (1 LAYER)	1/2" RESILIENT CHANNEL + 5/8" GYPSUM BOARD (1 LAYER)
V	5/8" GYPSUM BOARD (2 LAYERS)	1/2" RESILIENT CHANNEL + 5/8" GYPSUM BOARD (1 LAYER)
W	5/8" GYPSUM BOARD (2 LAYERS)	1/2" RESILIENT CHANNEL + 5/8" GYPSUM BOARD (2 LAYERS)
X		
Y		
Z		

5: HEAD / CAVITY CONDITIONS

MARK	HEAD CONDITION			RATING	
	CORE	SUBSTRATE 1	SUBSTRATE 2	ACOUSTIC	FIRE
A	ABOVE CEILING	ABOVE CEILING	ABOVE CEILING		
B	ABOVE CEILING	ABOVE CEILING	ABOVE CEILING	■	
C	TO CEILING	TO CEILING	TO CEILING		
D	TO CEILING	TO CEILING	TO CEILING	■	
E	TO CEILING	TO CEILING	TO CEILING	■	■
F	TO CEILING	TO CEILING	TO CEILING		■
G	EXPANSION HEAD	EXPANSION HEAD	EXPANSION HEAD		
H	EXPANSION HEAD	EXPANSION HEAD	EXPANSION HEAD	■	
J	EXPANSION HEAD	EXPANSION HEAD	EXPANSION HEAD	■	■
K	EXPANSION HEAD	EXPANSION HEAD	EXPANSION HEAD		■
N	PARTIAL HIGH	PARTIAL HIGH	PARTIAL HIGH		
P	PARTIAL LOW	PARTIAL LOW	PARTIAL LOW		
S	TO STRUCTURE	TO STRUCTURE	TO STRUCTURE		
T	TO STRUCTURE	TO STRUCTURE	TO STRUCTURE	■	
U	TO STRUCTURE	TO STRUCTURE	TO STRUCTURE	■	■
V	TO STRUCTURE	TO STRUCTURE	TO STRUCTURE		■
W	TO STRUCTURE	TO STRUCTURE	ABOVE CEILING		
X	TO STRUCTURE	TO STRUCTURE	ABOVE CEILING	■	

GYPSUM BOARD NOTES

TYPE	THK	LOCATION
GYPSUM WALL BOARD	1/2"	ALL INTERIOR LOCATIONS UNLESS NOTED OTHERWISE BELOW
GYPSUM WALL BOARD	5/8"	ALL INTERIOR LOCATIONS UNLESS NOTED OTHERWISE BELOW
GYPSUM BOARD, TYPE X	5/8"	ALL INTERIOR LOCATIONS UNLESS NOTED OTHERWISE BELOW
GYPSUM BOARD, TYPE C	1/2"	FIRE RATED ASSEMBLIES PER UL DESIGN.
GYPSUM BOARD, TYPE C	5/8"	FIRE RATED ASSEMBLIES PER UL DESIGN.
FLEXIBLE GYPSUM BOARD	1/4"	INSTALLED IN LAYERS INDICATED IN DRAWINGS AT CURVED WALL, CEILING, AND SOFFIT LOCATIONS.
ABUSE RESISTANT GYPSUM BOARD	1/2"	ALL CORRIDORS, FROM FLOOR SLAB TO 4'-0" ABOVE SLAB, WHERE CORRIDOR IS NOT PROTECTED WITH DURABLE WAINSCOT.
ABUSE RESISTANT GYPSUM BOARD	5/8"	ALL CORRIDORS, FROM FLOOR SLAB TO 4'-0" ABOVE SLAB, WHERE CORRIDOR IS NOT PROTECTED WITH DURABLE WAINSCOT.
ABUSE-AND-MOLD-RESISTANT GYPSUM BOARD	5/8"	ALL CORRIDORS, FROM FLOOR SLAB TO 4'-0" ABOVE SLAB, WHERE CORRIDOR IS NOT PROTECTED WITH DURABLE WAINSCOT.
IMPACT-RESISTANT GYPSUM BOARD	1/2"	ALL CORRIDORS, FROM FLOOR SLAB TO 4'-0" ABOVE SLAB, WHERE CORRIDOR IS NOT PROTECTED WITH DURABLE WAINSCOT.
IMPACT-RESISTANT GYPSUM BOARD	5/8"	ALL CORRIDORS, FROM FLOOR SLAB TO 4'-0" ABOVE SLAB, WHERE CORRIDOR IS NOT PROTECTED WITH DURABLE WAINSCOT.
MOLD-RESISTANT GYPSUM BOARD	1/2"	ALL NON-WET WALLS AND CEILINGS IN TOILET ROOMS, BATH ROOMS, LOCKER ROOMS WITHOUT WALL TILE.
MOLD-RESISTANT GYPSUM BOARD	5/8"	ALL NON-WET WALLS AND CEILINGS IN TOILET ROOMS, BATH ROOMS, LOCKER ROOMS WITHOUT WALL TILE.
GLASS-MAT INTERIOR GYPSUM BOARD	1/2"	CONTRACTOR OPTION FOR USE AT PRE-ROCK/EARLY ROUGH-IN WALL INSTALLATION AT CONCEALED LOCATIONS.
GLASS-MAT INTERIOR GYPSUM BOARD	5/8"	CONTRACTOR OPTION FOR USE AT PRE-ROCK/EARLY ROUGH-IN WALL INSTALLATION AT CONCEALED LOCATIONS.
EXTERIOR GYPSUM SOFFIT BOARD	1/2"	EXTERIOR SOFFITS
EXTERIOR GYPSUM SOFFIT BOARD	5/8"	EXTERIOR SOFFITS
GLASS-MAT GYPSUM SHEATING BOARD	1/2"	EXTERIOR SOFFITS
GLASS-MAT GYPSUM SHEATING BOARD	5/8"	EXTERIOR SOFFITS
GLASS-MAT, WATER-RESISTANT BACKING BOARD	1/2"	BEHIND ALL TILE, EXCEPT SHOWERS.
GLASS-MAT, WATER-RESISTANT BACKING BOARD	5/8"	BEHIND ALL TILE, EXCEPT SHOWERS.
WATER-RESISTANT GYPSUM BACKING BOARD	1/2"	BEHIND ALL TILE, EXCEPT SHOWERS.
WATER-RESISTANT GYPSUM BACKING BOARD	5/8"	BEHIND ALL TILE, EXCEPT SHOWERS.
CEMENTITIOUS BACKER UNITS	1/2"	BEHIND TILE AT SHOWERS AND OTHER WET AREAS.
CEMENTITIOUS BACKER UNITS	5/8"	BEHIND TILE AT SHOWERS AND OTHER WET AREAS.
REFER TO		FOR RATED GYPSUM BOARD CONTROL JOINT DETAILS

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MC PROJECT # FP24-021 / BUILDING # 206

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

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EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: FT
Checked By: MF

Drawing
PARTITION TYPES AND DETAILS

A.011

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C M Y K

1 2 3 4 5 6

A B C D E

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K Y M C

E D C B A

1 2 3 4 5 6

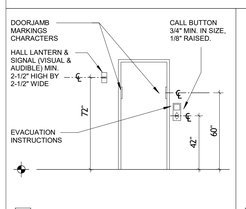
ACCESSORIES SCHEDULE OFFICES

Type Mark	DESCRIPTION	MANUFACTURER	MODEL	COUNT	PROVIDED BY	INSTALLED BY	REQUIRES WALL BLOCKING
	FAUCET, GOOSENECK, AUTOSENSOR			1			No
T-1	ADA GRAB BAR SET	BOBRICK	B-5806 SERIES	10	CONTRACTOR	CONTRACTOR	Yes
T-2	SURFACE MOUNTED WASTE RECEPTACLE	BOBRICK	B-9279	10			Yes

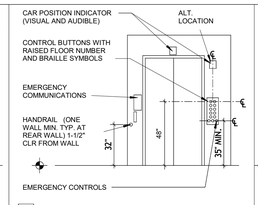
EQUIPMENT SCHEDULE

TAG	DESCRIPTION	COUNT	PROVIDED BY	INSTALLED BY	REQUIRES WALL BLOCKING	COMMENTS
AED	AED RECESSED CABINET	4	CONTRACTOR	CONTRACTOR	Yes	
BC	BLEED CONTROL RECESSED CABINET	4	CONTRACTOR	CONTRACTOR	Yes	
	COPIER/PRINTER (FLOOR)	2	OWNER	OWNER	No	
	WASTE BIN - 16X16X30	14	OWNER	OWNER	No	

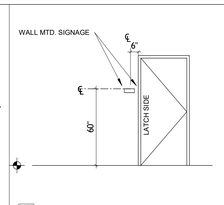
STANDARD MOUNTING HEIGHTS: SCALE 1/4" = 1'-0"



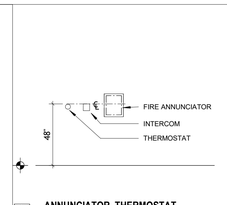
PUBLIC ELEVATOR ELEVATION



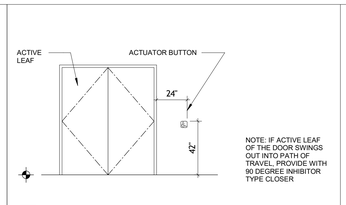
PUBLIC ELEVATOR CAB INTERIOR



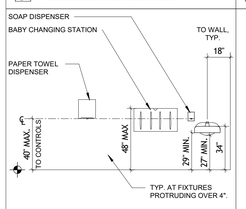
ROOM DESIGNATION



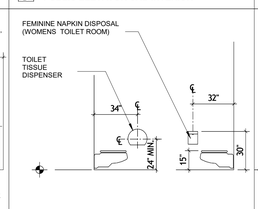
ANNUNCIATOR, THERMOSTAT, INTERCOM & CLOCK



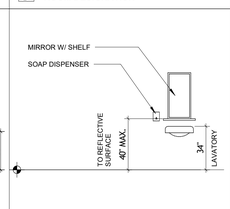
DOOR ACTUATOR BUTTON ELEVATION



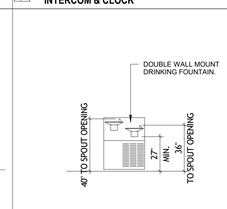
ACCESSIBLE FIXTURES & ACCESSORIES



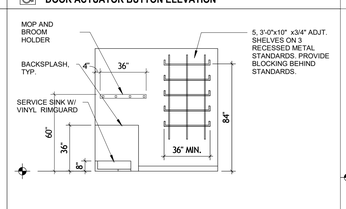
STANDARD TOILET FIXTURES & ACCESSORIES



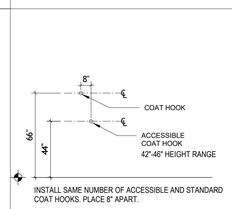
STANDARD FIXTURES & ACCESSORIES



DRINKING FOUNTAIN

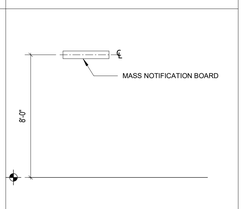


CUSTODIAL CLOSETS

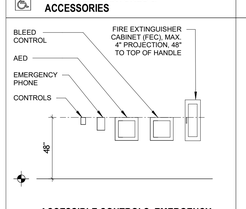


INSTALL SAME NUMBER OF ACCESSIBLE AND STANDARD COAT HOOKS. PLACE 8" APART.

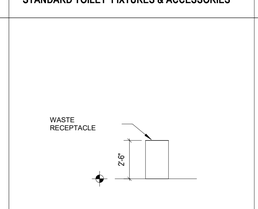
COAT HOOKS



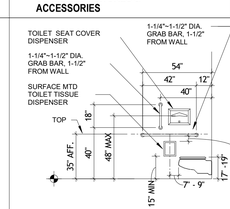
MASS NOTIFICATION BOARDS



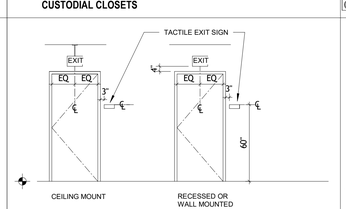
ACCESSIBLE CONTROLS, EMERGENCY PHONE, AED, BLEED CONTROL & FIRE EXTINGUISHER CABINET



ACCESSIBLE WASTE RECEPTACLE

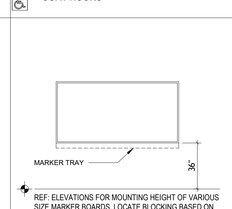


ACCESSIBLE TOILET FIXTURES & ACCESSORIES



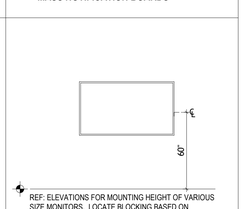
EXIT SIGN

NOTE: PROVIDE TACTILE EXIT SIGNAGE WHERE ILLUMINATED EXIT SIGNS ARE REQUIRED OR WHERE REQUIRED BY CBC 1011.3



REF: ELEVATIONS FOR MOUNTING HEIGHT OF VARIOUS SIZE MARKER BOARDS. LOCATE BLOCKING BASED ON MANUFACTURERS REQUIREMENTS

MARKERBOARD/TACKBOARD



REF: ELEVATIONS FOR MOUNTING HEIGHT OF VARIOUS SIZE MONITORS. LOCATE BLOCKING BASED ON MANUFACTURERS REQUIREMENTS

MONITOR

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MC PROJECT # FP24-021 / BUILDING # 206

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

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LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: LL
Checked By:

Drawing
ACCESSORIES & EQUIPMENT MOUNTING HEIGHTS & SCHEDULES
A.054

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E

D

C

B

A

1 2 3 4 5 6

PARKING LOT

WEST CAMPUS DR.

FIRE HYDRANT

LOADING DOCK

ETR FDC

ETR FDC

SCIENCE CENTER WEST

MACKLIN TOWER LIBRARY

TECHNICAL CENTER

NORTH CAMPUS DR.

SCIENCE CENTER

COMPPUTER SCIENCE BUILDING

HUMANITIES BUILDING

STUDENT SERVICES CENTER

APMPHITHEATER

FAMILY QUAD

ACADEMIC ANNEX

THEATER ARTS BUILDING

CAMPUS CENTER

PARKING LOT

TRUE NORTH

A1 ARCHITECTURAL SITE PLAN- OVERALL

AS.101 1" = 30'-0"

(AS)

(XX) SHEET KEYNOTES

NUM.	NOTE
AS	

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MC PROJECT # FP24-021 / BUILDING # 206

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

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EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number:	225012.00
Drawn By:	FT
Checked By:	MF

Drawing
OVERALL SITE PLAN (BUILDINGS)

AS.101

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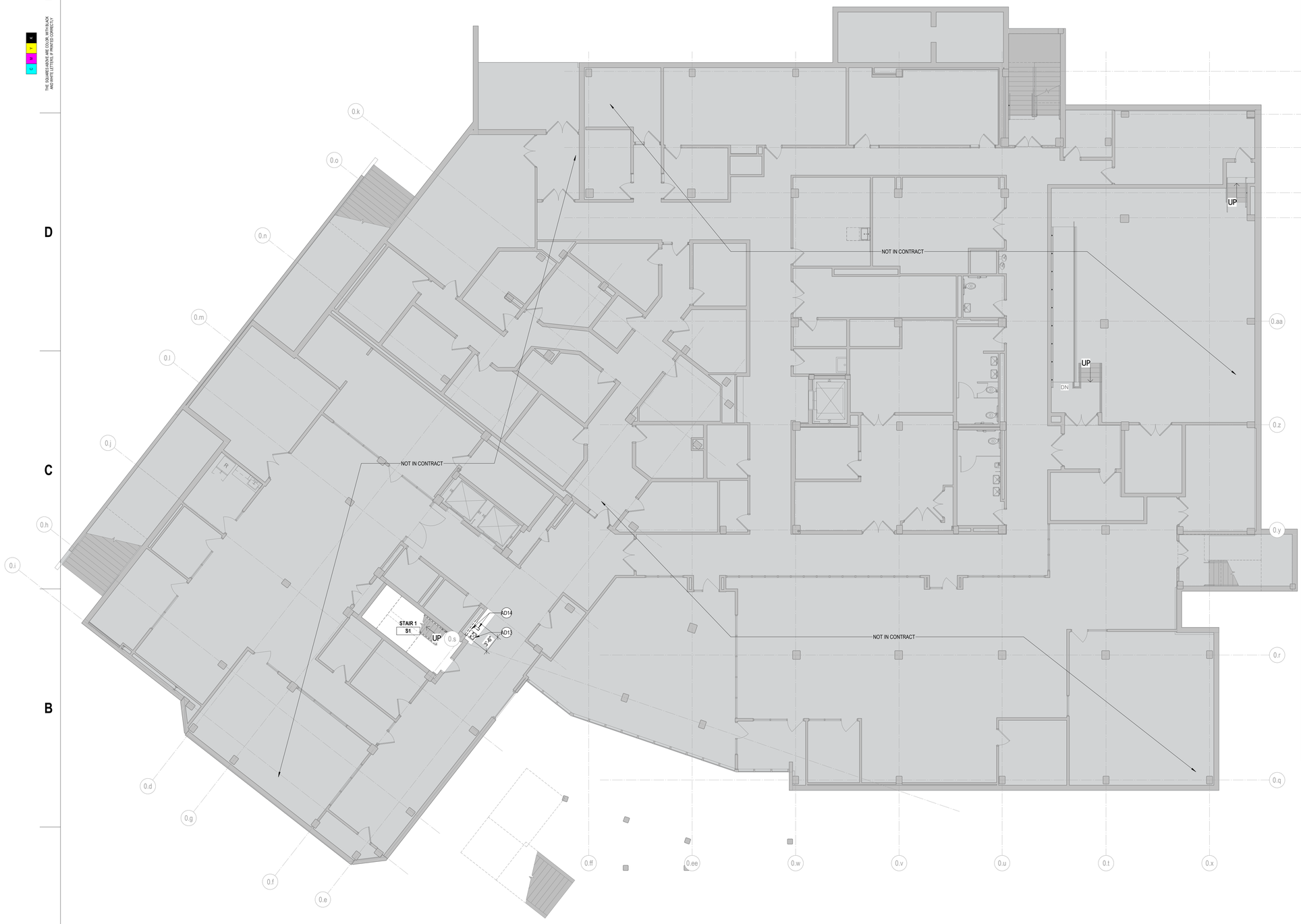

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

DEMOLITION PLAN GENERAL NOTES

1. GENERAL CONTRACTOR TO COORDINATE SCHEDULING ALL WORK WITH OWNER.
2. WORK LABELED [NIC], OR OTHERWISE NOT NOTED IS NOT IN CONTRACT FOR ANY ARCHITECTURAL IMPROVEMENTS.
3. THE GENERAL CONTRACTOR & THEIR SUBCONTRACTORS SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS WITH CONDITIONS SHOWN IN THE CONTRACT DOCUMENTS AND SHALL REPORT ANY DEVIATIONS, DISCREPANCIES AND/OR CONFLICTS TO ARCHITECT AND OWNER.
4. THE GENERAL CONTRACTOR & SUBCONTRACTOR SHALL TAKE EXTREME CARE DURING DEMOLITION NOT TO DAMAGE OR DISTURB ANY EXISTING CONDITIONS THAT ARE TO REMAIN. GENERAL CONTRACTOR OR SUBCONTRACTOR SHALL REPAIR ANY DAMAGE OR DISTURBANCE TO EXISTING CONDITIONS AT NO COST TO THE OWNER.
5. PROVIDE PROTECTION FOR FLOORS, WALLS, CEILING & BUILT-IN FURNITURE AT ALL EXISTING CONDITIONS TO REMAIN, INCLUDING TRAFFIC AREA FOR DEMOLITION REMOVAL IN COMMON BUILDING AREAS & FREIGHT ELEVATORS. DAMAGED FLOORS, WALLS, CEILINGS & BUILT-IN FURNITURE WILL BE REPLACED @ NO COST TO OWNER.
6. REMOVE ALL WALLS, DOORS [AND OTHER ITEMS] SHOWN DASHED - FIELD VERIFY CONSTRUCTION OF ALL WALLS TO BE REMOVED - PROVIDE SHORING AND BRACING AS REQUIRED.
7. ALL ITEMS WITHIN WALLS TO BE REMOVED ARE NOT SHOWN - FIELD VERIFY EXISTING CONDITIONS AND TO TEMPORARILY OR PERMANENTLY REMOVE ITEMS AS NECESSARY FOR NEW CONSTRUCTION.
8. REMOVE ALL EXISTING POWER AND ASSOCIATED CONDUIT AND OTHER MISCELLANEOUS ITEMS WHERE INDICATED ON EXISTING WALLS TO BE REUSED. IF REMOVAL WILL DISRUPT PERFORMANCE OF ANY ITEM NOT INCLUDED IN THIS SCOPE, RELOCATE AND ENSURE PROPER FUNCTION IS RESTORED.
9. GENERAL CONTRACTOR TO COORDINATE ABATEMENT CONSULTANT FOR ANY CONTAMINATED MATERIALS TO BE REMOVED BEFORE WORK TO BEGIN IN THIS AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE APPROPRIATE REMOVAL OF HAZARDOUS MATERIALS AS REQUIRED TO COMPLETE THE NEW WORK, AND SHALL COORDINATE THESE ACTIVITIES WITH THE OWNER'S REPRESENTATIVE.
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16. REFER TO [ELECTRICAL, MECHANICAL, STRUCTURAL, LANDSCAPE, ETC.] DEMOLITION DRAWINGS FOR ADDITIONAL ITEMS.
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(XX) SHEET KEYNOTES

NUM.	NOTE
AD13	DEMO (E) DRINKING FOUNTAIN. CAP AND SEAL CONNECTIONS
AD14	DEMO (E) WALLS

A1 GROUND FLOOR DEMOLITION PLAN

A-201 | AD.10G

1/8" = 1'-0"

TRUE NORTH | PROJECT NORTH

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MC PROJECT # FP24-021 / BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
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INTERIOR DESIGN

ARCH NAME ARCH ##

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Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
GROUND FLOOR DEMOLITION PLAN

AD.10G

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

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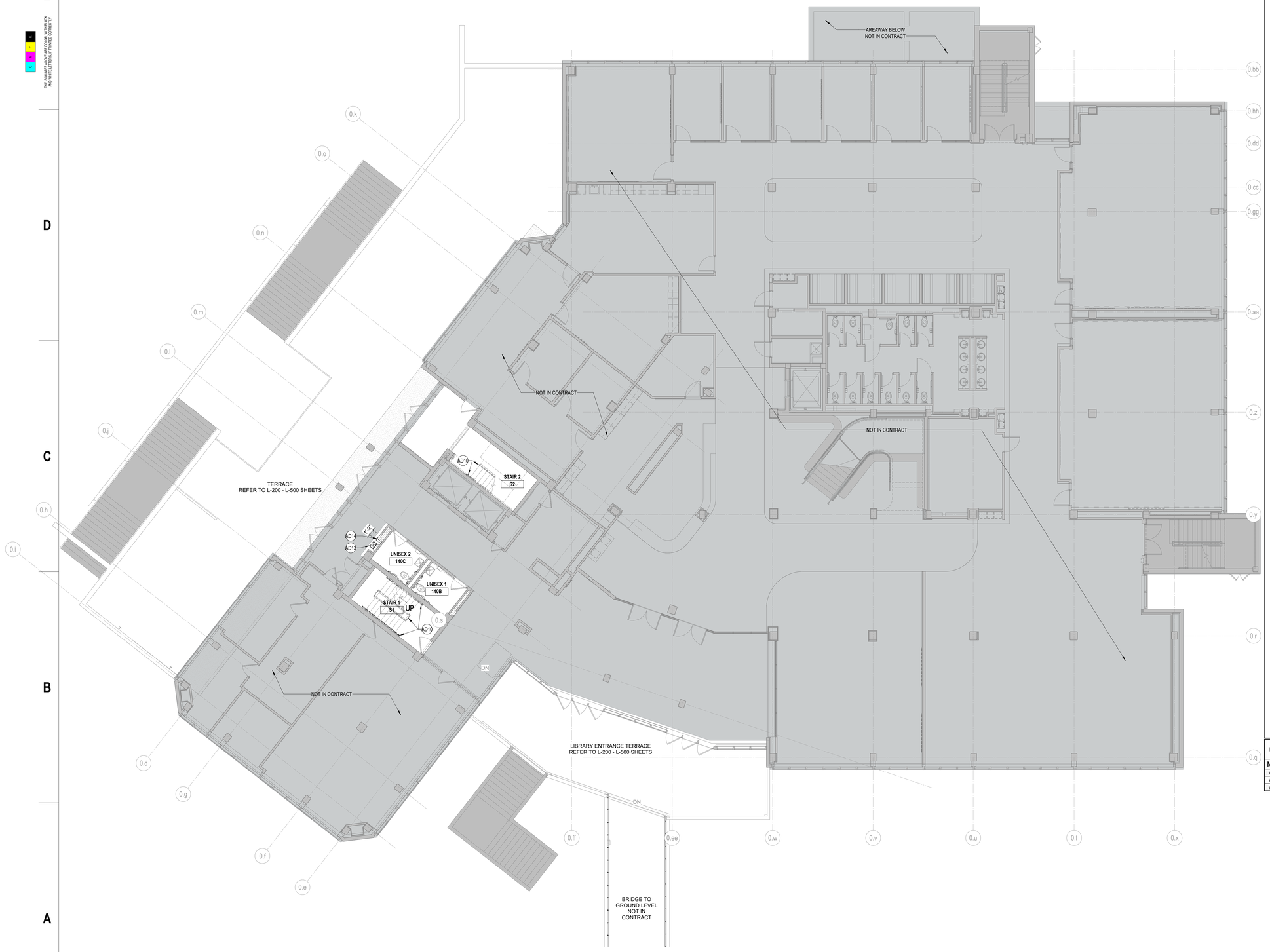

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

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SHEET KEYNOTES

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AD13	DEMO (E) DRINKING FOUNTAIN. CAP AND SEAL CONNECTIONS
AD14	DEMO (E) WALLS

A1 FIRST FLOOR DEMOLITION PLAN

A-201 | AD.101 | 1/8" = 1'-0"

TRUE NORTH | PROJECT NORTH

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Checked By: MF

Drawing
FIRST FLOOR
DEMOLITION PLAN

AD.101

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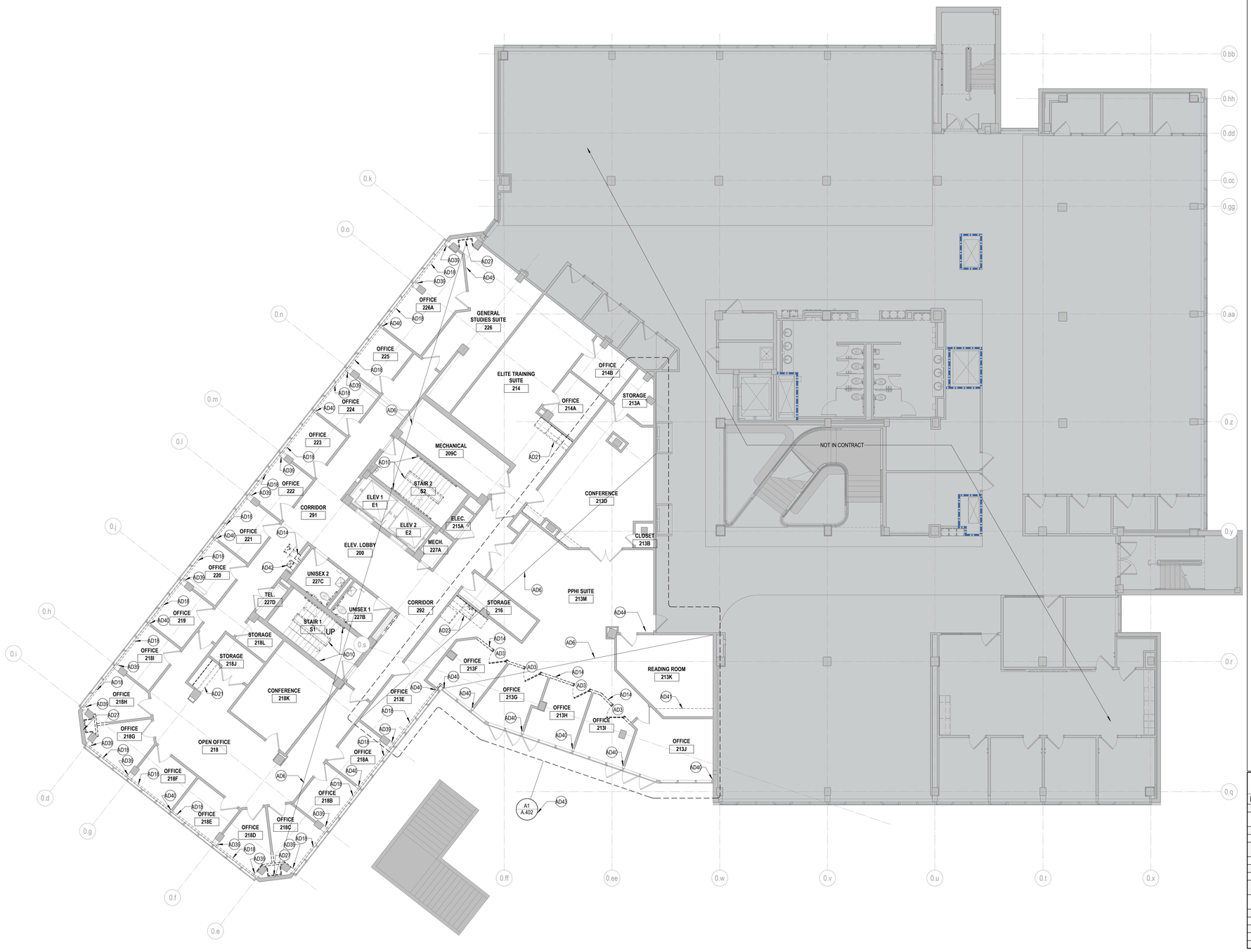

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SHEET KEYNOTES

NUM.	NOTE
AD3	DEMO (E) DOOR(S) AND FRAMES, SALVAGE DOOR HARDWARE AND RETURN TO OWNER
AD6	DEMO (E) FLOOR FINISHES, WALL BASE, AND ADHESIVES DOWN TO THE STRUCTURAL SLAB BELOW FOR EXTENT SHOWN. PREPARE SLAB TO RECEIVE PROPOSED FINISHES.
AD10	DEMO (E) FLOOR MOUNTED GUARDRAIL AND WALL MOUNTED HANDRAIL
AD14	DEMO (E) WALLS
AD18	DEMO (E) DRYWALL & WOOD FRAMING ON EXTERIOR KNEE WALL UNDER CURTAINWALL SILL. PREPARE FOR NEW WORK. SEE A-503
AD21	DEMO (E) SERVICE AREA MILLWORK.
AD23	DEMO (E) MILLWORK, PLUMBING FIXTURE, AND CAP EXISTING PLUMBING LINES.
AD27	DEMO (E) DRYWALL AND PREPARE CMU WALL FOR INSULLATION AND FURRING. SEE A-503
AD39	REMOVE (E) COLUMN CAP CAREFULLY & TEMPORARILY STORE FOR MODIFICATION AND REINSTALLATION.
AD40	REMOVE (E) ALUM. WALL PARTITION END CAP CAREFULLY & TEMPORARILY STORE FOR MODIFICATION AND REINSTALLATION.
AD41	DEMO (E) COUNTER TOP. PATCH & REPAIR WALL AS REQ'D.
AD42	DEMO (E) DRINKING FOUNTAIN. CAP IN PREPARATION OF REPLACEMENT DRINKING FOUNTAIN.
AD43	REFER TO SHEET A.402 FOR ALTERNATE #4.
AD44	RELOCATE FURNITURE/CABINET AT THIS LOCATION. COORDINATE WITH OWNER.
AD45	RELOCATE WALL MOUNTED CABINET AT THIS LOCATION. COORDINATE WITH OWNER.

A1 SECOND FLOOR DEMOLITION PLAN

A-201 | AD.102 | 1/8" = 1'-0"

TRUE NORTH | PROJECT NORTH

ARCHITECT
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MONTGOMERY COLLEGE
MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
51 MANNAKEE STREET
ROCKVILLE, MD 20850
MC PROJECT # FP24-021 / BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

PROFESSIONAL CERTIFICATION: I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OF APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
SECOND FLOOR DEMOLITION PLAN

AD.102

NOT FOR CONSTRUCTION

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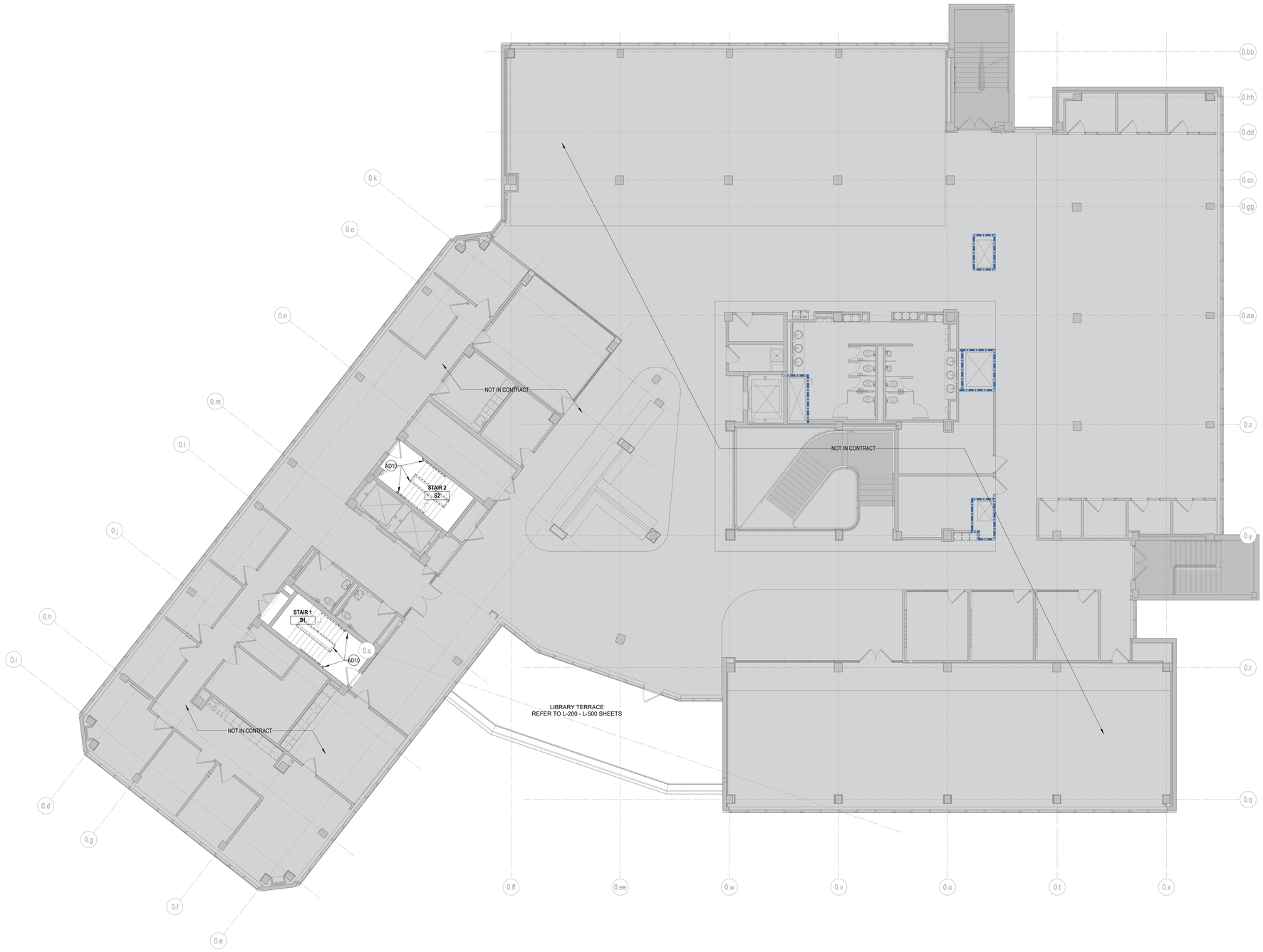

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

DEMOLITION PLAN GENERAL NOTES

1. GENERAL CONTRACTOR TO COORDINATE SCHEDULING ALL WORK WITH OWNER.
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5. PROVIDE PROTECTION FOR FLOORS, WALLS, CEILING & BUILT-IN FURNITURE AT ALL EXISTING CONDITIONS TO REMAIN, INCLUDING TRAFFIC AREA FOR DEMOLITION REMOVAL IN COMMON BUILDING AREAS & FREIGHT ELEVATORS. DAMAGED FLOORS, WALLS, CEILINGS & BUILT-IN FURNITURE WILL BE REPLACED @ NO COST TO OWNER.
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10. COORDINATE DEMOLITION AND CONSTRUCTION ACTIVITIES WITH THE OWNER'S REPRESENTATIVE TO MINIMIZE DISRUPTION OF NORMAL DAILY FUNCTIONS WITHIN OCCUPIED AREAS.
11. KEEP NOISE DURING DEMOLITION AND CONSTRUCTION TO A MINIMUM WHEN OCCUPIED SPACES ARE IN USE. HIGH LEVEL NOISE WILL NEED TO BE CONDUCTED DURING OFF HOURS.
12. INSTALL TEMPORARY BARRICADES AND PARTITIONS TO PREVENT INJURY TO PERSONS IN AND AROUND DEMOLITION AND CONSTRUCTION AREAS IN ACCORDANCE WITH OSHA REQUIREMENTS. COORDINATE LOCATIONS AND INSTALLATION WITH OWNER'S REPRENSENTATIVE.
13. INSTALL DUST PARTITIONS IN ACCORDANCE WITH FIRE PROTECTION AND EGRESS REQUIREMENTS AND COORDINATE LOCATIONS AND INSTALLATION WITH THE OWNER'S REPRESENTATIVE.
14. UPON REMOVAL OF TEMPORARY PARTITIONS, PATCH DISTURBED EXISTING AREAS TO MATCH EXISTING ADJACENT CONSTRUCTION. IF PAINTING IS REQUIRED, REPAINT ENTIRE WALL TO AVOID MISMATCH OF COLOR.
15. REFER TO SPECIFICATIONS REGARDING; EXISTING CONDITIONS, CUTTING AND PATCHING AND SELECTIVE DEMOLITION REQUIREMENTS THAT APPLY TO ALL WORK KEY NOTES DESCRIBED ON THIS SHEET.
16. REFER TO [ELECTRICAL, MECHANICAL, STRUCTURAL, LANDSCAPE, ETC.] DEMOLITION DRAWINGS FOR ADDITIONAL ITEMS.
17. EXISTING FIRE & SMOKE DETECTION SYSTEMS ARE TO BE PROTECTED FROM DUST AND CONTAMINANT IN AND AROUND THE DEMOLITION AREA.
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33. REMOVE PORTIONS OF WATER DAMAGED WALLS AND CEILINGS AS REQUIRED TO ALIGN WITH PROPOSED OR EXISTING ADJACENT FINISHES AS DESCRIBED IN CONTRACT DOCUMENTS.
34. COORDINATE WITH OWNER TO IDENTIFY WHICH FURNITURE WILL BE REMOVED TO STORE AND WHICH WILL BE TO DISPOSE.
35. ALL CURTAIN WALL-COLUMN GAPS CAPS ARE ETR, UNO. REMOVE AND REINSTALL WHERE NEEDED.
36. FOR DEMOLITION OF DOORS ON ALTERNATE #4, SEE DOOR SCHEDULE ON SHEET A.601 & A.602.

SHEET KEYNOTES

NUM.	NOTE
AD10	DEMO (E) FLOOR MOUNTED GUARDRAIL AND WALL MOUNTED HANDRAIL

A1 THIRD FLOOR DEMOLITION PLAN

A-201 | AD.103 — 1/8" = 1'-0"

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Checked By: MF

Drawing
THIRD FLOOR
DEMOLITION PLAN

AD.103

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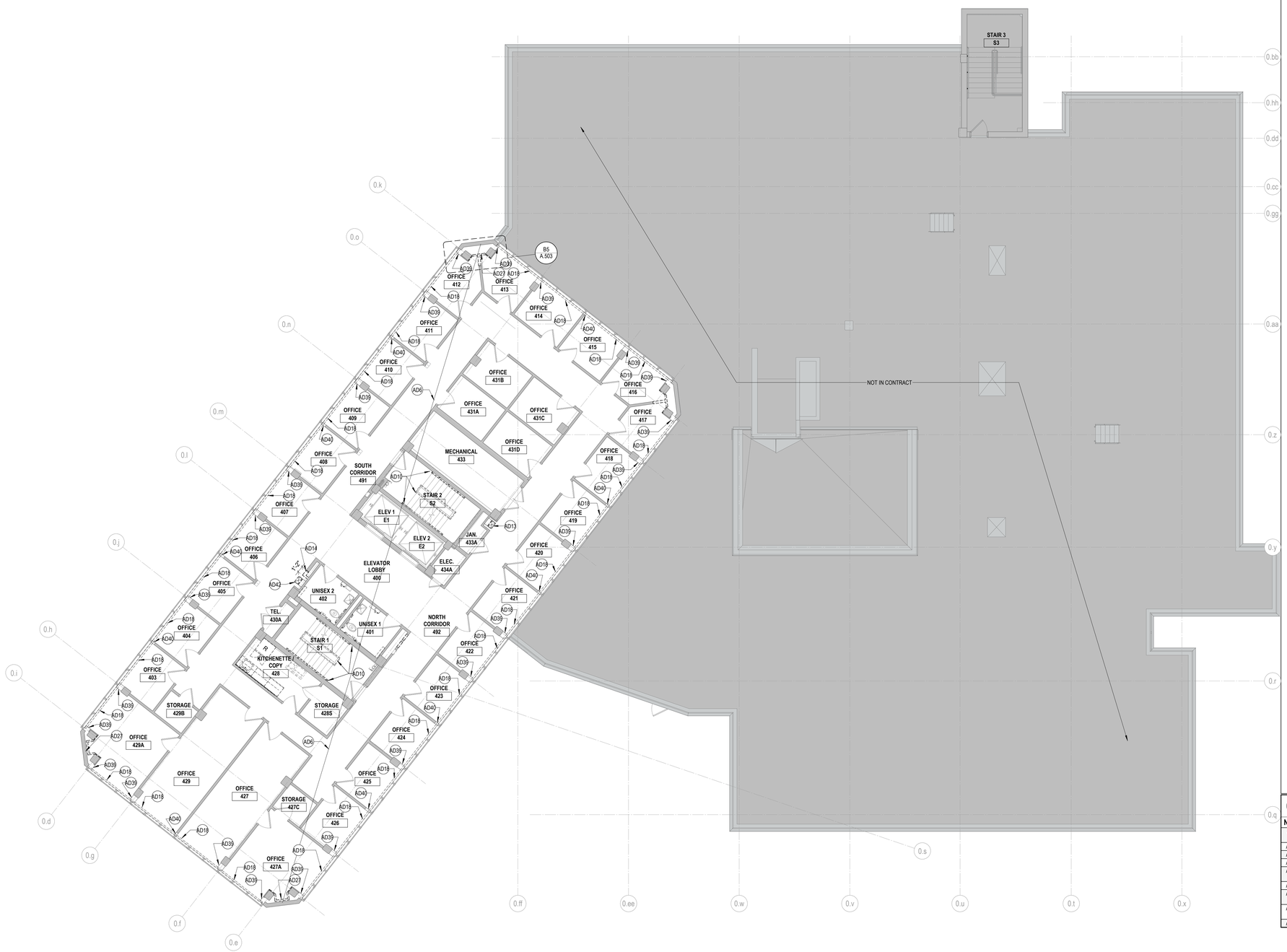

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

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36. FOR DEMOLITION OF DOORS ON ALTERNATE #4, SEE DOOR SCHEDULE ON SHEET A.601 & A.602.

SHEET KEYNOTES

NUM.	NOTE
AD6	DEMO (E) FLOOR FINISHES, WALL BASE, AND ADHESIVES DOWN TO THE STRUCTURAL SLAB BELOW FOR EXTENT SHOWN. PREPARE SLAB TO RECEIVE PROPOSED FINISHES.
AD10	DEMO (E) FLOOR MOUNTED GUARDRAIL AND WALL MOUNTED HANDRAIL
AD13	DEMO (E) DRINKING FOUNTAIN. CAP AND SEAL CONNECTIONS
AD14	DEMO (E) WALLS
AD18	DEMO (E) DRYWALL & WOOD FRAMING ON EXTERIOR KNEE WALL UNDER CURTAINWALL SILL. PREPARE FOR NEW WORK. SEE A-503
AD27	DEMO (E) DRYWALL AND PREPARE CMU WALL FOR INSULLATION AND FURRING. SEE A-503
AD39	REMOVE (E) COLUMN CAP CAREFULLY & TEMPORARILY STORE FOR MODIFICATION AND REINSTALLATION.
AD40	REMOVE (E) ALUM. WALL PARTITION END CAP CAREFULLY & TEMPORARILY STORE FOR MODIFICATION AND REINSTALLATION.
AD42	DEMO (E) DRINKING FOUNTAIN. CAP IN PREPARATION OF REPLACEMENT DRINKING FOUNTAIN.

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LICENSE NUMBER:
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Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
FOURTH FLOOR DEMOLITION PLAN

AD.104

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

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A1 FOURTH FLOOR DEMOLITION PLAN
A-201 | AD.104 1/8" = 1'-0"

TRUE NORTH PROJECT NORTH

1 2 3 4 5 6
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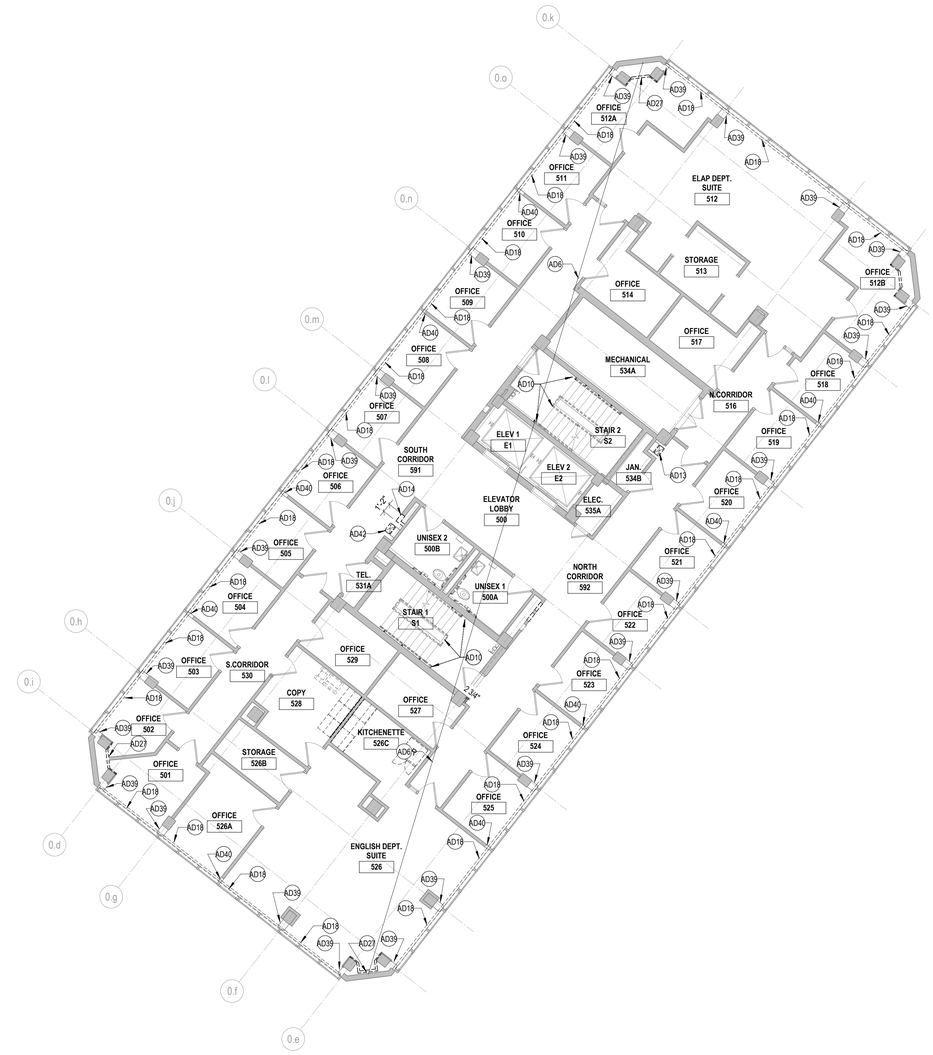

A1 FIFTH FLOOR DEMOLITION PLAN

A-201	AD.105	1/8" = 1'-0"

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

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35. ALL CURTAIN WALL-COLUMN GAPS CAPS ARE ETR, UNO. REMOVE AND REINSTALL WHERE NEEDED.
36. FOR DEMOLITION OF DOORS ON ALTERNATE #4, SEE DOOR SCHEDULE ON SHEET A.601 & A.602.

(XX) **SHEET KEYNOTES**

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AD6	DEMO (E) FLOOR FINISHES, WALL BASE, AND ADHESIVES DOWN TO THE STRUCTURAL SLAB BELOW FOR EXTENT SHOWN. PREPARE SLAB TO RECEIVE PROPOSED FINISHES.
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AD13	DEMO (E) DRINKING FOUNTAIN. CAP AND SEAL CONNECTIONS
AD14	DEMO (E) WALLS
AD18	DEMO (E) DRYWALL & WOOD FRAMING ON EXTERIOR KNEE WALL UNDER CURTAINWALL SILL. PREPARE FOR NEW WORK. SEE A-503
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Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
FIFTH FLOOR
DEMOLITION PLAN

AD.105

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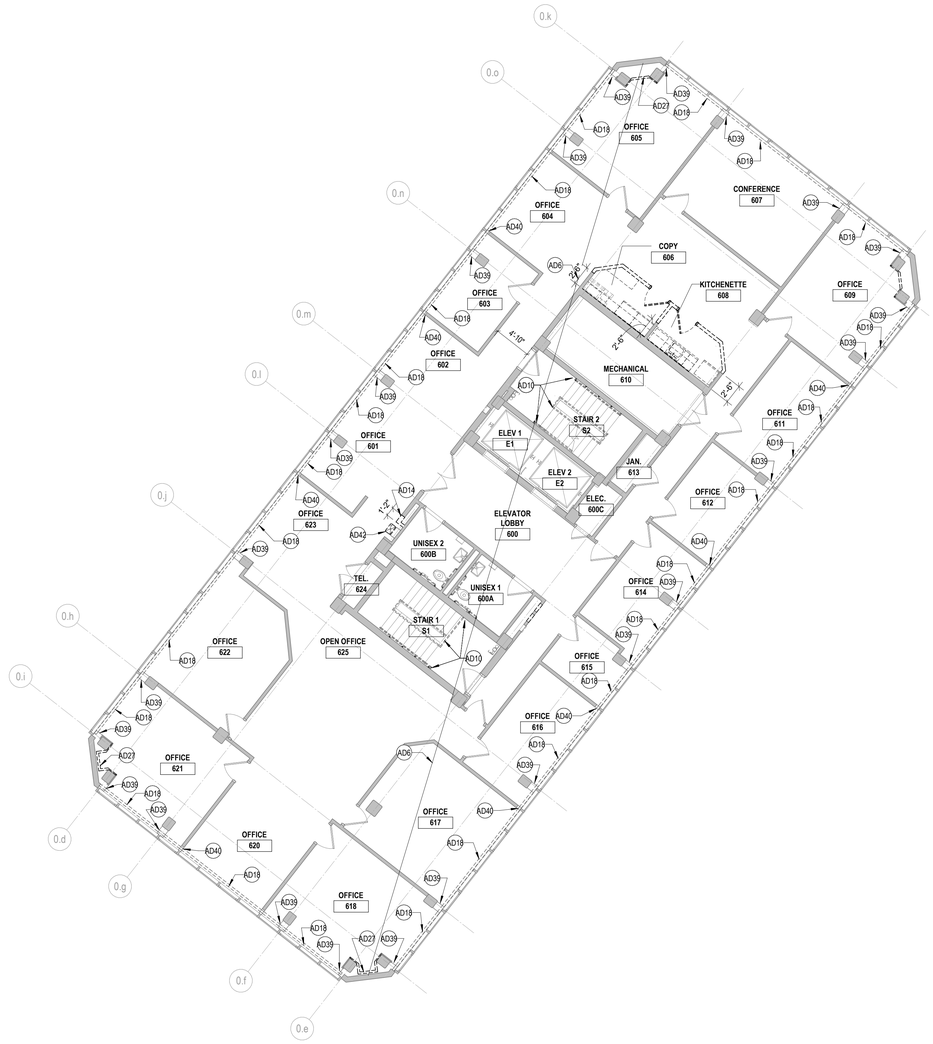

A1 SIXTH FLOOR DEMOLITION PLAN

A-201	AD.106	1/8" = 1'-0"

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

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Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
SIXTH FLOOR DEMOLITION PLAN

AD.106

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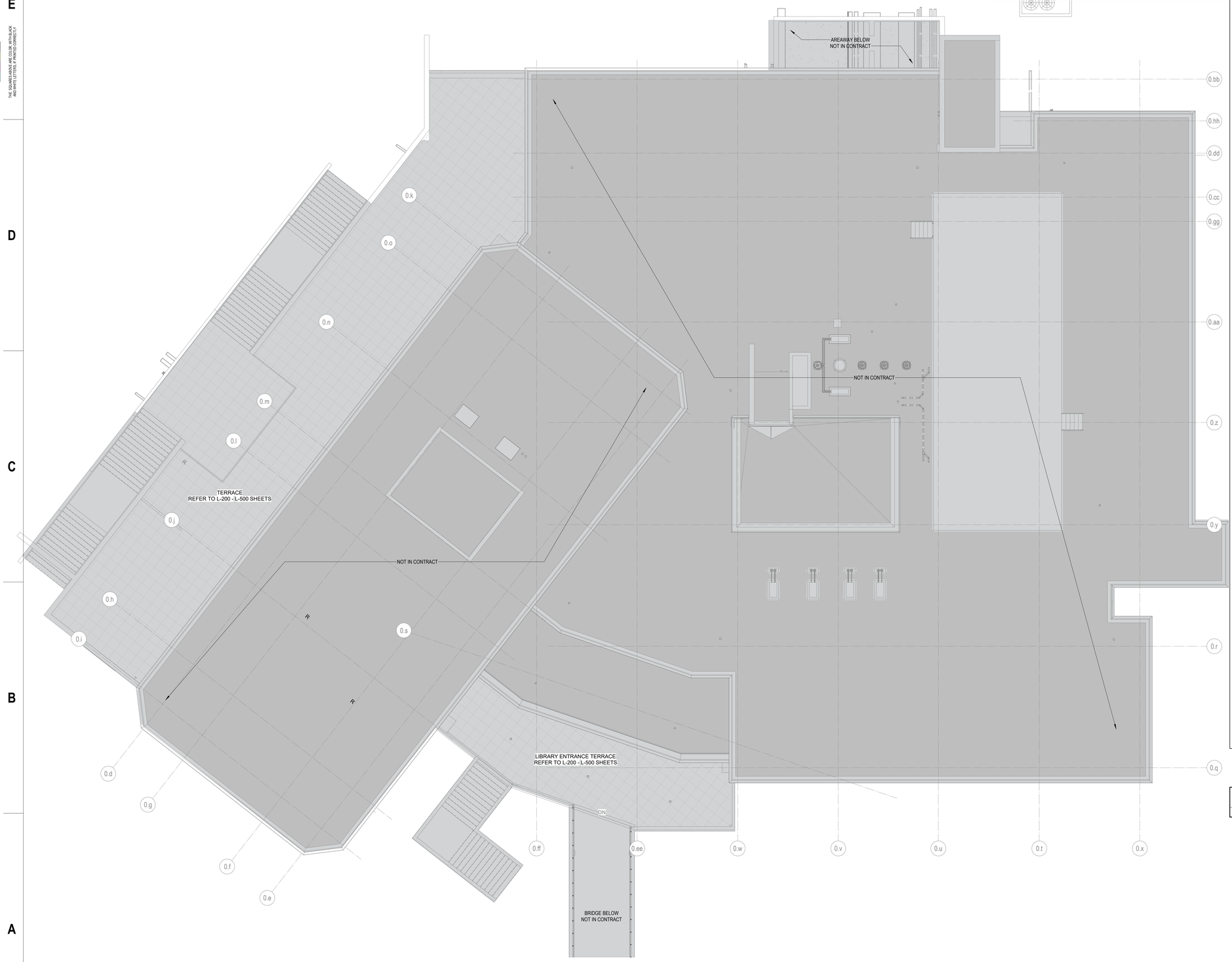

PLAN LEGEND

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SHEET KEYNOTES

XX	NOTE

TRUE NORTH / PROJECT NORTH

A1 DEMOLITION ROOF PLAN

A-201 | AD.1R1 | 1/8" = 1'-0"

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Drawing
DEMOLITION PLAN-ROOF

AD.1R1

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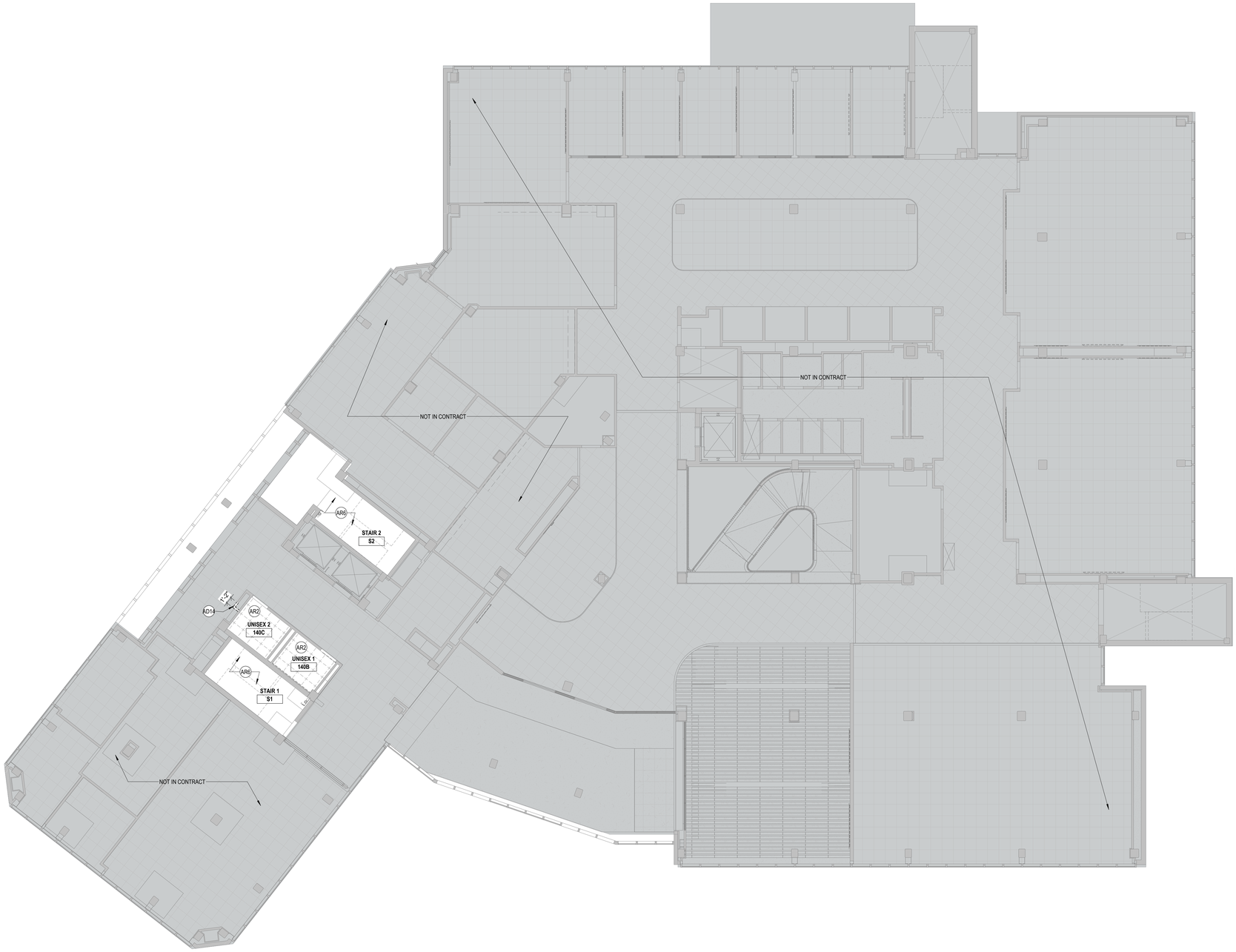
THE SQUARES BESIDE ARE COLOR, WITH BLACK AND WHITE, LETTERS IF PRINTED CORRECTLY



PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

DEMOLITION RCP GENERAL NOTES

1. REMOVE ALL CEILINGS [SOFFITS, LIGHT FIXTURES, ETC.] SHOWN DASHED - FIELD VERIFY CONSTRUCTION OF ALL CEILINGS TO BE REMOVED - PROVIDE SHORING AND BRACING AS REQUIRED. REFER TO ELECTRICAL, MECHANICAL AND STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
2. REMOVE ALL LIGHT FIXTURES, GRILLS AND RETURNS.
3. REMOVE STAPLES, NAILS AND SCREWS FROM CEILINGS AND SOFFITS, TYPICAL THROUGHOUT.
4. REFER TO CONSULTANT DEMOLITION DRAWINGS FOR ADDITIONAL NFORMATION.
5. REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
6. REMOVE [AND SALVAGE] ALL CEILING MOUNTED EQUIPMENT PROJECTORS, PULL DOWN SCREENS, SPEAKERS, ETC] AND TURN OVER TO OWNER. SHOULD REMOVAL NOT BE NECESSARY, COVER AND PROTECT ELEMENTS DURING CONSTRUCTION.
7. GENERAL CONTRACTOR TO COORDINATE WITH ABATEMENT CONSULTANT FOR ANY CONTAMINATED MATERIALS TO BE REMOVED BEFORE WORK TO BEGIN IN THIS AREA.
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9. COORDINATE DEMOLITION AND CONSTRUCTION ACTIVITIES WITH THE OWNER'S REPRESENTATIVE TO MINIMIZE DISRUPTION OF NORMAL DAILY FUNCTIONS WITHIN OCCUPIED AREAS.
10. KEEP NOISE DURING DEMOLITION AND CONSTRUCTION TO A MINIMUM WHEN OCCUPIED SPACES ARE IN USE.
11. INSTALL TEMPORARY BARRICADES AND PARTITIONS TO PREVENT INJURY TO PERSONS IN AN AROUND DEMOLITION AND CONSTRUCTION AREAS IN ACCORDANCE WITH OSHA REQUIREMENTS. COORDINATE LOCATIONS AND INSTALLATION WITH OWNER'S REPRENSENTATIVE.
12. INSTALL DUST PARTITIONS IN ACCORDANCE WITH FIRE PROTECTION AND EGRESS REQUIREMENTS AND COORDINATE LOCATIONS AND INSTALLATION WITH THE OWNER'S REPRESENTATIVE.
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14. DASHED LINES INDICATE WALLS AND ITEMS TO BE REMOVED. REFER TO A0.10 FOR A GRAPHIC LEGEND.
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25. COORDINATE WITH MEP REQUIREMENTS FOR CONDITIONS THAT WILL DISTURB EXISTING CONDITIONS AND WHICH WILL REQUIRE SELECTIVE DEMOLITION, CUTTING AND PATCHING, AND FINISHING OUTSIDE OF THAT SHOWN ON THE DRAWINGS.
26. REMOVE PORTIONS OF WATER DAMAGED WALLS AND CEILINGS AS REQUIRED TO ALIGN WITH PROPOSED OR EXISTING ADJACENT FINISHES AS DESCRIBED IN CONTRACT DOCUMENTS.

SHEET KEYNOTES

NUM.	NOTE
AD14	DEMO (E) WALLS
AR2	DEMO (E) ACOUSTICAL PANEL CEILING AND METAL SUSPENSION GRID. FOR WORK TO CEILING MOUNTED DEVICES, REFER TO MEP DRAWINGS.
AR6	DEMO (E) LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.

A1 FIRST FLOOR DEMOLITION RCP

A-201 | AQ.101 — 1/8" = 1'-0"

TRUE NORTH | PROJECT NORTH

ARCHITECT
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ROCKVILLE, MD 20850
MC PROJECT # FP24-021 / BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME — ARCH ##

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
FIRST FLOOR DEMO REFLECTED CEILING PLAN

AQ.101

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

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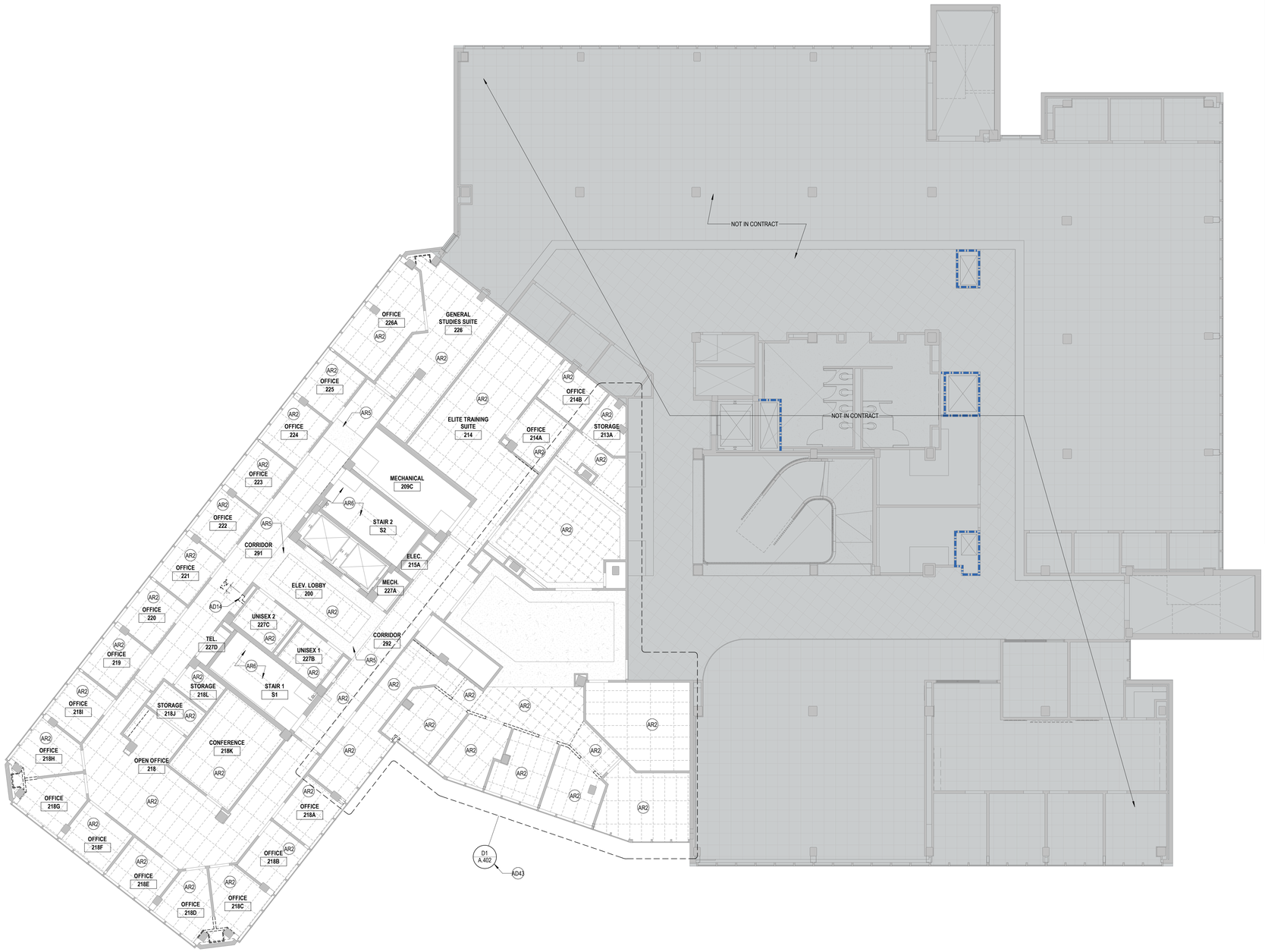

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

DEMOLITION RCP GENERAL NOTES

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SHEET KEYNOTES

NUM.	NOTE
AD14	DEMO (E) WALLS
AD43	REFER TO SHEET A.402 FOR ALTERNATE #4.
AR2	DEMO (E) ACOUSTICAL PANEL CEILING AND METAL SUSPENSION GRID. FOR WORK TO CEILING MOUNTED DEVICES, REFER TO MEP DRAWINGS.
AR5	EXISTING BULKHEADS ARE TO REMAIN.
AR6	DEMO (E) LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.

A1 SECOND FLOOR DEMOLITION RCP

A-201	AQ.102

1/8" = 1'-0"

TRUE NORTH

PROJECT NORTH

ARCHITECT
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ALEXANDRIA, VA 22314
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ROCKVILLE, MD 20850

MC PROJECT # FP24-021 / BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

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LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
SECOND FLOOR DEMO REFLECTED CEILING PLAN

AQ.102

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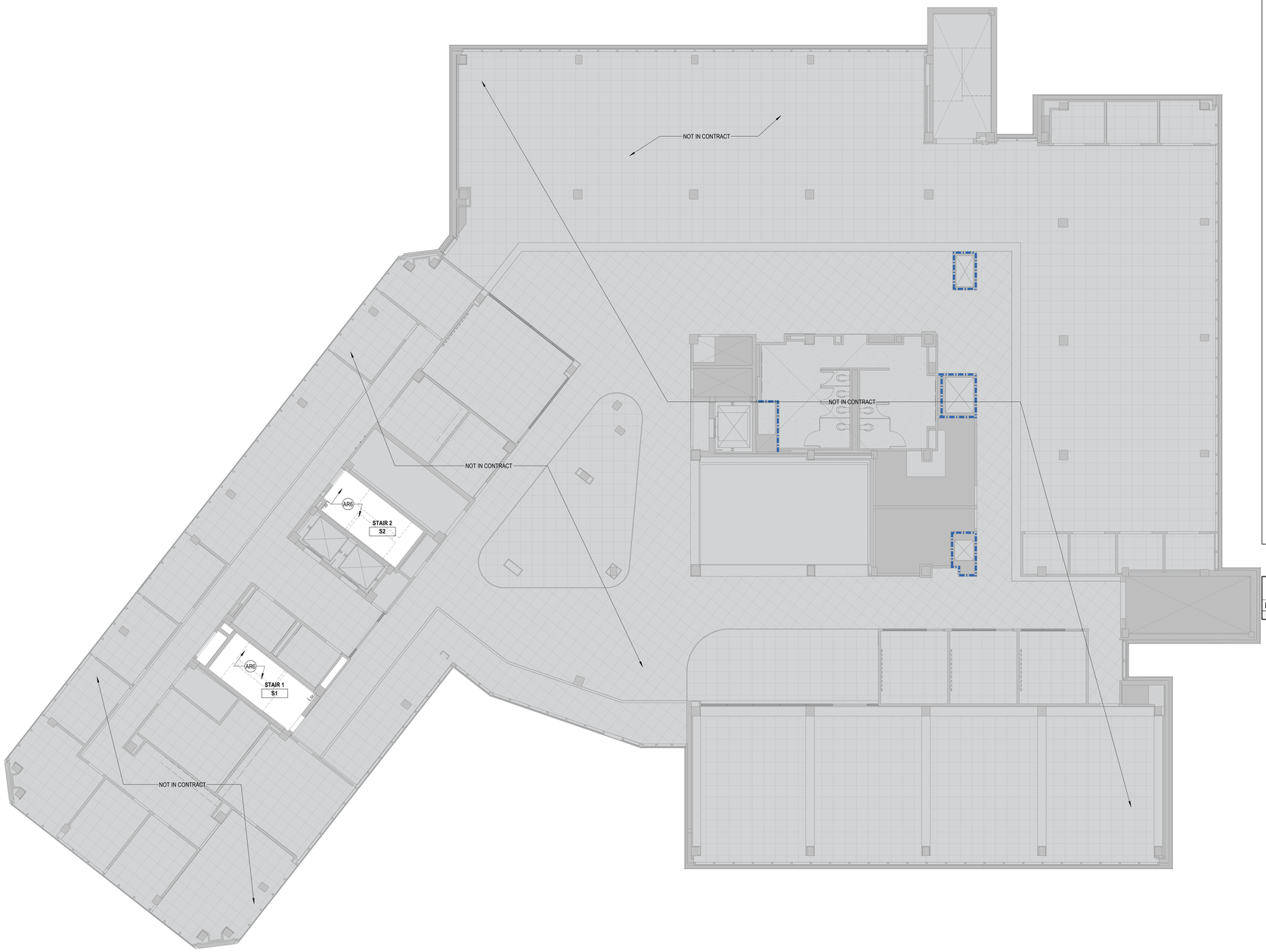

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

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SHEET KEYNOTES

NUM.	NOTE
AR6	DEMO (E) LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.

A1 TR03 - THIRD FLOOR DEMOLITION RCP

A-201 | AQ.103 | 1/8" = 1'-0"

TRUE NORTH | PROJECT NORTH

ARCHITECT
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LICENSE NUMBER:
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Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
THIRD FLOOR DEMO REFLECTED CEILING PLAN

AQ.103

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A1 FOURTH FLOOR DEMOLITION RCP

A-201	AQ.104	1/8" = 1'-0"

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

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25. COORDINATE WITH MEP REQUIREMENTS FOR CONDITIONS THAT WILL DISTURB EXISTING CONDITIONS AND WHICH WILL REQUIRE SELECTIVE DEMOLITION, CUTTING AND PATCHING, AND FINISHING OUTSIDE OF THAT SHOWN ON THE DRAWINGS.
26. REMOVE PORTIONS OF WATER DAMAGED WALLS AND CEILINGS AS REQUIRED TO ALIGN WITH PROPOSED OR EXISTING ADJACENT FINISHES AS DESCRIBED IN CONTRACT DOCUMENTS.

SHEET KEYNOTES

(XX)

NUM.	NOTE
AD14	DEMO (E) WALLS
AR2	DEMO (E) ACOUSTICAL PANEL CEILING AND METAL SUSPENSION GRID. FOR WORK TO CEILING MOUNTED DEVICES, REFER TO MEP DRAWINGS.
AR5	EXISTING BULKHEADS ARE TO REMAIN.
AR6	DEMO (E) LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.

TRUE NORTH PROJECT NORTH

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MC PROJECT # FP24-021 / BUILDING # 206

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
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ARCH NAME ARCH ##

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LICENSE NUMBER:
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Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
FOURTH FLOOR DEMO REFLECTED CEILING PLAN

AQ.104

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A1 FIFTH FLOOR FDEMOLITION RCP

A-201	AQ.105	1/8" = 1'-0"

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

DEMOLITION RCP GENERAL NOTES

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2. REMOVE ALL LIGHT FIXTURES, GRILLS AND RETURNS.
3. REMOVE STAPLES, NAILS AND SCREWS FROM CEILINGS AND SOFFITS, TYPICAL THROUGHOUT.
4. REFER TO CONSULTANT DEMOLITION DRAWINGS FOR ADDITIONAL NFORMATION.
5. REFER TO ELECTRICAL DRAWINGS FOR ADDITIONAL INFORMATION.
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14. DASHED LINES INDICATE WALLS AND ITEMS TO BE REMOVED. REFER TO A0.10 FOR A GRAPHIC LEGEND.
15. THE ITEMS IDENTIFIED TO BE REMOVED REPRESENT THE MAJOR ITEMS ONLY AND IN NO WAY TRY TO IDENTIFY ALL PIECES AND PARTS ASSOCIATED TO BE REMOVED.
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SHEET KEYNOTES

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Project Number: 225012.00
Drawn By: MRA
Checked By: Checker

Drawing
FIFTH FLOOR DEMO REFLECTED CEILING PLAN

AQ.105

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A1 SIXTH FLOOR DEMOLITION RCP

A-201 | AQ.106 | 1/8" = 1'-0"

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

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SHEET KEYNOTES

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AR6	DEMO (E) LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.

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MC PROJECT # FP24-021 / BUILDING # 206

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

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Project Number:	225012.00
Drawn By:	MRA
Checked By:	MF

Drawing
SIXTH FLOOR DEMO REFLECTED CEILING PLAN

AQ.106

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PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

FLOOR PLAN GENERAL NOTES

1. DIMENSIONS INDICATED ARE TO FACE OF GYPSUM BOARD OF PARTITION OR WALL AND GRID LINES, UNO.
2. ALL DOOR FRAMES TO BE LOCATED 4" FROM PERPENDICULAR WALL, UNO.
3. ALL INTERIOR STUD PARTITIONS TO BE TYPE MSAG UNO WITH A 25 GAUGE STUD UNO. ALL INTERIOR STUD PARTITIONS GO UP TO STRUCTURE WITH A EXPANSION HEAD UNO. CONCRETE COLUMN FURRING TO BE M0FC UNO. ALL WALL ANGLES ARE 90° TO EACH OTHER UNO.
4. REFER TO FINISH PLANS FOR FLOOR FINISH PATTERNS.
5. REFER TO FINISH PLANS FOR VISUAL DISPLAY UNIT TYPES, SIZES, AND LOCATIONS.
6. REFER TO FLOOR DIMENSION PLANS FOR PARTITION IDENTIFICATION AND DIMENSIONS.
7. PROVIDE WOOD BLOCKING AT WALL MOUNTED GRAB BARS AND HAND RAILS.
8. PROVIDE STRAP SHEET METAL BLOCKING AT ALL OTHER WALL MOUNTED ACCESSORIES, EQUIPMENT, CASEWORK, ETC.
9. PROVIDE PAINTED ACCESS PANELS IN WALLS & GYPSUM BOARD CEILINGS AT CONCEALED ITEMS (VALVES, CONTROLS, SWITCHES, AND ANY OTHER ITEM THAT REQUIRES ACCESS. COORDINATE LOCATION WITH ARCHITECT PRIOR TO INSTALLATION.
10. AT GANG TOILETS, SET FLOOR DRAINS IN A 24" HAND TROWELED DEPRESSION WITH DRAIN ASSEMBLY IN CENTER OF DEPRESSION, 1/4" BELOW SURROUNDING TOP OF SLAB ELEVATION; SLOPE FLOOR AT DEPRESSION TO ROOMS SO AS NOT TO HAVE DRAINS DIRECTLY UNDER LEGS OF TOILET PARTITIONS.
11. VERIFY & COORDINATE ALL REQUIREMENTS FOR OWNER FURNISHED ITEMS PRIOR TO PERFORMANCE OF WORK THAT MAY INTERFACE WITH SUCH ITEMS.
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13. ASSUME NEW, ADA COMPLIANT ROOM SIGNAGE AT ALL NEW DOOR LOCATIONS TO MATCH COLLEGE STANDARDS.
14. WALLS TO BE REPAIRED AS REQUIRED FOLLOWING PIPING OR CONDUIT INSTALLATION AND ASSOCIATED PENETRATIONS, INCLUDING AREAS DESIGNATED AS "NOT IN CONTRACT." REFER TO CONSULTANT DRAWINGS FOR SPECIFIC LOCATIONS.
15. FOR DOORS ON ALTERNATE #4, SEE DOOR SCHEDULE ON SHEET A.601 & A.602.

SHEET KEYNOTES

(XX) (A)

NUM.	NOTE
A	ARCHITECTURAL PLAN NOTE.
A28	CONTINUOUS WALL-MOUNTED SS HANDRAIL.
A29	CONTINUOUS STEEL TUBE GUARDRAIL AND SS HANDRAIL
A30	PATCH & REPAIR WALL. ALIGN TO EXISTING AND MATCH FINISH.

A1 GROUND FLOOR PLAN

A-201	A.10G	1/8" = 1'-0"

TRUE NORTH PROJECT NORTH

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Drawing
GROUND FLOOR PLAN

A.10G

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A31	PATCH & REPAIR CMU WALL. MATCH FINISH OF WALL TO ADJACENT WALL WITH RAILING INSTALLATION, TYP.

EXISTING 2 HR RATED MASONRY WALLS
UP
TERRACE
REFER TO L-200 - L-500 SHEETS
D1 A.403
STAIR 2 S2
MECH. 107A
ELEC. 104A
FUR-OUT WALL IF DIM. < 1'-6"
1'-6" MIN.
UNISEX 2 140C
UNISEX 1 140B
STAIR 1 S1
B1 A.403
NOT IN CONTRACT
DN
LIBRARY ENTRANCE TERRACE
REFER TO L-200 - L-500 SHEETS
A2 A.503
A1 A.503
0.k 0.o 0.n 0.m 0.l 0.j 0.h 0.i 0.d 0.g 0.f 0.e 0.bb 0.hh 0.dd 0.cc 0.gg 0.aa 0.z 0.y 0.s 0.r 0.q 0.ff 0.ee 0.w 0.v 0.u 0.t 0.x

TRUE NORTH PROJECT NORTH

A1 FIRST FLOOR PLAN

A-201	A.101	1/8" = 1'-0"

ARCHITECT
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1925 BALLENGER AVENUE, SUITE 525
ALEXANDRIA, VA 22314
571.388.7761

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410.532.2396

MONTGOMERY COLLEGE
MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
51 MANNAKEE STREET
ROCKVILLE, MD 20850
MC PROJECT # FP24-021 / BUILDING # 206

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OF APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: FT
Checked By: MF

Drawing
FIRST FLOOR PLAN

A.101

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

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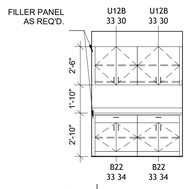
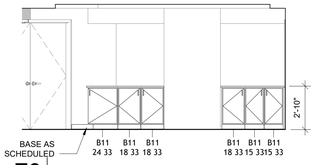


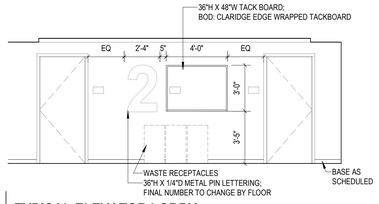
E1 OPEN OFFICE 218

A-102	A.102	1/4" = 1'-0"



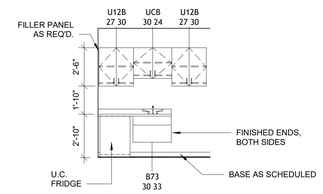
E2 CONFERENCE 213D

A-102	A.102	1/4" = 1'-0"



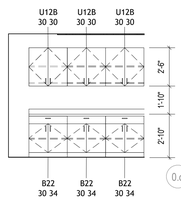
E3 TYPICAL ELEVATOR LOBBY

A.104	A.102	1/4" = 1'-0"



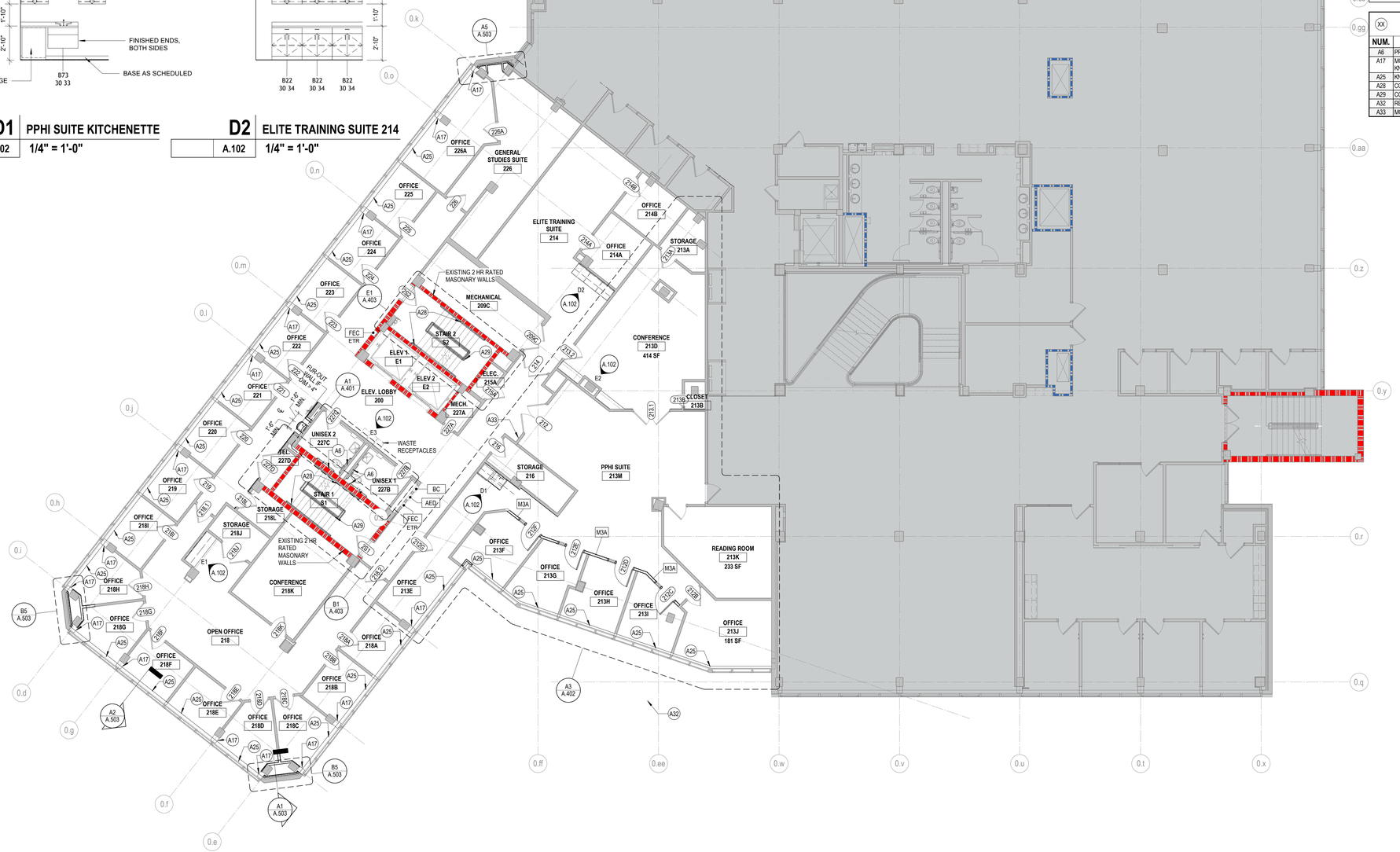
D1 PPHI SUITE KITCHENETTE

A-102	A.102	1/4" = 1'-0"



D2 ELITE TRAINING SUITE 214

	A.102	1/4" = 1'-0"



A1 SECOND FLOOR PLAN

A-201	A.102	1/8" = 1'-0"

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

FLOOR PLAN GENERAL NOTES

1. DIMENSIONS INDICATED ARE TO FACE OF GYPSUM BOARD OF PARTITION OR WALL AND GRID LINES, UNO.
2. ALL DOOR FRAMES TO BE LOCATED 4" FROM PERPENDICULAR WALL, UNO.
3. ALL INTERIOR STUD PARTITIONS TO BE TYPE MSAG UNO WITH A 25 GAUGE STUD UNO. ALL INTERIOR STUD PARTITIONS GO UP TO STRUCTURE WITH A EXPANSION HEAD UNO. CONCRETE COLUMN FURRING TO BE M0FC UNO. ALL WALL ANGLES ARE 90° TO EACH OTHER UNO.
4. REFER TO FINISH PLANS FOR FLOOR FINISH PATTERNS.
5. REFER TO FINISH PLANS FOR VISUAL DISPLAY UNIT TYPES, SIZES, AND LOCATIONS.
6. REFER TO FLOOR DIMENSION PLANS FOR PARTITION IDENTIFICATION AND DIMENSIONS.
7. PROVIDE WOOD BLOCKING AT WALL MOUNTED GRAB BARS AND HAND RAILS.
8. PROVIDE STRAP SHEET METAL BLOCKING AT ALL OTHER WALL MOUNTED ACCESSORIES, EQUIPMENT, CASEWORK, ETC.
9. PROVIDE PAINTED ACCESS PANELS IN WALLS & GYPSUM BOARD CEILINGS AT CONCEALED ITEMS (VALVES, CONTROLS, SWITCHES, AND ANY OTHER ITEM THAT REQUIRES ACCESS. COORDINATE LOCATION WITH ARCHITECT PRIOR TO INSTALLATION.
10. AT GANG TOILETS, SET FLOOR DRAINS IN A 24" HAND TROWELED DEPRESSION WITH DRAIN ASSEMBLY IN CENTER OF DEPRESSION, 1/4" BELOW SURROUNDING TOP OF SLAB ELEVATION; SLOPE FLOOR AT DEPRESSION TO ROOMS SO AS NOT TO HAVE DRAINS DIRECTLY UNDER LEGS OF TOILET PARTITIONS.
11. VERIFY & COORDINATE ALL REQUIREMENTS FOR OWNER FURNISHED ITEMS PRIOR TO PERFORMANCE OF WORK THAT MAY INTERFACE WITH SUCH ITEMS.
12. PROVIDE PAINTED HINGED ACCESS PANELS IN WALLS & CEILINGS AT CONCEALED ITEMS, SUCH AS VALVES, CONTROLS, SWITCHES OR ANY OTHER ITEMS THAT REQUIRES ACCESS. GC TO DETERMINE ACCESS PANEL LOCATION W/ ARCHITECT PRIOR TO INSTALLTION.
13. ASSUME NEW, ADA COMPLIANT ROOM SIGNAGE AT ALL NEW DOOR LOCATIONS TO MATCH COLLEGE STANDARDS.
14. WALLS TO BE REPAIRED AS REQUIRED FOLLOWING PIPING OR CONDUIT INSTALLATION AND ASSOCIATED PENETRATIONS, INCLUDING AREAS DESIGNATED AS "NOT IN CONTRACT." REFER TO CONSULTANT DRAWINGS FOR SPECIFIC LOCATIONS.
15. FOR DOORS ON ALTERNATE #4, SEE DOOR SCHEDULE ON SHEET A.601 & A.602.

SHEET KEYNOTES

(XX)

NUM.	NOTE
A6	PROVIDE BLOCKING WITHIN PARTITION WALL AT EQUIPMENT MOUNTING HEIGHT. SEE A-054
A17	MODIFY EXISTING EXTRUDED ALUMINUM COLUMN/WALL TO MULLION GAP-CAP TO FIT AROUND KNEE-WALL & SILL CAP. SEE D1/A-503
A25	KNEE-WALL WITH INSULATION. SEE A3/A-503
A28	CONTINUOUS WALL-MOUNTED SS HANDRAIL.
A29	CONTINUOUS STEEL TUBE GUARDRAIL AND SS HANDRAIL
A32	REFER TO SHEET A.402 FOR ALTERNATE #4.
A33	MOVE UP EXIST. DROP BOX TO 48" AFF TO MEET ADA.

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LICENSE NUMBER:
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Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
SECOND FLOOR PLAN

A.102

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THE SQUARES BELOW ARE COLOR, WITH BLACK AND WHITE LETTERS IF PRINTED CORRECTLY

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

FLOOR PLAN GENERAL NOTES

1. DIMENSIONS INDICATED ARE TO FACE OF GYPSUM BOARD OF PARTITION OR WALL AND GRID LINES, UNO.
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8. PROVIDE STRAP SHEET METAL BLOCKING AT ALL OTHER WALL MOUNTED ACCESSORIES, EQUIPMENT, CASEWORK, ETC.
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15. FOR DOORS ON ALTERNATE #4, SEE DOOR SCHEDULE ON SHEET A.601 & A.602.

SHEET KEYNOTES

(XX) (A)

NUM.	NOTE
A	ARCHITECTURAL PLAN NOTE
A28	CONTINUOUS WALL-MOUNTED SS HANDRAIL
A29	CONTINUOUS STEEL TUBE GUARDRAIL AND SS HANDRAIL

A1 THIRD FLOOR PLAN

A-201	A.103

1/8" = 1'-0"

TRUE NORTH PROJECT NORTH

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ARCH NAME ARCH ##

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Project Number: 225012.00
Drawn By: FT
Checked By: MF

Drawing
THIRD FLOOR PLAN

A.103

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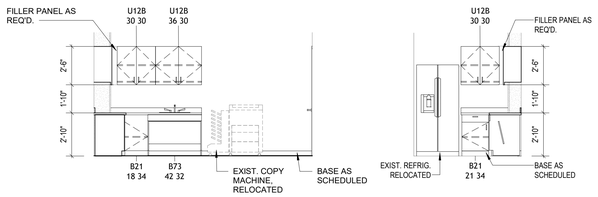

E1 COPY ROOM 428 - SINK WALL

A.104 | A.104 | 1/4" = 1'-0"

E2 COPY ROOM 428 - REF. WALL

A.104 | A.104 | 1/4" = 1'-0"

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

FLOOR PLAN GENERAL NOTES

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3. ALL INTERIOR STUD PARTITIONS TO BE TYPE M3AG UNO WITH A 25 GAUGE STUD UNO. ALL INTERIOR STUD PARTITIONS GO UP TO STRUCTURE WITH A EXPANSION HEAD UNO. CONCRETE COLUMN FURRING TO BE M0FC UNO. ALL WALL ANGLES ARE 90° TO EACH OTHER UNO.
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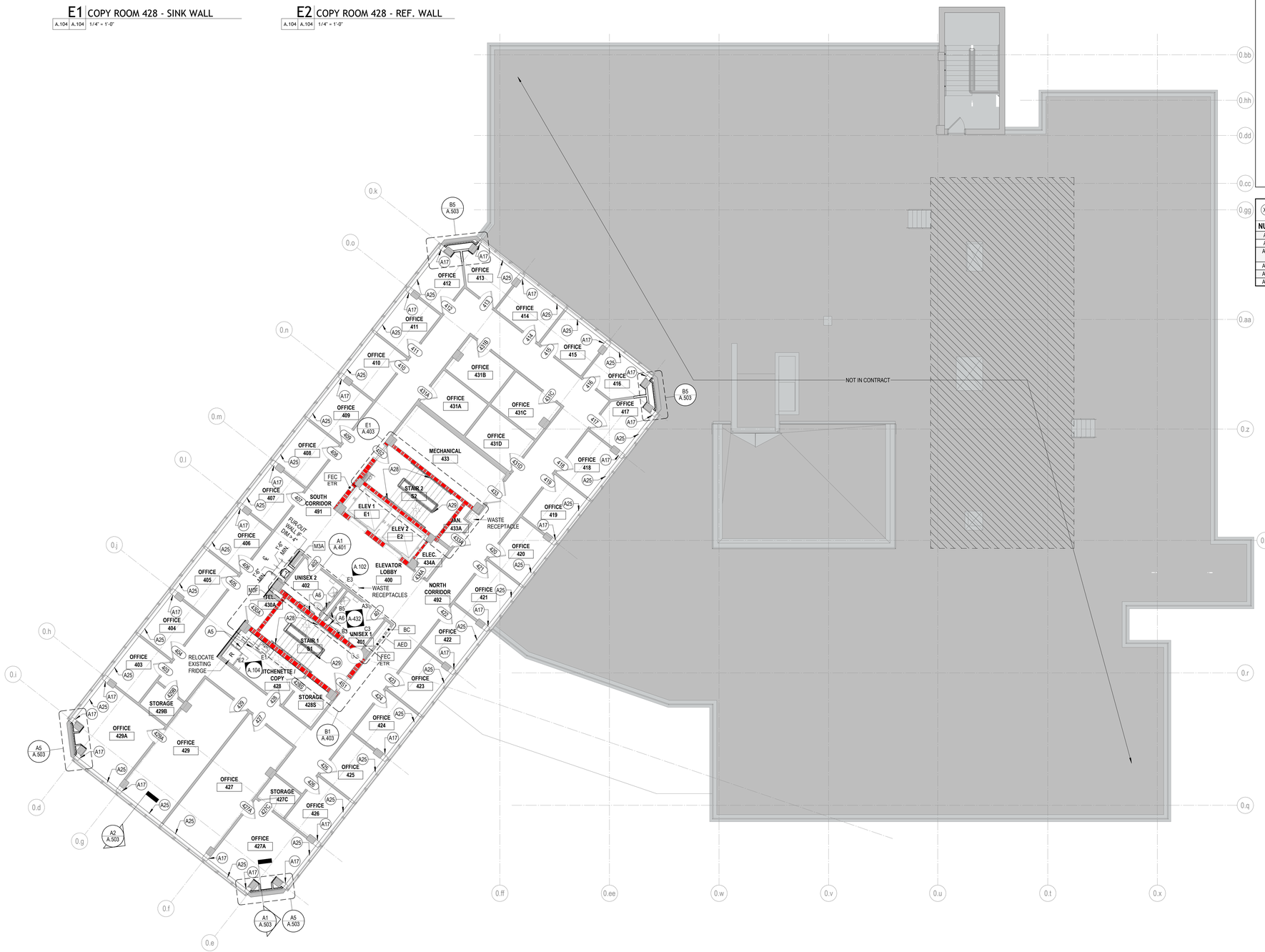
15. FOR DOORS ON ALTERNATE #4, SEE DOOR SCHEDULE ON SHEET A.601 & A.602.

SHEET KEYNOTES

(XX)

NUM.	NOTE
A5	MILLWORK
A6	PROVIDE BLOCKING WITHIN PARTITION WALL AT EQUIPMENT MOUNTING HEIGHT. SEE A-054
A17	MODIFY EXISTING EXTRUDED ALUMINUM COLUMN/WALL TO MULLION GAP-CAP TO FIT AROUND KNEE-WALL & SILL CAP. SEE D1/A-503
A25	KNEE-WALL WITH INSULATION. SEE A3/A-503
A28	CONTINUOUS WALL-MOUNTED SS HANDRAIL
A29	CONTINUOUS STEEL TUBE GUARDRAIL AND SS HANDRAIL



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LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
FOURTH FLOOR PLAN

A.104

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08/29/2025
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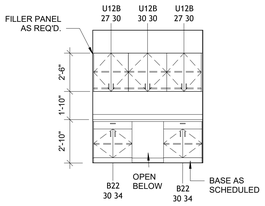
TRUE NORTH PROJECT NORTH

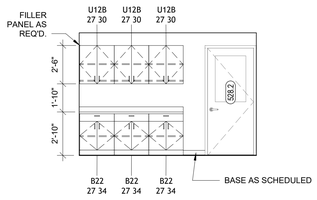
A1 FOURTH FLOOR PLAN

A-201 | A.104 | 1/8" = 1'-0"



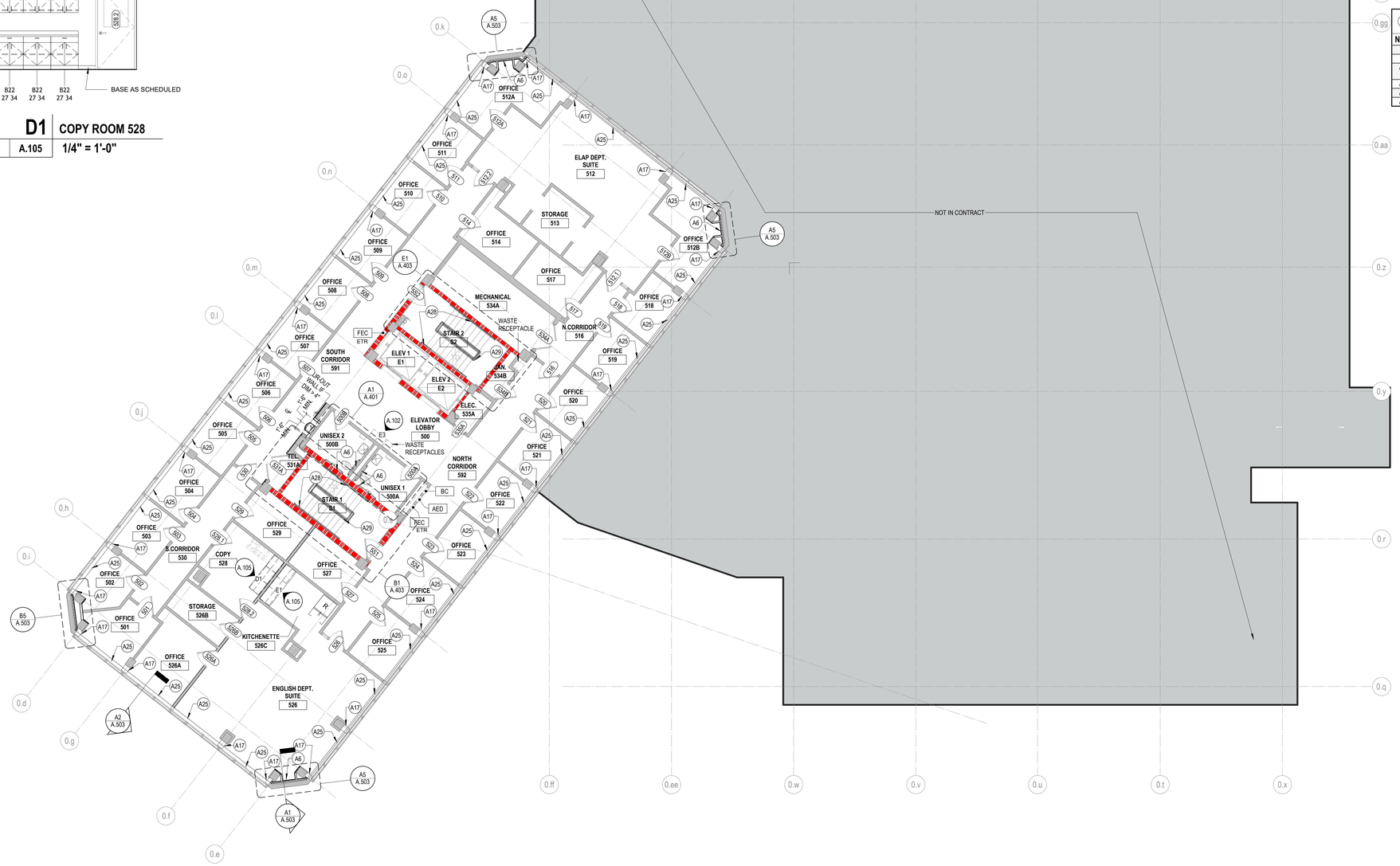
E1 KITCHENETTE 526C

A.105	A.105	1/4" = 1'-0"



D1 COPY ROOM 528

A.105	A.105	1/4" = 1'-0"



A1 FIFTH FLOOR PLAN

A-201	A.105	1/8" = 1'-0"

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

FLOOR PLAN GENERAL NOTES

1. DIMENSIONS INDICATED ARE TO FACE OF GYPSUM BOARD OF PARTITION OR WALL AND GRID LINES, UNO.
2. ALL DOOR FRAMES TO BE LOCATED 4" FROM PERPENDICULAR WALL, UNO.
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7. PROVIDE WOOD BLOCKING AT WALL MOUNTED GRAB BARS AND HAND RAILS.
8. PROVIDE STRAP SHEET METAL BLOCKING AT ALL OTHER WALL MOUNTED ACCESSORIES, EQUIPMENT, CASEWORK, ETC.
9. PROVIDE PAINTED ACCESS PANELS IN WALLS & GYPSUM BOARD CEILINGS AT CONCEALED ITEMS (VALVES, CONTROLS, SWITCHES, AND ANY OTHER ITEM THAT REQUIRES ACCESS. COORDINATE LOCATION WITH ARCHITECT PRIOR TO INSTALLATION.
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15. FOR DOORS ON ALTERNATE #4, SEE DOOR SCHEDULE ON SHEET A.601 & A.602.

SHEET KEYNOTES

(XX) (A)

NUM.	NOTE
A	ARCHITECTURAL PLAN NOTE
A6	PROVIDE BLOCKING WITHIN PARTITION WALL AT EQUIPMENT MOUNTING HEIGHT. SEE A-054
A17	MODIFY EXISTING EXTRUDED ALUMINUM COLUMN/WALL TO MULLION GAP-CAP TO FIT AROUND KNEE-WALL & SILL CAP. SEE D1/A-503
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TRUE NORTH / PROJECT NORTH

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Project Number: 225012.00
Drawn By: FT
Checked By: Checker

Drawing
FIFTH FLOOR PLAN

A.105

NOT FOR CONSTRUCTION

08/29/2025
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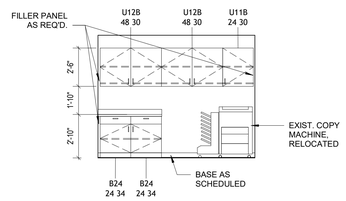

E1 COPY RM 606 - COPY WALL

A.106	A.106	1/4" = 1'-0"

D1 KITCHEN 609

A.106	A.106	1/4" = 1'-0"

A1 SIXTH FLOOR PLAN

A-201	A.106	1/8" = 1'-0"

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

FLOOR PLAN GENERAL NOTES

1. DIMENSIONS INDICATED ARE TO FACE OF GYPSUM BOARD OF PARTITION OR WALL AND GRID LINES, UNO.
2. ALL DOOR FRAMES TO BE LOCATED 4" FROM PERPENDICULAR WALL, UNO.
3. ALL INTERIOR STUD PARTITIONS TO BE TYPE MSAG UNO WITH A 25 GAUGE STUD UNO. ALL INTERIOR STUD PARTITIONS GO UP TO STRUCTURE WITH A EXPANSION HEAD UNO. CONCRETE COLUMN FURRING TO BE M0FC UNO. ALL WALL ANGLES ARE 90° TO EACH OTHER UNO.
4. REFER TO FINISH PLANS FOR FLOOR FINISH PATTERNS.
5. REFER TO FINISH PLANS FOR VISUAL DISPLAY UNIT TYPES, SIZES, AND LOCATIONS.
6. REFER TO FLOOR DIMENSION PLANS FOR PARTITION IDENTIFICATION AND DIMENSIONS.
7. PROVIDE WOOD BLOCKING AT WALL MOUNTED GRAB BARS AND HAND RAILS.
8. PROVIDE STRAP SHEET METAL BLOCKING AT ALL OTHER WALL MOUNTED ACCESSORIES, EQUIPMENT, CASEWORK, ETC.
9. PROVIDE PAINTED ACCESS PANELS IN WALLS & GYPSUM BOARD CEILINGS AT CONCEALED ITEMS (VALVES, CONTROLS, SWITCHES, AND ANY OTHER ITEM THAT REQUIRES ACCESS. COORDINATE LOCATION WITH ARCHITECT PRIOR TO INSTALLATION.
10. AT GANG TOILETS, SET FLOOR DRAINS IN A 24" HAND TROWELED DEPRESSION WITH DRAIN ASSEMBLY IN CENTER OF DEPRESSION, 1/4" BELOW SURROUNDING TOP OF SLAB ELEVATION; SLOPE FLOOR AT DEPRESSION TO ROOMS SO AS NOT TO HAVE DRAINS DIRECTLY UNDER LEGS OF TOILET PARTITIONS.
11. VERIFY & COORDINATE ALL REQUIREMENTS FOR OWNER FURNISHED ITEMS PRIOR TO PERFORMANCE OF WORK THAT MAY INTERFACE WITH SUCH ITEMS.
12. PROVIDE PAINTED HINGED ACCESS PANELS IN WALLS & CEILINGS AT CONCEALED ITEMS, SUCH AS VALVES, CONTROLS, SWITCHES OR ANY OTHER ITEMS THAT REQUIRES ACCESS. GC TO DETERMINE ACCESS PANEL LOCATION W/ ARCHITECT PRIOR TO INSTALLTION.
13. ASSUME NEW, ADA COMPLIANT ROOM SIGNAGE AT ALL NEW DOOR LOCATIONS TO MATCH COLLEGE STANDARDS.
14. WALLS TO BE REPAIRED AS REQUIRED FOLLOWING PIPING OR CONDUIT INSTALLATION AND ASSOCIATED PENETRATIONS, INCLUDING AREAS DESIGNATED AS "NOT IN CONTRACT." REFER TO CONSULTANT DRAWINGS FOR SPECIFIC LOCATIONS.
15. FOR DOORS ON ALTERNATE #4, SEE DOOR SCHEDULE ON SHEET A.601 & A.602.

(XX) (A) — SHEET KEYNOTES

NUM.	NOTE
A	ARCHITECTURAL PLAN NOTE
A6	PROVIDE BLOCKING WITHIN PARTITION WALL AT EQUIPMENT MOUNTING HEIGHT. SEE A-054
A17	MODIFY EXISTING EXTRUDED ALUMINUM COLUMN/WALL TO MULLION GAP-CAP TO FIT AROUND KNEE-WALL & SILL CAP. SEE D1/A-503
A25	KNEE-WALL WITH INSULATION. SEE A3/A-503
A28	CONTINUOUS WALL-MOUNTED SS HANDRAIL.
A29	CONTINUOUS STEEL TUBE GUARDRAIL AND SS HANDRAIL

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Checked By:	MF

Drawing
SIXTH FLOOR PLAN

A.106

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PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

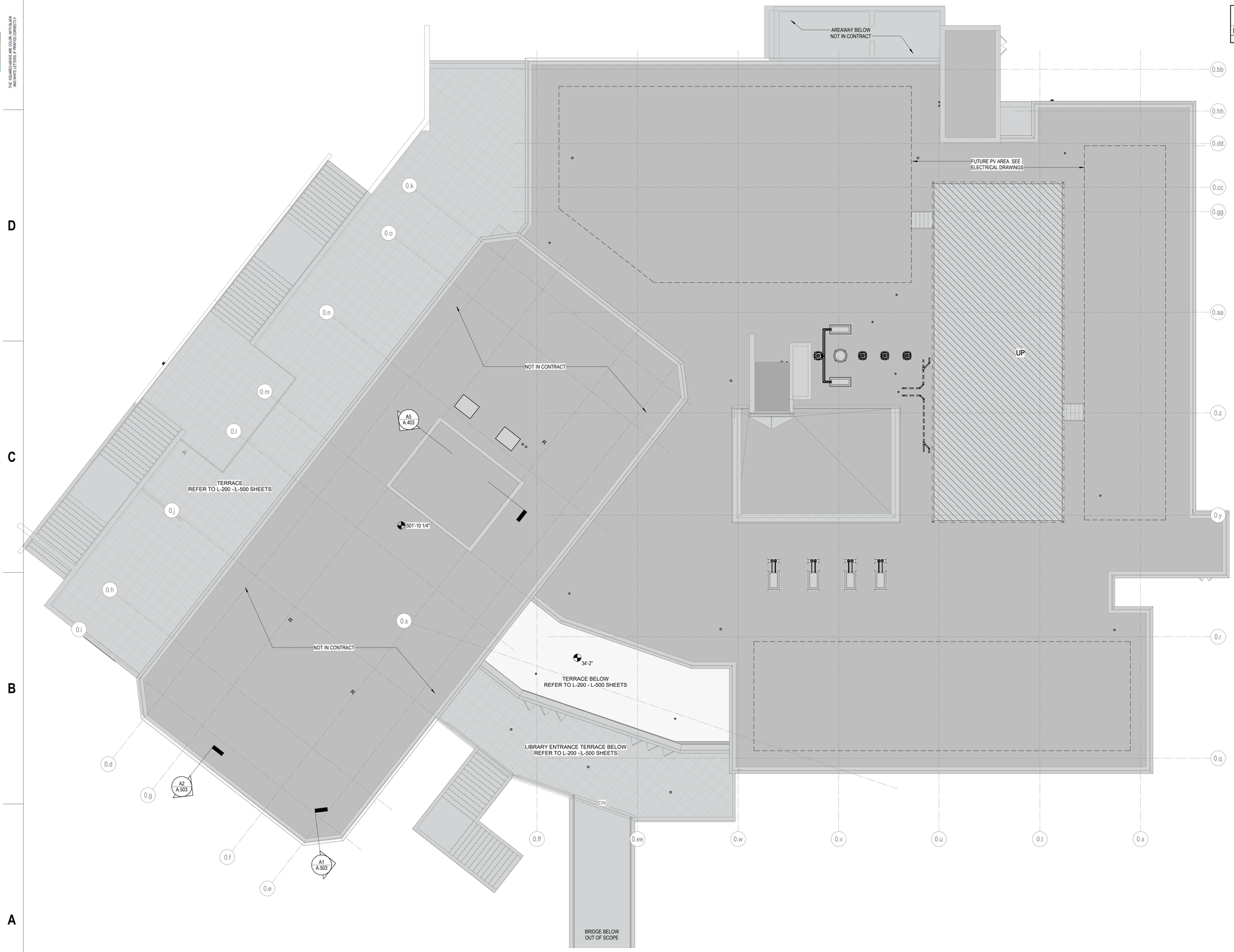
ROOF PLAN GENERAL NOTES

1. TAPERED INSULATION REQUIRED AROUND ALL ROOF TOP EQUIPMENT
2. WALK WAY PADS TO BE PROVIDED AROUND ALL MECHANICAL ITEMS THAT REQUIRE SERVICE AND BETWEEN ROOF HATCHES AND ROOF LADDERS
3. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR ADDITIONAL ROOF EQUIPMENT AND PENETRATIONS.
4. 5" CONCRETE HOUSEKEEPING PAD AT RTU, REF. MECH FOR LOCATION

SHEET KEYNOTES

(XX) (A)

NUM.	NOTE
A	ARCHITECTURAL PLAN NOTE



A1 ROOF FLOOR PLAN

A-201	A.1Q1	1/8" = 1'-0"

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Drawing
ROOF FLOOR PLAN

A.1Q1

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RCP GENERAL NOTES

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2. CENTER CEILING TILES WITHIN ROOM (UNLESS NOTED OTHERWISE)
3. CENTER ALL DEVICES, SPRINKLER HEADS, ETC. IN CEILING TILE. FINAL LOCATIONS FOR AL CEILING DEVICES TO BE COORDINATED WITH ALL TRADES.
4. PROVIDE CONTINUOUS SOUND BATT INSULATION ABOVE TOILET ROOM CEILINGS.
5. PAINT ALL EXPOSED STRUCTURE (BEAMS, JOISTS, DECK), EXPOSED CONDUIT, EXPOSED DUCT AND PIPING (INCLUDING INSULATION). REFER TO FINISH LEGEND FOR COLOR.
6. EXISTING CEILINGS TO BE REMOVED, STORED, REPAIRED, AND REINSTALLED AS REQUIRED FOLLOWING PIPING DEMOLITION AND INSTALLATION. ASSUME 25-50% DAMAGE TO ACOUSTIC CEILING PANELS (ACP) DURING REMOVAL, WITH REPLACEMENT AS NECESSARY. WHEN THE REMOVAL OF CEILING GRIDS IS REQUIRED, THEY NEED TO BE REPLACED WITH NEW GRIDS. REFER TO CONSULTANT DRAWINGS FOR SPECIFIC LOCATIONS.

MEP WORK CEILING LEGEND

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SHEET KEYNOTES

(XX) (AC) ←

NUM.	NOTE
AC	
AC2	LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.

A1 GROUND FLOOR REFLECTED CEILING PLAN

A-201 | AC.10G

1/8" = 1'-0"

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Drawing
GROUND FLOOR REFLECTED CEILING PLAN

AC.10G

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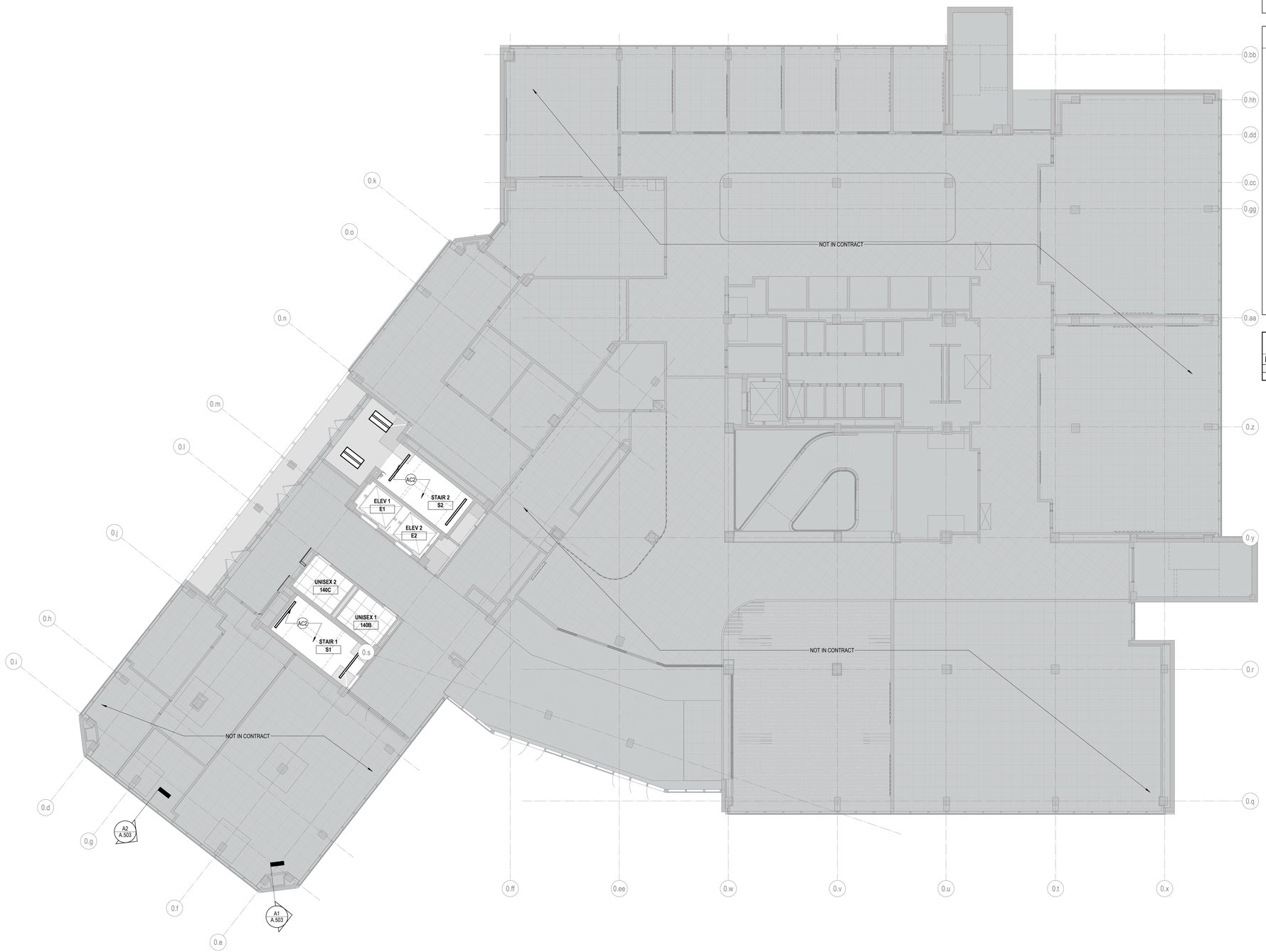

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

RCP GENERAL NOTES

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CEILING PLAN LEGEND

CEILING TYPE

- ACP-1 OR ACP-2 - 2'x2' SUSPENDED ACOUSTICAL TILE CEILING W/ EXPOSED SUSPENSION GRID
- AP-1 - 2'x4' SUSPENDED FELT ACOUSTICAL TILE CEILING
- GYP-1 AND GYP-2 - GYPSUM BOARD CEILING ON METAL STUD FRAME

CEILING DEVICES

- EXIT SIGN (RE: ELECTRICAL DRAWINGS)
- SECURITY CAMERA (RE: TA DRAWINGS)
- WIRELESS ACCESS POINT (RE: TA DRAWINGS)
- CEILING RECESSED LOUD SPEAKER (RE: TA DRAWINGS)
- MASS NOTIFICATION BOARDS (RE: TA DRAWINGS)

NOTE: SEE ELEC. DRAWINGS FOR LIGHT FIXTURES TYPES AND MECHANICAL DRAWINGS FOR GRILLE TYPES.

SHEET KEYNOTES

(XX) (AC) ←

NUM.	NOTE
AC	
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Checked By: MF

Drawing
FIRST FLOOR REFLECTED CEILING PLAN

AC.101

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A1 FIRST FLOOR REFLECTED CEILING PLAN
A-201 | AC.101 | 1/8" = 1'-0"

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AP-1 - 2'x4' SUSPENDED FELT ACOUSTICAL TILE CEILING

GYP-1 AND GYP-2 - GYPSUM BOARD CEILING ON METAL STUD FRAME

CEILING DEVICES

EXIT SIGN (RE: ELECTRICAL DRAWINGS)

SECURITY CAMERA (RE: TA DRAWINGS)

WIRELESS ACCESS POINT (RE: TA DRAWINGS)

CEILING RECESSED LOUD SPEAKER (RE: TA DRAWINGS)

MASS NOTIFICATION BOARDS (RE: TA DRAWINGS)

NOTE: SEE ELEC. DRAWINGS FOR LIGHT FIXTURES TYPES AND MECHANICAL DRAWINGS FOR GRILLE TYPES.

SHEET KEYNOTES

(XX) (AC)

NUM.	NOTE
AC	
AC1	NEW MINI LOUVER BLINDS
AC2	LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.
AC3	REFER TO SHEET A.402 FOR ALTERNATE #1.

A1 SECOND FLOOR REFLECTED CEILING PLAN

A-201 | AC.102 | 1/8" = 1'-0"

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Checked By: MF

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SECOND FLOOR REFLECTED CEILING PLAN

AC.102

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PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

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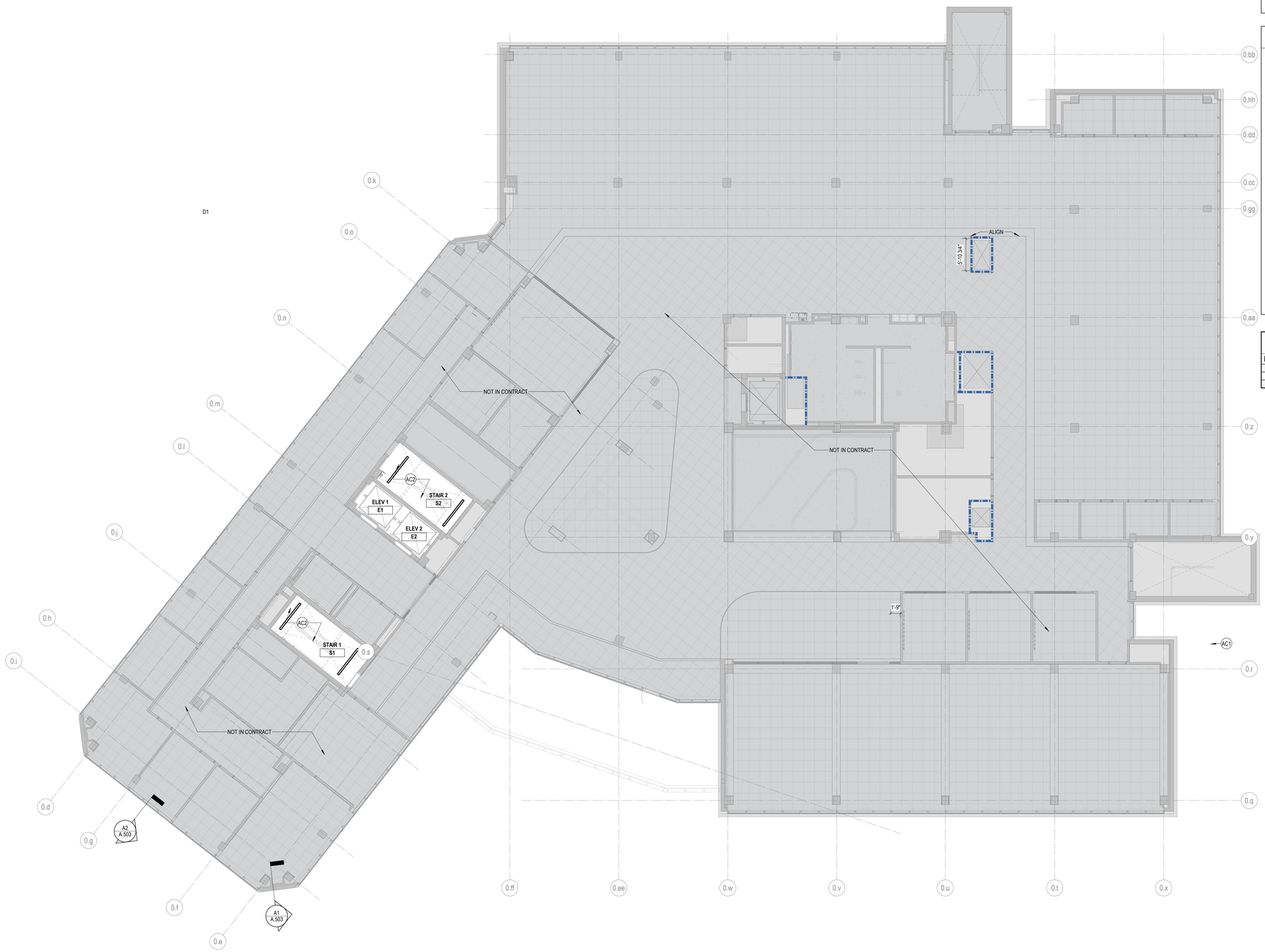

A1 THIRD FLOOR REFLECTED CEILING PLAN

A-201	AC.103

1/8" = 1'-0"

TRUE NORTH PROJECT NORTH

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INTERIOR DESIGN

ARCH NAME ARCH ##

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LICENSE NUMBER:
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Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: FT
Checked By: MF

Drawing
THIRD FLOOR REFLECTED CEILING PLAN

AC.103

NOT FOR CONSTRUCTION

08/29/2025
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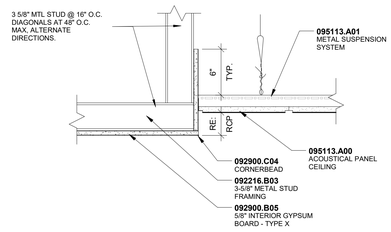
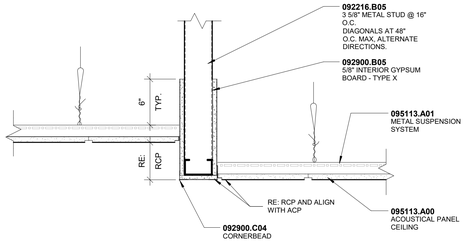


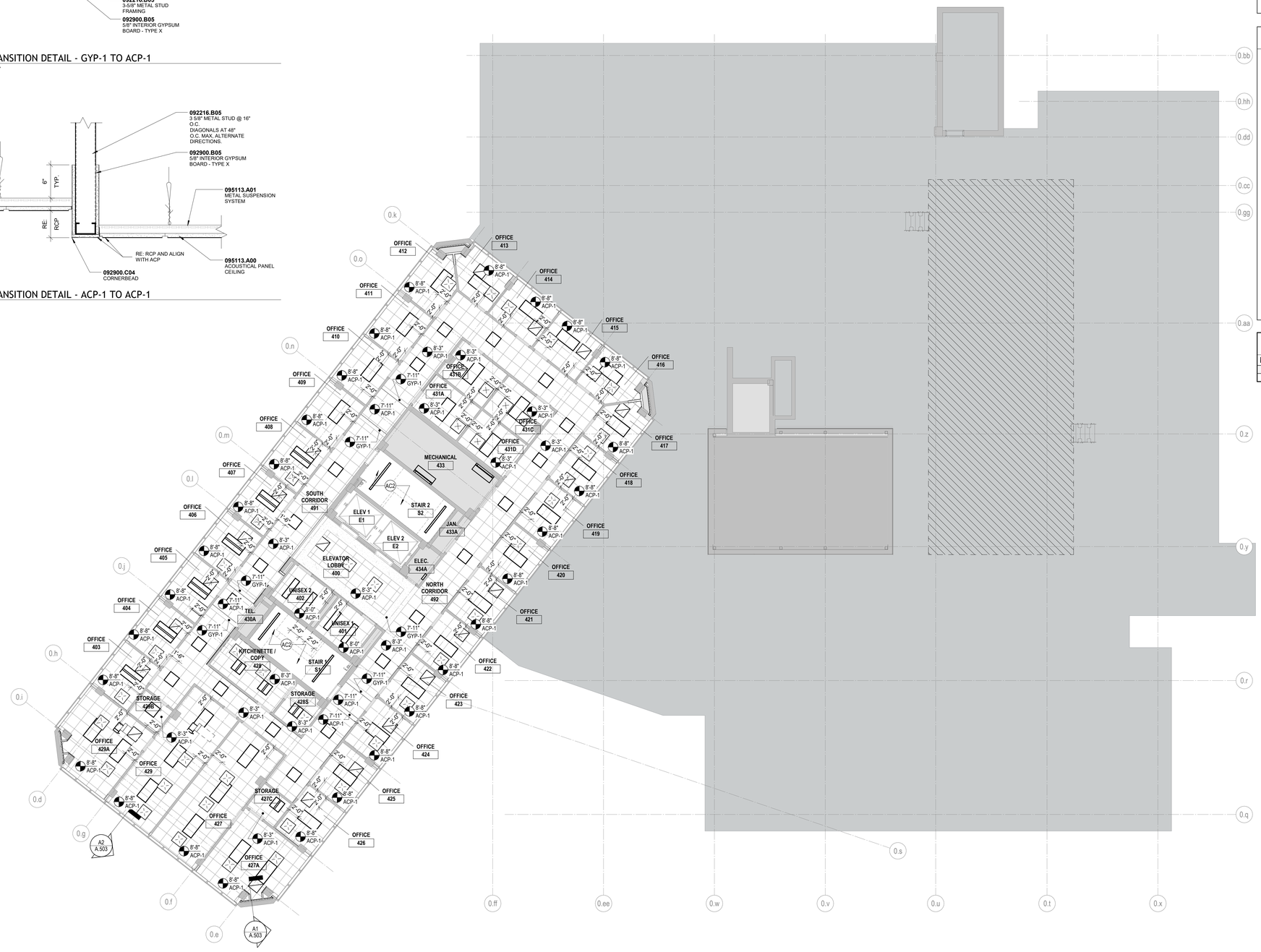
E1 CLG TRANSITION DETAIL - GYP-1 TO ACP-1

AC.104 1 1/2" = 1'-0"



D1 CLG TRANSITION DETAIL - ACP-1 TO ACP-1

AC.104 1 1/2" = 1'-0"



A1 FOURTH FLOOR REFLECTED CEILING PLAN

A-201 | AC.104 1/8" = 1'-0"

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

RCP GENERAL NOTES

1. ALL CEILING ELEVATIONS TO BE DIMENSIONED FROM SLAB ELEVATION BELOW OR FINISH FLOOR AT RECESSED SLAB LOCATIONS.
2. CENTER CEILING TILES WITHIN ROOM (UNLESS NOTED OTHERWISE)
3. CENTER ALL DEVICES, SPRINKLER HEADS, ETC. IN CEILING TILE. FINAL LOCATIONS FOR AL CEILING DEVICES TO BE COORDINATED WITH ALL TRADES.
4. PROVIDE CONTINUOUS SOUND BATT INSULATION ABOVE TOILET ROOM CEILINGS.
5. PAINT ALL EXPOSED STRUCTURE (BEAMS, JOISTS, DECK), EXPOSED CONDUIT, EXPOSED DUCT AND PIPING (INCLUDING INSULATION). REFER TO FINISH LEGEND FOR COLOR.
6. EXISTING CEILINGS TO BE REMOVED, STORED, REPAIRED, AND REINSTALLED AS REQUIRED FOLLOWING PIPING DEMOLITION AND INSTALLATION. ASSUME 25-50% DAMAGE TO ACOUSTIC CEILING PANELS (ACP) DURING REMOVAL WITH REPLACEMENT AS NECESSARY. WHEN THE REMOVAL OF CEILING GRIDS IS REQUIRED, THEY NEED TO BE REPLACED WITH NEW GRIDS. REFER TO CONSULTANT DRAWINGS FOR SPECIFIC LOCATIONS.

CEILING PLAN LEGEND

CEILING TYPE

- ACP-1 OR ACP-2 - 2'x2' SUSPENDED ACOUSTICAL TILE CEILING W/ EXPOSED SUSPENSION GRID
- AP-1 - 2'x4' SUSPENDED FELT ACOUSTICAL TILE CEILING
- GYP-1 AND GYP-2 - GYPSUM BOARD CEILING ON METAL STUD FRAME

CEILING DEVICES

- EXIT SIGN (RE: ELECTRICAL DRAWINGS)
- SECURITY CAMERA (RE: TA DRAWINGS)
- WIRELESS ACCESS POINT (RE: TA DRAWINGS)
- CEILING RECESSED LOUD SPEAKER (RE: TA DRAWINGS)
- MASS NOTIFICATION BOARDS (RE: TA DRAWINGS)

NOTE: SEE ELEC. DRAWINGS FOR LIGHT FIXTURES TYPES AND MECHANICAL DRAWINGS FOR GRILLE TYPES.

SHEET KEYNOTES

(XX) (AC)

NUM.	NOTE
AC	
AC2	LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.

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ROCKVILLE, MD 20850

MC PROJECT # FP24-021 / BUILDING # 206

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

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LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: FT/MRA
Checked By: MF

Drawing
FOURTH FLOOR REFLECTED CEILING PLAN

AC.104

NOT FOR CONSTRUCTION

08/29/2025
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THE SQUARES BEING ONE COLOR, WITH BLACK AND WHITE LETTERS IF PRINTED CORRECTLY

THE LINE SHOWN ABOVE IS EXACTLY ONE INCH LONG AT THIS SHEET'S ORIGINAL PAPER SIZE

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A1 FIFTH FLOOR REFLECTED CEILING PLAN

A-201 | AC.105 | 1/8" = 1'-0"

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

RCP GENERAL NOTES

1. ALL CEILING ELEVATIONS TO BE DIMENSIONED FROM SLAB ELEVATION BELOW OR FINISH FLOOR AT RECESSED SLAB LOCATIONS.
2. CENTER CEILING TILES WITHIN ROOM (UNLESS NOTED OTHERWISE)
3. CENTER ALL DEVICES, SPRINKLER HEADS, ETC. IN CEILING TILE. FINAL LOCATIONS FOR AL CEILING DEVICES TO BE COORDINATED WITH ALL TRADES.
4. PROVIDE CONTINUOUS SOUND BATT INSULATION ABOVE TOILET ROOM CEILINGS.
5. PAINT ALL EXPOSED STRUCTURE (BEAMS, JOISTS, DECK), EXPOSED CONDUIT, EXPOSED DUCT AND PIPING (INCLUDING INSULATION). REFER TO FINISH LEGEND FOR COLOR.
6. EXISTING CEILINGS TO BE REMOVED, STORED, REPAIRED, AND REINSTALLED AS REQUIRED FOLLOWING PIPING DEMOLITION AND INSTALLATION. ASSUME 25-50% DAMAGE TO ACOUSTIC CEILING PANELS (ACP) DURING REMOVAL WITH REPLACEMENT AS NECESSARY. WHEN THE REMOVAL OF CEILING GRIDS IS REQUIRED, THEY NEED TO BE REPLACED WITH NEW GRIDS. REFER TO CONSULTANT DRAWINGS FOR SPECIFIC LOCATIONS.

CEILING PLAN LEGEND

CEILING TYPE

- ACP-1 OR ACP-2 - 2'x2' SUSPENDED ACOUSTICAL TILE CEILING W/ EXPOSED SUSPENSION GRID
- AP-1 - 2'x4' SUSPENDED FELT ACOUSTICAL TILE CEILING
- GYP-1 AND GYP-2 - GYPSUM BOARD CEILING ON METAL STUD FRAME

CEILING DEVICES

- EXIT SIGN (RE: ELECTRICAL DRAWINGS)
- SECURITY CAMERA (RE: TA DRAWINGS)
- WIRELESS ACCESS POINT (RE: TA DRAWINGS)
- CEILING RECESSED LOUD SPEAKER (RE: TA DRAWINGS)
- MASS NOTIFICATION BOARDS (RE: TA DRAWINGS)

NOTE: SEE ELEC. DRAWINGS FOR LIGHT FIXTURES TYPES AND MECHANICAL DRAWINGS FOR GRILLE TYPES.

SHEET KEYNOTES

(XX) (AC)

NUM.	NOTE
AC	
AC2	LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.

TRUE NORTH | PROJECT NORTH

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MONTGOMERY COLLEGE
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51 MANNAKEE STREET
ROCKVILLE, MD 20850

MC PROJECT # FP24-021 / BUILDING # 206

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
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ARCH NAME ARCH ##

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Checked By:	MF

Drawing
FIFTH FLOOR REFLECTED CEILING PLAN

AC.105

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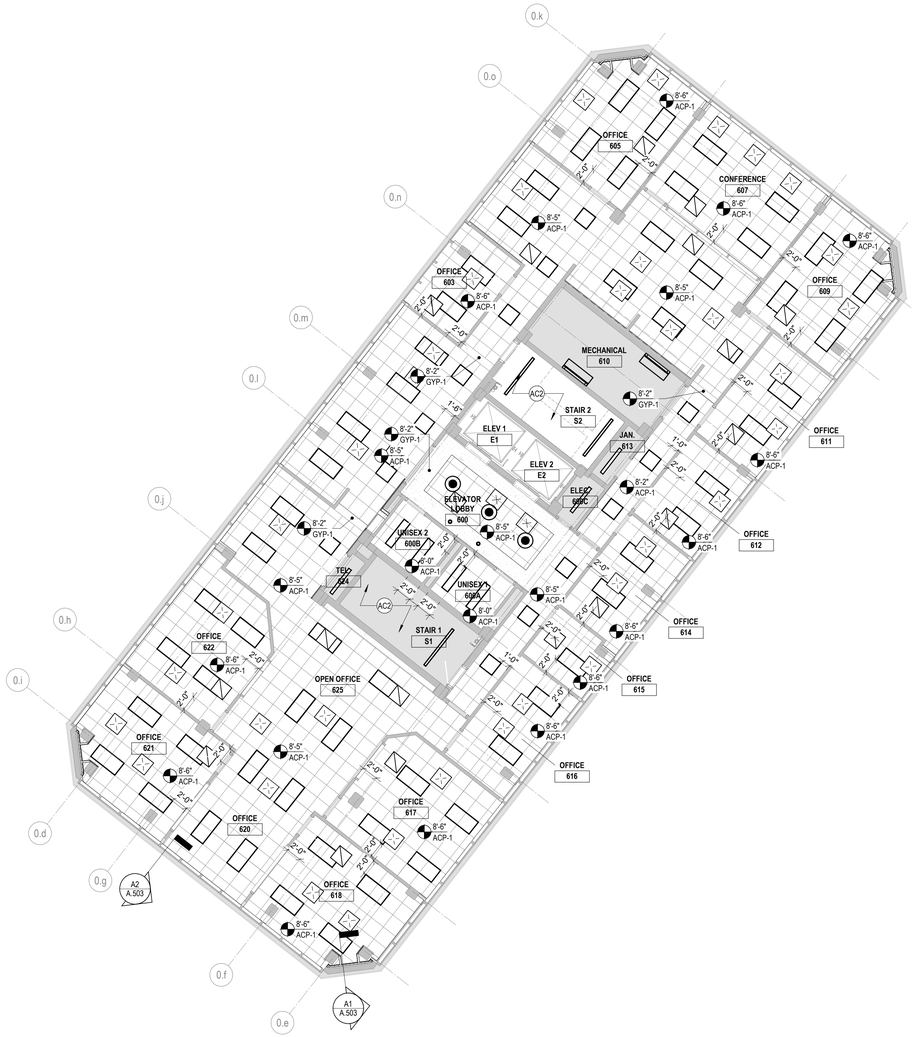

A1 SIXTH FLOOR REFLECTED CEILING PLAN

A-201	AC.106	1/8" = 1'-0"

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

RCP GENERAL NOTES

1. ALL CEILING ELEVATIONS TO BE DIMENSIONED FROM SLAB ELEVATION BELOW OR FINISH FLOOR AT RECESSED SLAB LOCATIONS.
2. CENTER CEILING TILES WITHIN ROOM (UNLESS NOTED OTHERWISE)
3. CENTER ALL DEVICES, SPRINKLER HEADS, ETC. IN CEILING TILE. FINAL LOCATIONS FOR AL CEILING DEVICES TO BE COORDINATED WITH ALL TRADES.
4. PROVIDE CONTINUOUS SOUND BATT INSULATION ABOVE TOILET ROOM CEILINGS.
5. PAINT ALL EXPOSED STRUCTURE (BEAMS, JOISTS, DECK), EXPOSED CONDUIT, EXPOSED DUCT AND PIPING (INCLUDING INSULATION). REFER TO FINISH LEGEND FOR COLOR.
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CEILING PLAN LEGEND

CEILING TYPE

- ACP-1 OR ACP-2 - 2'x2' SUSPENDED ACOUSTICAL TILE CEILING W/ EXPOSED SUSPENSION GRID
- AP-1 - 2'x4' SUSPENDED FELT ACOUSTICAL TILE CEILING
- GYP-1 AND GYP-2 - GYPSUM BOARD CEILING ON METAL STUD FRAME

CEILING DEVICES

- EXIT SIGN (RE: ELECTRICAL DRAWINGS)
- SECURITY CAMERA (RE: TA DRAWINGS)
- WIRELESS ACCESS POINT (RE: TA DRAWINGS)
- CEILING RECESSED LOUD SPEAKER (RE: TA DRAWINGS)
- MASS NOTIFICATION BOARDS (RE: TA DRAWINGS)

NOTE: SEE ELEC. DRAWINGS FOR LIGHT FIXTURES TYPES AND MECHANICAL DRAWINGS FOR GRILLE TYPES.

SHEET KEYNOTES

NUM.	NOTE
AC	
AC2	LIGHT FIXTURES. REFER TO ELECT. DRAWINGS.

TRUE NORTH PROJECT NORTH

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Project Number: 225012.00
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Checked By: MF

Drawing
SIXTH FLOOR REFLECTED CEILING PLAN

AC.106

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ROOM FINISH SCHEDULE - OFFICES

LEVEL	ROOM NO.	NAME	FLOORING	BASE	WALLS	MILLWORK		CEILING	COMMENTS
						VERTICAL	HORIZ.		
FIRST FLOOR									
FIRST FLOOR	140B	UNISEX 1	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
FIRST FLOOR	140C	UNISEX 2	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
SECOND FLOOR									
SECOND FLOOR	200	ELEV. LOBBY	LVT-1	RB-1	P-1, P-8			ACP-1, ETR	
SECOND FLOOR	209C	MECHANICAL	ETR	ETR	ETR			ETR	
SECOND FLOOR	213A	STORAGE	CPT-5	RB-1	P-1			ACP-1	
SECOND FLOOR	213B	CLOSET	CPT-5	RB-1	P-1			ACP-1	
SECOND FLOOR	213D	CONFERENCE	CPT-5	RB-1	P-1	PL-1	SS-1	ACP-1, GYP-1	
SECOND FLOOR	213E	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	213F	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	213G	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	213H	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	213I	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	213J	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	213K	READING ROOM	CPT-5	RB-1	P-1		SS-1	ACP-1	
SECOND FLOOR	213M	PPHI SUITE	CPT-1	RB-1	P-1	PL-1	SS-1	GYP-1	
SECOND FLOOR	214	ELITE TRAINING SUITE	CPT-1	RB-1	P-1	PL-1	SS-1	ACP-1	
SECOND FLOOR	214A	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	214B	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	215A	ELEC.	ETR	ETR	ETR			ETR	
SECOND FLOOR	216	STORAGE	LVT-2	RB-1	P-1	ETR	ETR	ACP-1	
SECOND FLOOR	218	OPEN OFFICE	CPT-1, LVT-3	RB-1	P-1	PL-1	SS-1	ACP-1	
SECOND FLOOR	218A	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	218B	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	218C	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	218D	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	218E	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	218F	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	218G	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	218H	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	218I	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	218J	STORAGE	LVT-3	RB-1	P-1	PL-1	SS-1	ACP-1	
SECOND FLOOR	218K	CONFERENCE	CPT-5	RB-1	P-1			ACP-1	
SECOND FLOOR	218L	STORAGE	LVT-2	RB-1	P-1			ACP-1	
SECOND FLOOR	219	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	220	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	221	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	222	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	223	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	224	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	225	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	226	GENERAL STUDIES SUITE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	226A	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SECOND FLOOR	227A	MECH.	ETR	ETR	ETR			ETR	
SECOND FLOOR	227B	UNISEX 1	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
SECOND FLOOR	227C	UNISEX 2	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
SECOND FLOOR	227D	TEL.	ETR	ETR	ETR			ETR	
SECOND FLOOR	291	CORRIDOR	LVT-2	RB-1	P-1			ACP-1	
SECOND FLOOR	292	CORRIDOR	LVT-2	RB-1	P-1			ACP-1	
FOURTH FLOOR									
FOURTH FLOOR	400	ELEVATOR LOBBY	LVT-1	RB-1	P-1, P-8			ACP-1, ETR	
FOURTH FLOOR	401	UNISEX 1	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
FOURTH FLOOR	402	UNISEX 2	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
FOURTH FLOOR	403	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	404	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	405	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	406	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	407	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	408	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	409	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	410	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	411	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	412	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	413	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	414	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	415	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	416	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	417	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	418	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	419	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	420	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	421	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	422	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	423	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	424	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	425	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	426	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	427	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	427A	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	427C	STORAGE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	428	KITCHENETTE / COPY	CPT-1	RB-1	P-1	PL-1	SS-1	ACP-1	
FOURTH FLOOR	428S	STORAGE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	429	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	429A	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	429B	STORAGE	LVT-4	RB-1	P-1			ACP-1	
FOURTH FLOOR	430A	TEL.	ETR	ETR	ETR			ETR	
FOURTH FLOOR	431A	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	431B	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	431C	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	431D	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FOURTH FLOOR	433	MECHANICAL	ETR	ETR	ETR			ETR	
FOURTH FLOOR	433A	JAN.	ETR	ETR	ETR			ETR	
FOURTH FLOOR	434A	ELEC.	ETR	ETR	ETR			ETR	
FOURTH FLOOR	491	SOUTH CORRIDOR	LVT-2	RB-1	P-1			ACP-1	
FOURTH FLOOR	492	NORTH CORRIDOR							
FIFTH FLOOR									
FIFTH FLOOR	500	ELEVATOR LOBBY	LVT-1	RB-1	P-1, P-8			ACP-1, ETR	
FIFTH FLOOR	500A	UNISEX 1	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
FIFTH FLOOR	500B	UNISEX 2	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
FIFTH FLOOR	501	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	502	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	503	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	504	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	505	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	506	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	507	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	508	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	509	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	510	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	511	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	512	ELAP DEPT. SUITE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	512A	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	512B	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	513	STORAGE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	514	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	516	N.CORRIDOR	LVT-2	RB-1	P-1			ACP-1	
FIFTH FLOOR	517	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	518	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	519	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	520	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	521	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	522	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	523	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	524	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	525	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	526	ENGLISH DEPT. SUITE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	526A	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	526B	STORAGE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	526C	KITCHENETTE	LVT-3	RB-1	P-1	PL-1	SS-1	ACP-1	
FIFTH FLOOR	527	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	528	COPY	LVT-3	RB-1	P-1	PL-1	SS-1	ACP-1	
FIFTH FLOOR	529	OFFICE	CPT-1	RB-1	P-1			ACP-1	
FIFTH FLOOR	530	S.CORRIDOR	LVT-2	RB-1	P-1			ACP-1	
FIFTH FLOOR	531A	TEL.	ETR	ETR	ETR			ETR	

ROOM FINISH SCHEDULE - OFFICES

LEVEL	ROOM NO.	NAME	FLOORING	BASE	WALLS	MILLWORK		CEILING	COMMENTS
						VERTICAL	HORIZ.		
FIFTH FLOOR	534A	MECHANICAL	ETR	ETR	ETR			ETR	
FIFTH FLOOR	534B	JAN.	ETR	ETR	ETR			ETR	
FIFTH FLOOR	535A	ELEC.	ETR	ETR	ETR			ETR	
FIFTH FLOOR	591	SOUTH CORRIDOR	LVT-2	RB-1	P-1			ACP-1	
FIFTH FLOOR	592	NORTH CORRIDOR	LVT-2	RB-1	P-1			ACP-1	
SIXTH FLOOR									
SIXTH FLOOR	600	ELEVATOR LOBBY	LVT-1, LVT-2	RB-1	P-1, P-8			ACP-1, ETR	
SIXTH FLOOR	600A	UNISEX 1	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
SIXTH FLOOR	600B	UNISEX 2	ETR	ETR	ETR			ACP-1	PATCH AND REPAIR AREAS DISTURBED BY CONSTRUCTION.
SIXTH FLOOR	600C	ELEC.	ETR	ETR	ETR			ETR	
SIXTH FLOOR	601	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	602	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	603	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	604	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	605	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	606	COPY	LVT-3	RB-1	P-1	PL-1	SS-1	ACP-1	
SIXTH FLOOR	607	CONFERENCE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	608	KITCHENETTE	LVT-3	RB-1	P-1	PL-1	SS-1	ACP-1	
SIXTH FLOOR	609	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	610	MECHANICAL	ETR	ETR	ETR			ACP-1	
SIXTH FLOOR	611	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	612	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	613	JAN.	ETR	ETR	ETR			ETR	
SIXTH FLOOR	614	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	615	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	616	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	617	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	618	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	620	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	621	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	622	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	623	OFFICE	CPT-1	RB-1	P-1			ACP-1	
SIXTH FLOOR	624	TEL.	ETR	ETR	ETR			ETR	
SIXTH FLOOR	625	OPEN OFFICE	CPT-1	RB-1	P-1			ACP-1	

FINISH LEGEND

TYPE	FINISH DIVISION	CODE	MATERIAL	MANUFACTURER	PRODUCT	COLOR	REMARKS
FLOORING					---		
	DIVISION 9	CPT-1	CARPET TILE - FIELD	SHAW CONTRACT	ESTABLISH TILE, 12"X48"	NETWORK	HERRINGBONE INSTALLATION METHOD. ECOWORX PLATINUM BACKING
		CPT-2	CARPET TILE - ACCENT	SHAW CONTRACT	ESTABLISH TILE, 12"X48"	CLEAR	HERRINGBONE INSTALLATION METHOD. ECOWORX PLATINUM BACKING
		CPT-3	CARPET TILE - ACCENT	SHAW CONTRACT	CONVENE TILE, 12"X48"	CLEAR NETWORK	HERRINGBONE INSTALLATION METHOD. ECOWORX PLATINUM BACKING
		CPT-4	CARPET TILE - ACCENT	SHAW CONTRACT	ESTABLISH TILE, 12"X48"	BRILLIANT	HERRINGBONE INSTALLATION METHOD. ECOWORX PLATINUM BACKING
		CPT-5	CARPET TILE - ACCENT	SHAW CONTRACT	CONVENE TILE, 12"X48"	BRILLIANT NETWORK	HERRINGBONE INSTALLATION METHOD. ECOWORX PLATINUM BACKING
		CPT-6	CARPET TILE - ACCENT	SHAW CONTRACT	ESTABLISH TILE, 12"X48"	VIVID	HERRINGBONE INSTALLATION METHOD. ECOWORX PLATINUM BACKING
		CPT-7	CARPET TILE - ACCENT	SHAW CONTRACT	CONVENE TILE, 12"X48"	VIVID NETWORK	HERRINGBONE INSTALLATION METHOD. ECOWORX PLATINUM BACKING
		CPT-8	CARPET TILE - ACCENT	SHAW CONTRACT	ESTABLISH TILE, 12"X48"	FOUNDATION	HERRINGBONE INSTALLATION METHOD. ECOWORX PLATINUM BACKING
	DIVISION 9	LVT-1	LUXURY VINYL TILE	AVA FLOORING	2TRZO TILE, 36"X36"	TER012	
		LVT-2		AVA FLOORING	2TRZO TILE, 36"X36"	TER014	
		LVT-3		AVA FLOORING	SPRK TILE, 18"X18"	STEEL YOURSELF	
	DIVISION 9	PT-1	PORCELAIN TILE	AMERICAN OLEAN	THEORETICAL TILE, 12"X24"	CREATIVE GRAY	
	DIVISION 9	SC	SEALED CONCRETE	---	---	--	SEE SPECIFICATIONS FOR MORE INFORMATION.
BASE							
	DIVISION 9	RB-1	RUBBER BASE	TARKETT	4" RUBBER COVE BASE	GRAY 48	
	DIVISION 9	TB-1	TILE BASE	AMERICAN OLEAN	COVE BASE	TO MATCH PT-1	SEE BASE DETAIL ON A-533 FOR AREAS WHERE CT-1 MEETS PT-1.
WALLS							
	DIVISION 10	CR-1	CHAIR RAIL	ACROVYN	RUB STRIP, 2"H	TO MATCH WALL COLOR	SEE ELEVATIONS FOR MORE INFORMATION
	DIVISION 9	CT-1	CERAMIC TILE	AMERICAN OLEAN	COLOR STORY WALL, 4"X12"	ICE WHITE	WET WALLS ONLY. SEE ELEVATIONS FOR TILE PATTERN.
		CT-2	CERAMIC TILE	AMERICAN OLEAN	COLOR STORY WALL, 4"X12"	SAPPHIRE SKY	WET WALLS ONLY. SEE ELEVATIONS FOR TILE PATTERN.
		CT-3	CERAMIC TILE	AMERICAN OLEAN	COLOR STORY WALL, 4"X12"	GREEN APPLE	WET WALLS ONLY. SEE ELEVATIONS FOR TILE PATTERN.
		CT-4	CERAMIC TILE	AMERICAN OLEAN	COLOR STORY WALL, 4"X12"	FRESH	WET WALLS ONLY. SEE ELEVATIONS FOR TILE PATTERN.
		CT-5	CERAMIC TILE	AMERICAN OLEAN	COLOR STORY WALL, 4"X12"	BALANCE	WET WALLS ONLY. SEE ELEVATIONS FOR TILE PATTERN.
		CT-6	CERAMIC TILE	AMERICAN OLEAN	COLOR STORY WALL, 4"X12"	SHADOW	WET WALLS ONLY. SEE ELEVATIONS FOR TILE PATTERN.
	DIVISION 9	P-1	PAINT - GENERAL	SHERWIN WILLIAMS	EGGSHELL FINISH	SW7005 PURE WHITE	
		P-1A	PAINT - EPOXY	SHERWIN WILLIAMS	EPOXY FINISH	SW7005 PURE WHITE	
		P-2	PAINT - ACCENT	SHERWIN WILLIAMS	EGGSHELL FINISH	SW6522 SPORTY BLUE	
		P-3	PAINT - ACCENT	SHERWIN WILLIAMS	EGGSHELL FINISH	SW6240 WINDY BLUE	
		P-4	PAINT - ACCENT	SHERWIN WILLIAMS	EGGSHELL FINISH	SW6718 OVERT GREEN	
		P-5	PAINT - ACCENT	SHERWIN WILLIAMS	EGGSHELL FINISH	SW6716 DANCING GREEN	
		P-6	PAINT - ACCENT	SHERWIN WILLIAMS	EGGSHELL FINISH	SW6761 THERMAL SPRING	
		P-7	PAINT - ACCENT	SHERWIN WILLIAMS	EGGSHELL FINISH	SW6759 COOLED BLUE	
		P-8	PAINT - MC PURPLE	SHERWIN WILLIAMS	EGGSHELL FINISH	CUSTOM MANUAL MATCH	CCE COLORANT 02 32 64 128, WHITE - 40 - -, L1 BLUE- 62 1 1, MAGENTA 8 25 - 1
		P-9	PAINT - ACCENT	SHERWIN WILLIAMS	EGGSHELL FINISH	SW7064 PASSIVE	
		P-F	PAINT - FRAMES	SHERWIN WILLIAMS	SEMI-GLOSS FINISH	BLACK	FINAL COLOR TO BE COORDINATED WITH STOREFRONT COLOR.
	DIVISION 9	WC-1	VINYL WALL COVERING	MOMENTUM WALLCOVERING	EDITORIAL	HEADLINE	
CEILING							
	DIVISION 9	ACP-1	ACOUSTIC CEILING PANEL	ARMSTRONG CEILINGS	ULTIMA, 2X2	WHITE	SQUARE EDGE, 15/16" GRID.
		ACP-2	ACOUSTIC CEILING PANEL	ARMSTRONG CEILINGS	CALLA, 2X2	LIGHT GRAY	SQUARE EDGE, 15/16" GRID. SEE RCPS FOR LOCATIONS
	DIVISION 9	AP-1	ACOUSTIC PANEL	TURF CEILINGS	LINEAR L3	FADED DENIM	15/16" GRID, 2X4 PANELS
	DIVISION 9	EX-P	EXPOSED - PAINTED	---	---	SEMI-GLOSS FINISH	TO MATCH P-1
	DIVISION 9	GYP-1	GYP. BOARD	---	---	---	TO MATCH P-1 U.O.N. SEE RCPS FOR ADDITIONAL COLOR INFORMATION.
		GYP-2	ACOUSTICAL GYP. BOARD	ARMSTRONG CEILINGS	ACOUSTIBUILT, .80 NRC/46 CAC	WHITE	INSTALL PER MFR INSTRUCTIONS.
MISC							
	DIVISION 12	MB-1	LOUVER BLINDS	---	---	WHITE	SEE SPECIFICATIONS FOR MORE INFORMATION.
	DIVISION 12	PL-1	PLASTIC LAMINATE	WILSONART	---	KENSINGTON MAPLE	
	DIVISION 12	PL-2	PLASTIC LAMINATE	WILSONART	---	MARKERBOARD WHITE	AT BANQUETTE BOOTH TABLES ONLY.
	DIVISION 12	SS-1	SOLID SURFACE	DUPONT	CORIAN	CIRRUS WHITE	
	DIVISION 6	UPH-1	UPHOLSTERY	PALLAS TEXTILES	TBD	TBD	ON BUILT IN BANQUETTES AND READING NOOK; FABRIC TO BE COORDINATED WITH FURNITURE FINISH SELECTIONS
	DIVISION 6	WD-1	WOOD, STAINED	---	---	CLEAR MAPLE	
	DIVISION 6	WD-2	WOOD, PAINTED	---		PAINT GRADE WOOD	SEE FINISH PLANS AND ELEVATIONS FOR MORE INFORMATION.

FINISH PLAN GENERAL NOTES

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2. UNLESS INDICATED OTHERWISE:
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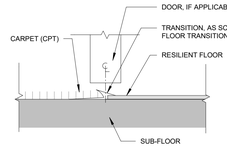
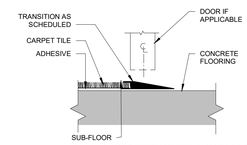
   B. ALL HM DOOR FRAMES TO BE PAINTED P-F
   C. ALL IMPACT RESISTANT GYP. TO BE PAINTED P-1, UP TO CONTROL JOINT
3. ALL FLOOR MATERIALS TO BE BUTT JOINTED AT TRANSITIONS ON CENTER OF DOOR LEAF WHERE APPLICABLE, UNO. PROVIDE EDGE PROTECTION AND TRANSITION PROFILES WHERE MATERIAL CHANGES AND/OR STOPS.
1. PAINT ALL EXPOSED STRUCTURE (BEAMS, JOISTS, DECK), EXPOSED CONDUIT, EXPOSED DUCT AND PIPING (INCLUDING INSULATION) TO MATCH P-1, U.O.N.
2. ALL WALL MOUNTED CASEWORK, MILLWORK, HARDWARE, EQUIPMENT, ETC. SHALL BE ANCHORED TO IN-WALL METAL STRAPPING OR PLYWOOD/LUMBER BLOCKING INSTALLED BETWEEN STUD FRAMING, UNO.
3. FIBER REINFORCED PLASTIC PANELING WALL PROTECTION FOR CUSTODIAL ROOMS SHALL BE EXTENDED 4'-0" IN BOTH DIRECTIONS FROM MOP SINK AND SHALL BE 4'-0" ABOVE WALL BASE, UNO.
4. ALL FLOORING MATERIALS TO CONTINUE UNDER CASEWORK TO TOE KICK OR IF OPEN, TO WALL.



REFER TO FLOOR TRANSITION NOTES FOR SPECIFIC TRANSITION USED
NOTE:
1. CUT TRANSITION STRIP SQUARE AND PLUMB WITH ADJACENT DOOR FRAME
2. THRESHOLD SHALL BE LOCATED UNDER THE DOOR WHERE THE THRESHOLD IS NOT VISIBLE OUTSIDE THE ROOM WHEN THE DOOR IS CLOSED.

B5 TR-1 - CARPET TILE TO RESILIENT FLOOR
AG.010 6" = 1'-0"



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NOTE:
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2. THRESHOLD SHALL BE LOCATED UNDER THE DOOR WHERE THE THRESHOLD IS NOT VISIBLE OUTSIDE THE ROOM WHEN THE DOOR IS CLOSED.

A5 TR-4 - CARPET TO CONCRETE
AG.010 3" = 1'-0"

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MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
51 MANNAKEE STREET
ROCKVILLE, MD 20850
MC PROJECT # FP24-021 / BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: LL
Checked By: MF

Drawing
ROOM FINISH SCHEDULE, LEGEND & DETAILS

AG.010

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

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E D C B A
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THE SQUARES BELOW ARE COLOR, WITH BLACK AND WHITE LETTERS, IF PRINTED CORRECTLY

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

FINISH PLAN GENERAL NOTES

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3. ALL FLOOR MATERIALS TO BE BUTT JOINTED AT TRANSITIONS ON CENTER OF DOOR LEAF WHERE APPLICABLE, UNO. PROVIDE EDGE PROTECTION AND TRANSITION PROFILES WHERE MATERIAL CHANGES AND/OR STOPS.
1. PAINT ALL EXPOSED STRUCTURE (BEAMS, JOISTS, DECK), EXPOSED CONDUIT, EXPOSED DUCT AND PIPING (INCLUDING INSULATION) TO MATCH P-1, U.O.N.
2. ALL WALL MOUNTED CASEWORK, MILLWORK, HARDWARE, EQUIPMENT, ETC. SHALL BE ANCHORED TO IN-WALL METAL STRAPPING OR PLYWOOD/LUMBER BLOCKING INSTALLED BETWEEN STUD FRAMING, UNO.
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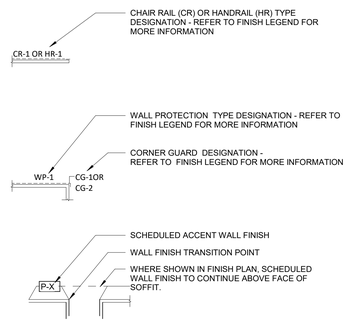
WALL FINISH LEGEND



FLOOR FINISH LEGEND

- CPT-1
- CPT-2
- CPT-3
- CPT-4
- CPT-5
- CPT-6
- CPT-7
- CPT-8
- LVT-1
- LVT-2
- LVT-3
- SC
- PT-1

FLOORING INSTALLATION DIRECTION INDICATOR

FLOOR TRANSITION LEGEND

TR-1: CARPET (CPT) TO RESILIENT FLOOR (VCT OR LVT OR RBR)
TARKETT TRANSITION SLT-XX-A

TR-3: CARPET (CPT) TO PORCELAIN TILE
SCHLUTER RENO-TK STAINLESS STEEL

TR-4: CARPET (CPT) TO SEALED CONCRETE (SC)
TARKETT CRS-XX-A RUBBER TRANSITION

TR-5: RESILIENT FLOORING (VCT OR LVT OR RBR) TO EXISTING FLOORING
CONTRACTOR TO VERIFY TRANSITION NEEDED IN FIELD

TR-6: CARPET (CPT) TO EXISTING FLOORING
CONTRACTOR TO VERIFY TRANSITION NEEDED IN FIELD

NOTES:
1. ALL TRANSITIONS TO BE CENTERED ON DOOR UNLESS OTHERWISE NOTED.
2. TARKETT TRANSITION COLOR TO MATCH RB-1.
3. CONTRACTOR TO VERIFY FLOORING THICKNESSES AND TRANSITIONS NEEDED IN FIELD TO ENSURE A SMOOTH AND ADA COMPLIANT TRANSITION.

TR-X
TRANSITION SYMBOL ON PLAN

SHEET KEYNOTES

(XX) (AG)

NUM.	NOTE
AG	FINISH PLAN NOTE
AG.1	PAINT WALLS; FLOORING AND BASE FINISHES ETR

TRUE NORTH
PROJECT NORTH

A1 GROUND FLOOR FINISH PLAN

A-201	AG.100	1/8" = 1'-0"

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Project Number: 225012.00
Drawn By: LL
Checked By: MF

Drawing
GROUND FLOOR FINISH PLAN

AG.100

NOT FOR CONSTRUCTION

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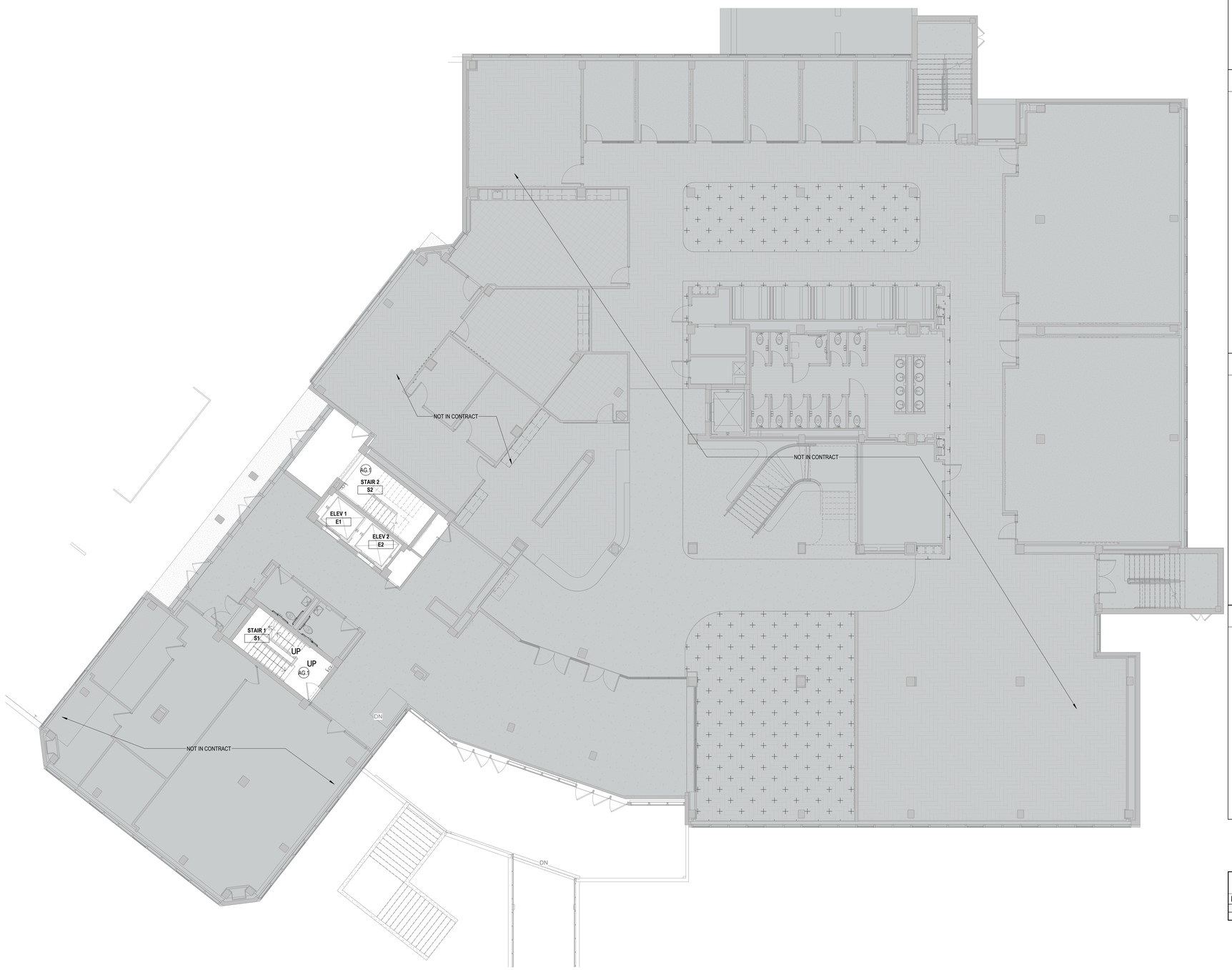

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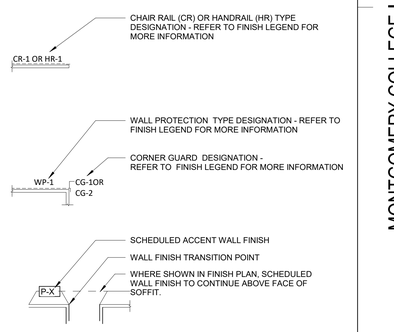
2. ALL WALL MOUNTED CASEWORK, MILLWORK, HARDWARE, EQUPIMENT, ETC. SHALL BE ANCHORED TO IN-WALL METAL STRAPPING OR PLYWOOD/LUMBER BLOCKING INSTALLED BETWEEN STUD FRAMING, UNO.
3. FIBER REINFORCED PLASTIC PANELING WALL PROTECTION FOR CUSTODIAL ROOMS SHALL BE EXTENDED 4'-0" IN BOTH DIRECTIONS FROM MOP SINK AND SHALL BE 4'-0" ABOVE WALL BASE, UNO.
4. ALL FLOORING MATERIALS TO CONTINUE UNDER CASEWORK TO TOE KICK OR IF OPEN, TO WALL.

WALL FINISH LEGEND



FLOOR FINISH LEGEND

CPT-1 | CPT-2 | CPT-3
CPT-4 | CPT-5 | CPT-6
CPT-7 | CPT-8 | LVT-1
LVT-2 | LVT-3 | SC
PT-1

FLOORING INSTALLATION DIRECTION INDICATOR

FLOOR TRANSITION LEGEND

TR-1: CARPET (CPT) TO RESILIENT FLOOR (VCT OR LVT OR RBR)
TARKETT TRANSITION SLT-XX-A

TR-3: CARPET (CPT) TO PORCELAIN TILE
SCHLUTER RENO-TK STAINLESS STEEL

TR-4: CARPET (CPT) TO SEALED CONCRETE (SC)
TARKETT CRS-XX-A RUBBER TRANSITION

TR-5: RESILIENT FLOORING (VCT OR LVT OR RBR) TO EXISTING FLOORING
CONTRACTOR TO VERIFY TRANSITION NEEDED IN FIELD

TR-6: CARPET (CPT) TO EXISTING FLOORING
CONTRACTOR TO VERIFY TRANSITION NEEDED IN FIELD

NOTES:
1. ALL TRANSITIONS TO BE CENTERED ON DOOR UNLESS OTHERWISE NOTED.
2. TARKETT TRANSITION COLOR TO MATCH RB-1.
3. CONTRACTOR TO VERIFY FLOORING THICKNESSES AND TRANSITIONS NEEDED IN FIELD TO ENSURE A SMOOTH AND ADA COMPLIANT TRANSITION.

TR-X TRANSITION SYMBOL ON PLAN

SHEET KEYNOTES

(XX) (AG)

NUM.	NOTE
AG	FINISH PLAN NOTE
AG.1	PAINT WALLS; FLOORING AND BASE FINISHES ETR

TRUE NORTH | PROJECT NORTH

A1 FIRST FLOOR FINISH PLAN

A-201 | AG.101 | 1/8" = 1'-0"

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MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
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ROCKVILLE, MD 20850

MC PROJECT # FP24-021 / BUILDING # 206

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LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

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LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: LL
Checked By: MF

Drawing
FIRST FLOOR FINISH PLAN

AG.101

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1 2 3 4 5 6

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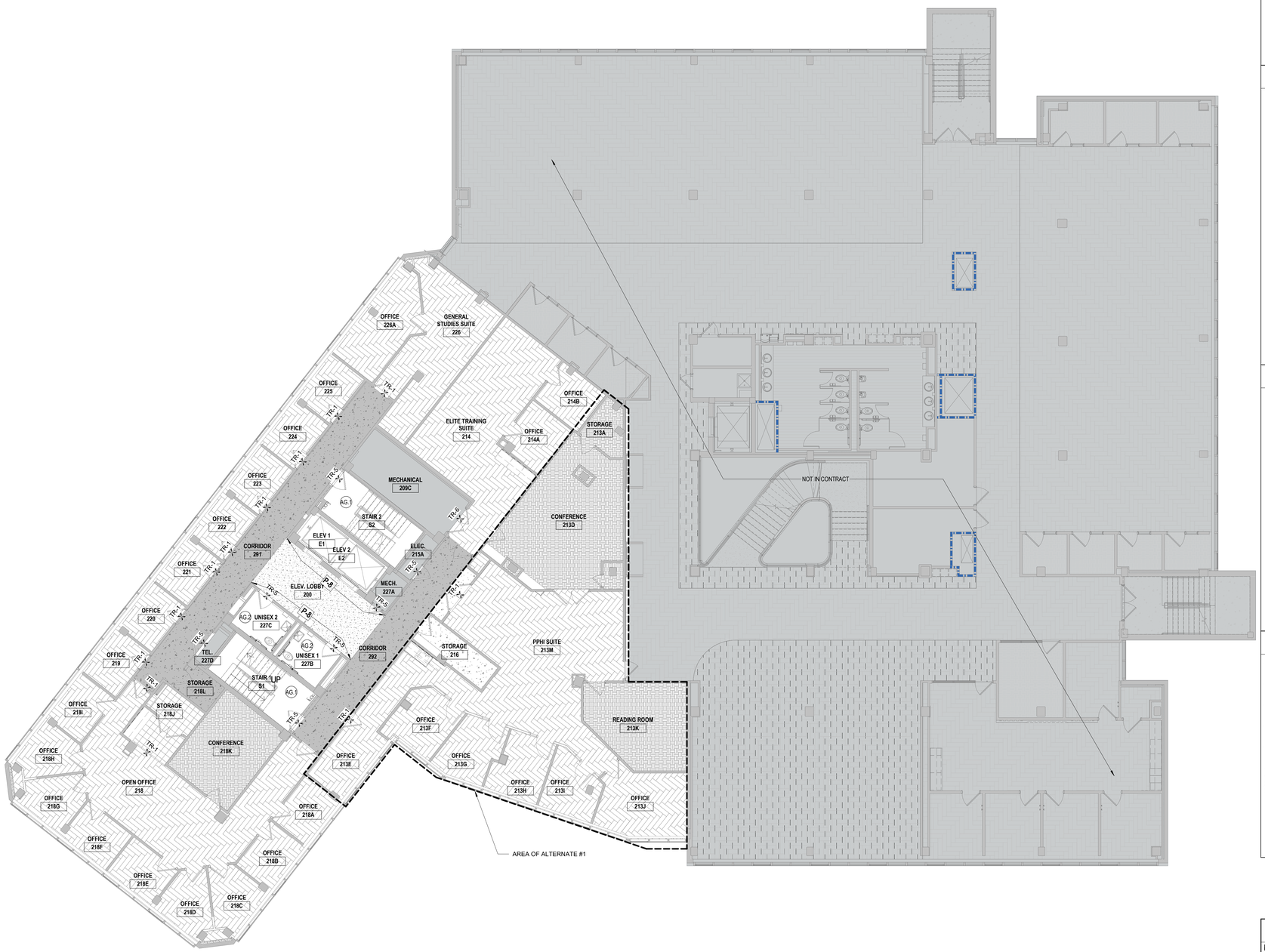

PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

FINISH PLAN GENERAL NOTES

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   C. ALL IMPACT RESISTANT GYP. TO BE PAINTED P-1, UP TO CONTROL JOINT
3. ALL FLOOR MATERIALS TO BE BUTT JOINTED AT TRANSITIONS ON CENTER OF DOOR LEAF WHERE APPLICABLE, UNO. PROVIDE EDGE PROTECTION AND TRANSITION PROFILES WHERE MATERIAL CHANGES AND/OR STOPS.
1. PAINT ALL EXPOSED STRUCTURE (BEAMS, JOISTS, DECK), EXPOSED CONDUIT, EXPOSED DUCT AND PIPING (INCLUDING INSULATION) TO MATCH P-1, U.O.N.
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WALL FINISH LEGEND

CR-1 OR HR-1 — CHAIR RAIL (CR) OR HANDRAIL (HR) TYPE DESIGNATION - REFER TO FINISH LEGEND FOR MORE INFORMATION

WP-1 CG-1OR CG-2 — WALL PROTECTION TYPE DESIGNATION - REFER TO FINISH LEGEND FOR MORE INFORMATION; CORNER GUARD DESIGNATION - REFER TO FINISH LEGEND FOR MORE INFORMATION

P-X — SCHEDULED ACCENT WALL FINISH; WALL FINISH TRANSITION POINT; WHERE SHOWN IN FINISH PLAN, SCHEDULED WALL FINISH TO CONTINUE ABOVE FACE OF SOFFIT.

FLOOR FINISH LEGEND

CPT-1, CPT-2, CPT-3, CPT-4, CPT-5, CPT-6, CPT-7, CPT-8, LVT-1, LVT-2, LVT-3, SC, PT-1

FLOORING INSTALLATION DIRECTION INDICATOR

FLOOR TRANSITION LEGEND

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TR-X — TRANSITION SYMBOL ON PLAN

SHEET KEYNOTES

NUM.	NOTE
AG	FINISH PLAN NOTE
AG.1	PAINT WALLS; FLOORING AND BASE FINISHES ETR
AG.2	CLEAN, RE-GROUT, & RE-SEAL RESTROOM FLOORS.

TRUE NORTH / PROJECT NORTH

A1 SECOND FLOOR FINISH PLAN

A-201 | AG.102 | 1/8" = 1'-0"

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Project Number: 225012.00
Drawn By: LL
Checked By: MF

Drawing
SECOND FLOOR FINISH PLAN

AG.102

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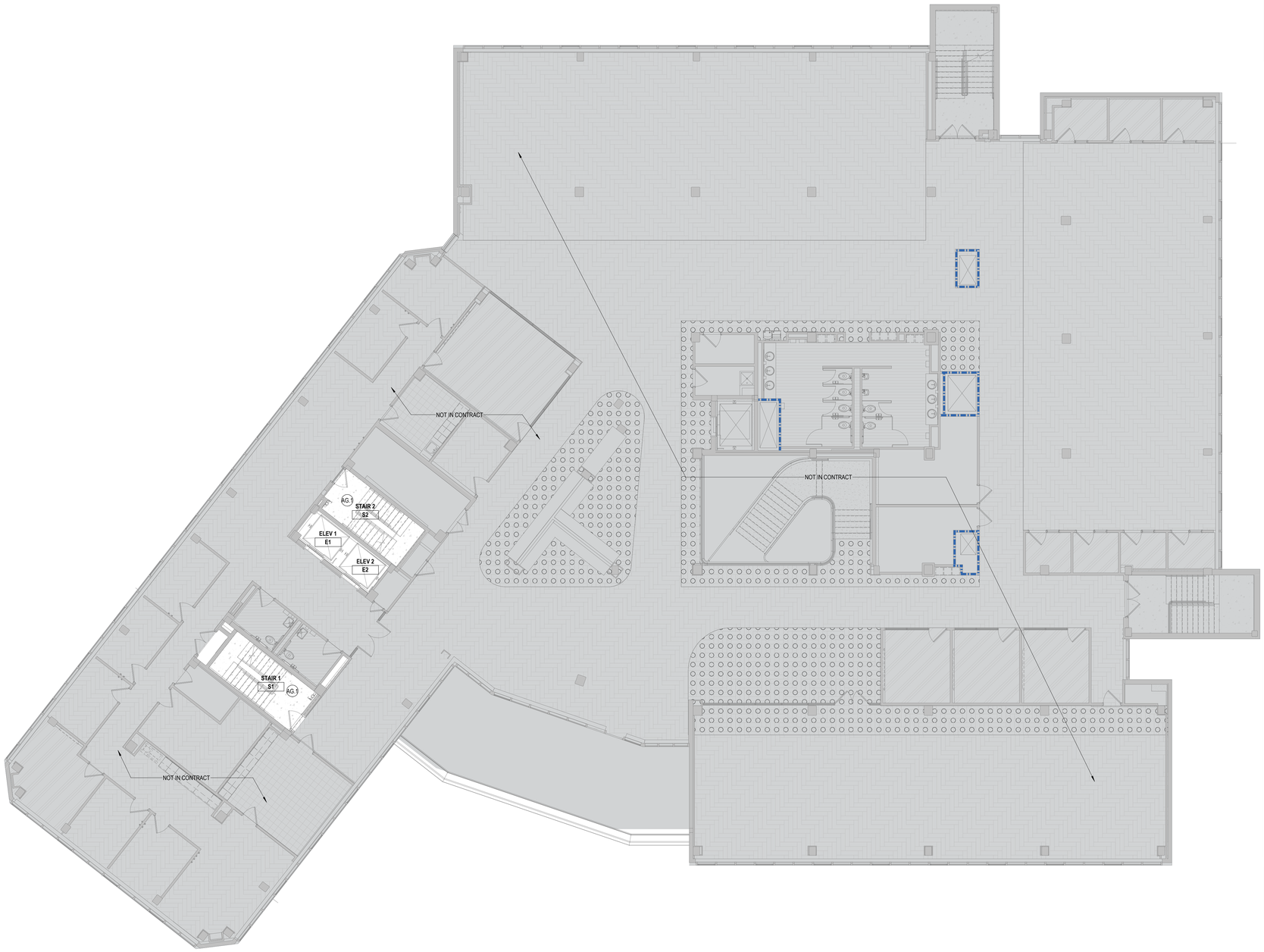

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

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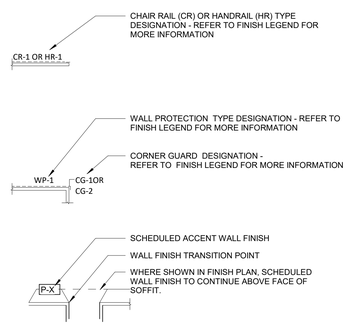
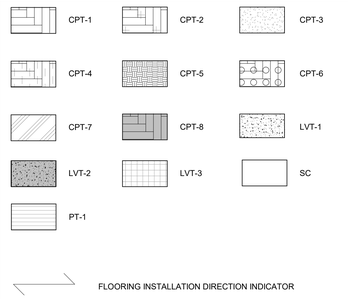
WALL FINISH LEGEND



FLOOR FINISH LEGEND



FLOOR TRANSITION LEGEND

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TARKETT TRANSITION SLT-XX-A

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TR-X
X — TRANSITION SYMBOL ON PLAN

SHEET KEYNOTES

(XX) (AG)

NUM.	NOTE
AG	FINISH PLAN NOTE
AG.1	PAINT WALLS; FLOORING AND BASE FINISHES ETR

A1 THIRD FLOOR FINISH PLAN

A-201	AG.103	1/8" = 1'-0"

TRUE NORTH / PROJECT NORTH

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MC PROJECT # FP24-021 / BUILDING # 206

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PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

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LICENSE NUMBER:
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Project Number: 225012.00
Drawn By: LL
Checked By: MF

Drawing
THIRD FLOOR FINISH PLAN

AG.103

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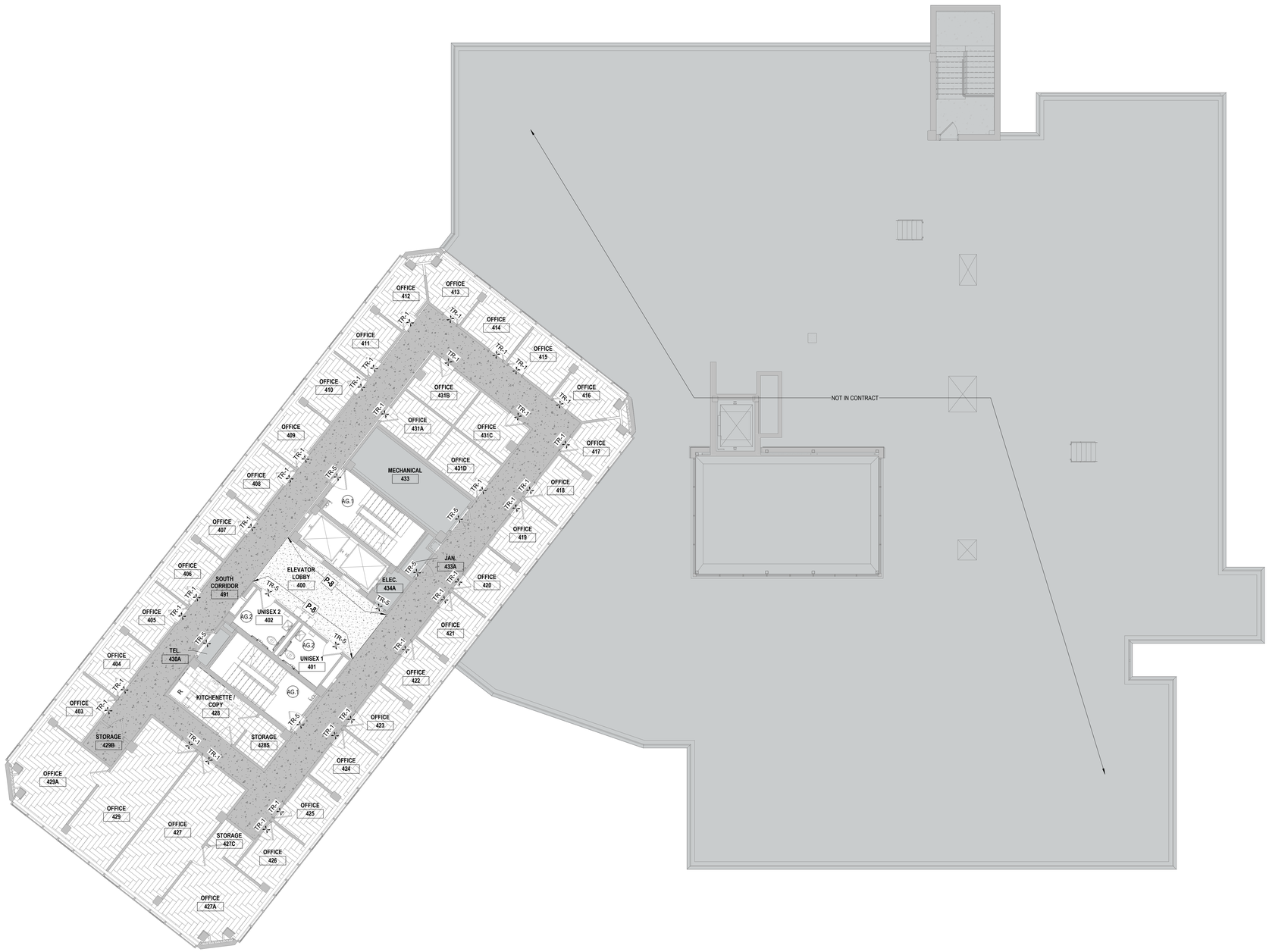

PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

FINISH PLAN GENERAL NOTES

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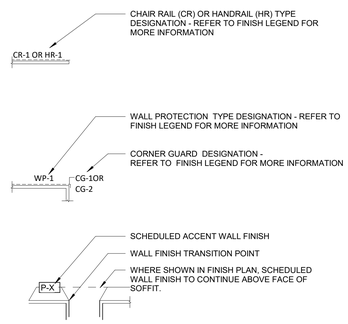
WALL FINISH LEGEND



FLOOR FINISH LEGEND

- CPT-1
- CPT-2
- CPT-3
- CPT-4
- CPT-5
- CPT-6
- CPT-7
- CPT-8
- LVT-1
- LVT-2
- LVT-3
- SC
- PT-1

FLOORING INSTALLATION DIRECTION INDICATOR

FLOOR TRANSITION LEGEND

TR-1: CARPET (CPT) TO RESILIENT FLOOR (VCT OR LVT OR RBR)
TARKETT TRANSITION SLT-XX-A

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SCHLUTER RENO-TK STAINLESS STEEL

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TR-X TRANSITION SYMBOL ON PLAN

SHEET KEYNOTES

(XX) (AG)

NUM.	NOTE
AG	FINISH PLAN NOTE
AG.1	PAINT WALLS, FLOORING AND BASE FINISHES ETR
AG.2	CLEAN, RE-GROUT, & RE-SEAL RESTROOM FLOORS.

TRUE NORTH PROJECT NORTH

A1 FOURTH FLOOR FINISH PLAN

A-201 | AG.104 | 1/8" = 1'-0"

ARCHITECT
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Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: LL
Checked By: MF

Drawing
FOURTH FLOOR FINISH PLAN

AG.104

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A1 FIFTH FLOOR FINISH PLAN

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PLAN LEGEND

AREAS NOT IN CONTRACT

ALTERNATE #1

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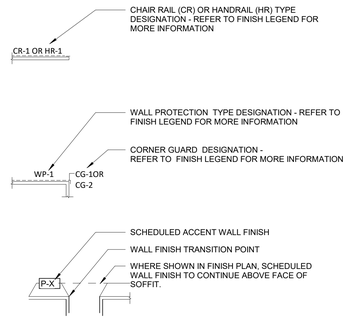

FLOOR FINISH LEGEND

CPT-1 CPT-2 CPT-3

CPT-4 CPT-5 CPT-6

CPT-7 CPT-8 LVT-1

LVT-2 LVT-3 SC

PT-1

FLOORING INSTALLATION DIRECTION INDICATOR

FLOOR TRANSITION LEGEND

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TR-X TRANSITION SYMBOL ON PLAN

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51 MANNAKEE STREET
ROCKVILLE, MD 20850

MC PROJECT # FP24-021 / BUILDING # 206

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: LL
Checked By: MF

Drawing
FIFTH FLOOR FINISH PLAN

AG.105

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

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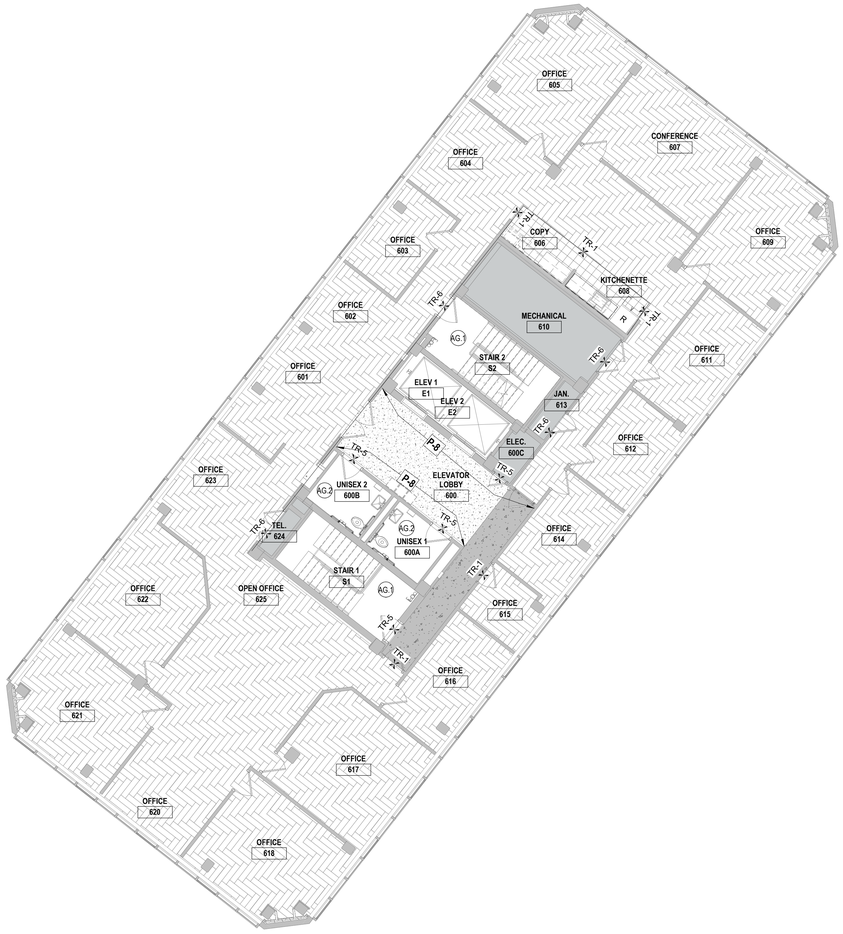
THE SQUARES BELOW ARE COLOR, WITH BLACK AND WHITE LETTERS, IF PRINTED CORRECTLY



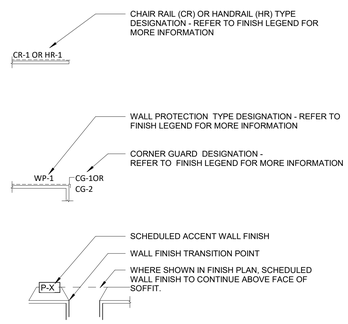
PLAN LEGEND

- AREAS NOT IN CONTRACT
- ALTERNATE #1

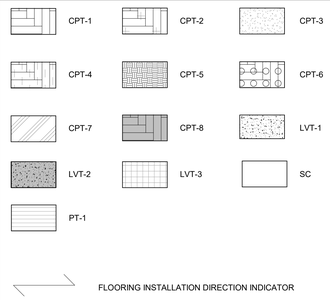
FINISH PLAN GENERAL NOTES

1. IDENTIFICATION OF INTERIOR FINISHES ARE LOCATED THROUGHOUT THE SCOPE OF WORK. ALL INTERIOR FINISHES SHOULD COMPLY WITH THE CODE REQUIREMENTS LISTED IN GL101.
2. UNLESS INDICATED OTHERWISE:
   A. ALL INTERIOR WALLS TO BE PAINTED P-1
   B. ALL HM DOOR FRAMES TO BE PAINTED P-F
   C. ALL IMPACT RESISTANT GYP. TO BE PAINTED P-1, UP TO CONTROL JOINT
3. ALL FLOOR MATERIALS TO BE BUTT JOINTED AT TRANSITIONS ON CENTER OF DOOR LEAF WHERE APPLICABLE, UNO. PROVIDE EDGE PROTECTION AND TRANSITION PROFILES WHERE MATERIAL CHANGES AND/OR STOPS.
1. PAINT ALL EXPOSED STRUCTURE (BEAMS, JOISTS, DECK), EXPOSED CONDUIT, EXPOSED DUCT AND PIPING (INCLUDING INSULATION) TO MATCH P-1, U.O.N.
2. ALL WALL MOUNTED CASEWORK, MILLWORK, HARDWARE, EQUPIMENT, ETC. SHALL BE ANCHORED TO IN-WALL METAL STRAPPING OR PLYWOOD/LUMBER BLOCKING INSTALLED BETWEEN STUD FRAMING, UNO.
3. FIBER REINFORCED PLASTIC PANELING WALL PROTECTION FOR CUSTODIAL ROOMS SHALL BE EXTENDED 4'-0" IN BOTH DIRECTIONS FROM MOP SINK AND SHALL BE 4'-0" ABOVE WALL BASE, UNO.
4. ALL FLOORING MATERIALS TO CONTINUE UNDER CASEWORK TO TOE KICK OR IF OPEN, TO WALL.

WALL FINISH LEGEND



FLOOR FINISH LEGEND



FLOOR TRANSITION LEGEND

TR-1: CARPET (CPT) TO RESILIENT FLOOR (VCT OR LVT OR RBR)
TARKETT TRANSITION SLT-XX-A

TR-3: CARPET (CPT) TO PORCELAIN TILE
SCHLUTER RENO-TK STAINLESS STEEL

TR-4: CARPET (CPT) TO SEALED CONCRETE (SC)
TARKETT CRS-XX-A RUBBER TRANSITION

TR-5: RESILIENT FLOORING (VCT OR LVT OR RBR) TO EXISTING FLOORING
CONTRACTOR TO VERIFY TRANSITION NEEDED IN FIELD

TR-6: CARPET (CPT) TO EXISTING FLOORING
CONTRACTOR TO VERIFY TRANSITION NEEDED IN FIELD

NOTES:
1. ALL TRANSITIONS TO BE CENTERED ON DOOR UNLESS OTHERWISE NOTED.
2. TARKETT TRANSITION COLOR TO MATCH RB-1.
3. CONTRACTOR TO VERIFY FLOORING THICKNESSES AND TRANSITIONS NEEDED IN FIELD TO ENSURE A SMOOTH AND ADA COMPLIANT TRANSITION.

TR-X — TRANSITION SYMBOL ON PLAN

SHEET KEYNOTES

(XX) (AG)

NUM.	NOTE
AG	FINISH PLAN NOTE
AG.1	PAINT WALLS; FLOORING AND BASE FINISHES ETR
AG.2	CLEAN, RE-GROUT, & RE-SEAL RESTROOM FLOORS.

A1 SIXTH FLOOR FINISH PLAN

A-201 | AG.106 | 1/8" = 1'-0"

TRUE NORTH | PROJECT NORTH

ARCHITECT
HORD COPLAN MACHT
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ALEXANDRIA, VA 22314
571.388.7761

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ACCESSORIES SCHEDULE - OFFICE RENO

Type Mark	DESCRIPTION	MANUFACTURER	MODEL	COUNT	PROVIDED BY	INSTALLED BY	REQUIRES WALL BLOCKING
H-1	COAT HOOK	BOBRICK	B-76717 SERIES	56	CONTRACTOR	CONTRACTOR	Yes
T-1	ADA GRAB BAR SET	BOBRICK	B-5806 SERIES	7	CONTRACTOR	CONTRACTOR	Yes
T-2	ADA AMBULATORY GRAB BAR SET	BOBRICK	B-5806 SERIES	1	CONTRACTOR	CONTRACTOR	Yes
T-3	48"X48" MIRROR, FRAMELESS	BOBRICK	B-1556 SERIES	4	CONTRACTOR	CONTRACTOR	Yes
T-4	PAPER TOWEL DISPENSER, ROLL	NITTANY PAPER	NP-PC-0563	16	CONTRACTOR	CONTRACTOR	Yes
T-5	SOAP DISPENSER	SPARTAN	FOAM DISPENSER 975600BLK	14	CONTRACTOR	CONTRACTOR	Yes
T-6	BABY CHANGING STATION	BOBRICK	KB310-SSWM SERIES	1	CONTRACTOR	CONTRACTOR	Yes
T-7	TOILET PAPER DISPENSER	NITTANY PAPER	NP-24MC	23	CONTRACTOR	CONTRACTOR	Yes
T-8	SANITARY DISPOSAL	HOSPITAL SPECIALTY COMPANY	HOSNDIY/E	21	CONTRACTOR	CONTRACTOR	Yes
T-9	TOILET SEAT COVER DISPENSER	GEORGIA PACIFIC CORP	GPC57725	23	CONTRACTOR	CONTRACTOR	Yes
T-10	24"X36" MIRROR, FRAMELESS	BOBRICK	B-1556 SERIES	12	CONTRACTOR	CONTRACTOR	Yes

INTERIOR ELEVATION GENERAL NOTES

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3. DO NOT SCALE DRAWINGS; NOTIFY ARCHITECT IF CRITICAL DIMENSIONS DO NOT APPEAR ON THE DRAWINGS.
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5. REFER TO HVAC & MEP DRAWINGS FOR ADDITIONAL INFORMATION.
6. REUSE ANY SALVAGED ELECTRICAL [& LIGHTING] AS INDICATED, RE: ELECTRICAL DWGS FOR ADDITIONAL INFORMATION.
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8. ALL INTERIOR STUD PARTITIONS TO BE TYPE M3AS UNO. ALL INTERIOR STUD PARTITIONS GO UP TO STRUCTURE UNO. CONCRETE COLUMN FURRING TO BE M0FC UNO. ALL WALL ANGLES ARE 90° TO EACH OTHER UNO.
9. ALL HEIGHTS AS SHOWN ARE FROM FINISHED FLOOR, UNLESS NOTED OTHERWISE.
10. REFER TO A-521FOR CEILING SECTIONS & DETAILS.
11. ALL CEILINGS TO BE: 8' 10" UNLESS NOTED OTHERWISE.
12. SPRINKLER HEADS, DIFFUSERS, ETC. SHALL BE CENTERED IN THE CEILING TILE.
13. ALL DIFFUSERS SHALL BE PAINTED TO MATCH ADJACENT SURFACE COLOR.
14. CLEAN, PATCH AND REPAIR EXISTING CEILINGS WHERE OLD WALLS AND CEILINGS WERE REMOVED (REFER TO DEMOLITION PLANS) TO "LIKE NEW" CONDITION.
15. CLEAN, PATCH AND REPAIR EXISTING CEILINGS WHERE DAMAGED FROM REMOVED/RELOCATED DEVICES [LIGHTS, EXIT SIGNS, PROJECTORS, ETC.] TO "LIKE NEW" CONDITION. SKIM FOR NEW CEILING FINISHES AND/OR MATERIALS.
16. CLEAN, PATCH AND REPAIR ALL LAY-IN CEILING TILE AND GRIDS TO "LIKE NEW" CONDITION.
17. CLEAN AND REPAIR EXISTING LIGHTS.
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19. ALL (WARDROBE) CABINETS TO HAVE LOCKS PER SPECIFICATIONS
20. CONTROL JOINTS AT EACH EDGE OF ALL DOOR FRAMES (CORRIDOR SIDE AND ROOM SIDE) AND EVERY 30 LINEAR FEET.
21. REFER TO A-531 AND A-532 FOR TYPICAL CASEWORK AND MILLWORK DETAILS.
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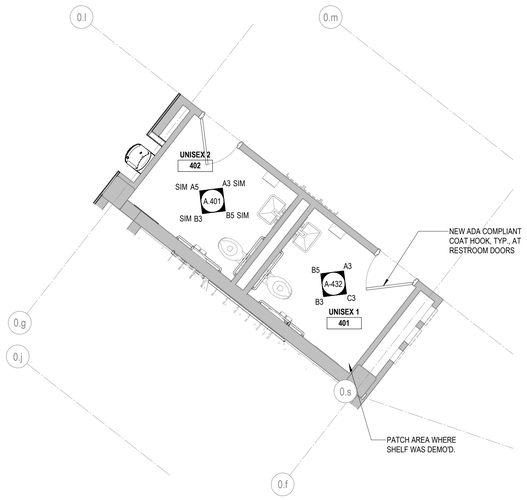
NOTE:

1. WARDROBES AND CASEWORK ADJACENT TO SIDE WALLS TO HAVE ENOUGH ROOM FOR DOOR HANDLES. ENSURE DOOR HANDLES DON'T HIT THE WALL AND THE DOOR WILL OPEN 90 DEGREES. DOOR HINGES TO SWING TO 90 DEGREES UNLESS OTHERWISE INDICATED IN SPECIFICATIONS.
2. IN BREAKROOMS, LOCATE PIPING AND DISPOSALS TO THE RIGHT OR LEFT CORNERS OF SINKS. ENSURE DRAIN HOLE IS IN ONE OF THE BACK SINK CORNERS SO AN ADA APRON OR A ROLL IN CONDITION CAN BE MET.
3. COORDINATE LOCATIONS OF OWNER SUPPLIED APPLIANCES WITH OWNER. VERIFY SPACE NEEDED IN FIELD WITH OWNER.
4. PROVIDE PLYWOOD BACKING ON METAL STUD FRAMING FOR CASEWORK NEEDING WALL BLOCKING.
5. VERIFY WATER SUPPLY REQUIREMENTS FOR ALL OWNER PROVIDED APPLIANCES (EXAMPLE: ICE MAKER).

CASEWORK KEY:

SHEET KEYNOTES

(XX) NUM.	NOTE



A1 TYPICAL RESTROOM PLAN - LEVELS 2, 4, 5, 6

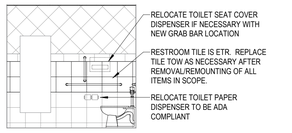
A.102 | A.401 | 1/4" = 1'-0"

ADA RESTROOM CORRECTIONS NEEDED, TYPICAL:

1. ADD ADDITIONAL ADA COMPLIANT DOOR HOOK BELOW EXISTING TO REMAIN DOOR HOOK. DEMO ALL MIRRORS IN CONFLICT WITH NEW ADA HOOKS.
2. REMOVE HAND DRYER AND DEMO WIRING BACK TO SOURCE.
3. PROVIDE NEW TRASH RECEPTACLE UNDER EXISTING PAPER TOWEL DISPENSER.
4. REMOVE AND REMOUNT TOILET PAPER DISPENSER TO BE WITHIN ADA ALLOWANCES.
5. DEMO GRAB BARS AND INSTALL NEW PER ADA. FINISH TO BE STAINLESS STEEL.
6. DEMO 5'D SHELF AND SUPPORT BRACKETS.

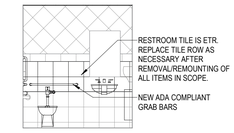
NOTE:

1. REPLACE WALL TILE ROW AS NECESSARY AFTER REMOVAL/REMOUNTING OF ALL ITEMS.
2. SEAL ALL PUNCTURES TO WALLS BELOW BEFORE RE-TILING.
3. PLUMBING FIXTURES AND ALL WALL MOUNTED ACCESSORIES ARE EXISTING TO REMAIN UNLESS OTHERWISE SCHEDULED FOR REMOVAL OR REPLACEMENT. EXISTING TO REMAIN FIXTURES ARE SHOWN FOR GRAPHIC PURPOSES ONLY AND MAY NOT REFLECT ACTUAL LOCATIONS OR SIZES. VERIFY ALL ELEMENTS IN FIELD.



B3 TYPICAL RESTROOM - TP WALL

A.401 | 1/4" = 1'-0"

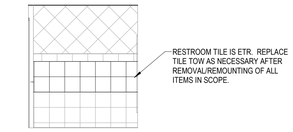


B5 TYPICAL RESTROOM -SINK WALL

A.401 | 1/4" = 1'-0"

A3 TYPICAL RESTROOM -DOOR WALL

A.401 | 1/4" = 1'-0"



A5 TYPICAL RESTROOM - WALL

A.401 | 1/4" = 1'-0"

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ENLARGED PLANS & INTERIOR ELEVATIONS

A.401

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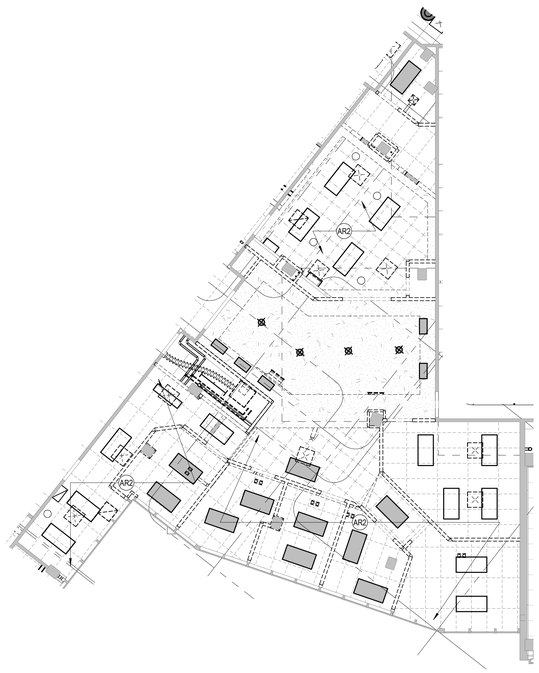
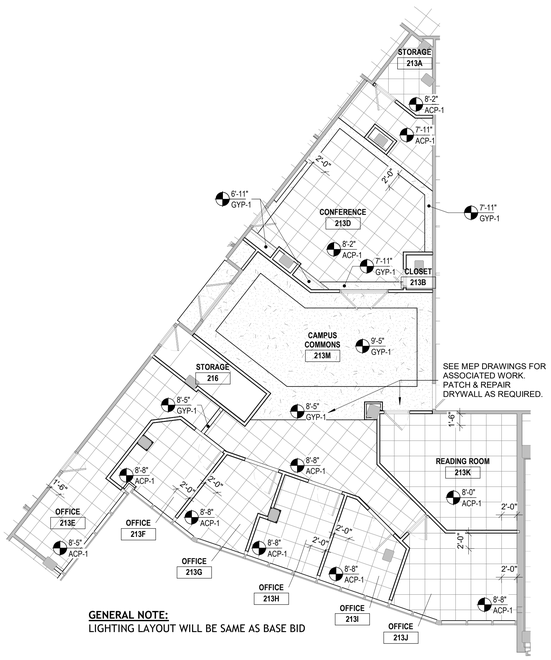


D1 PPHI SUITE DEMOLITION RCP - ALTERNATE # 1

A-201	A.402	1/8" = 1'-0"



GENERAL NOTE:
LIGHTING LAYOUT WILL BE SAME AS BASE BID

D3 PPHI SUITE RCP - ALTERNATE # 1

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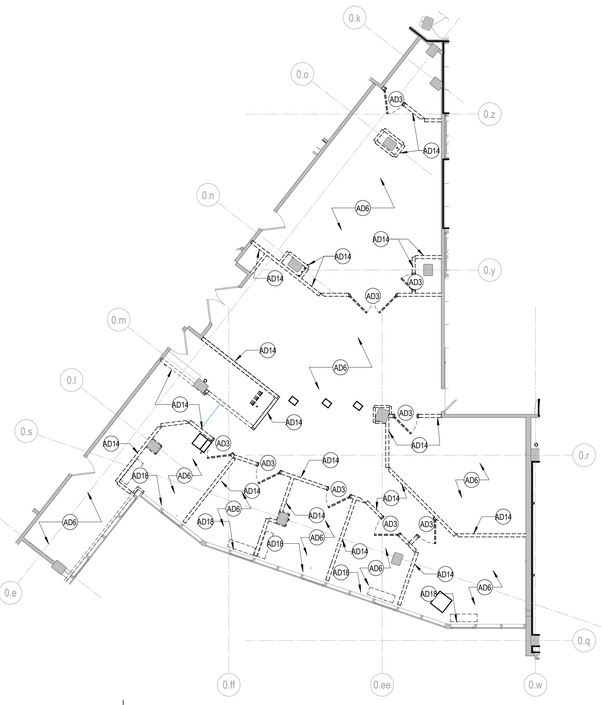
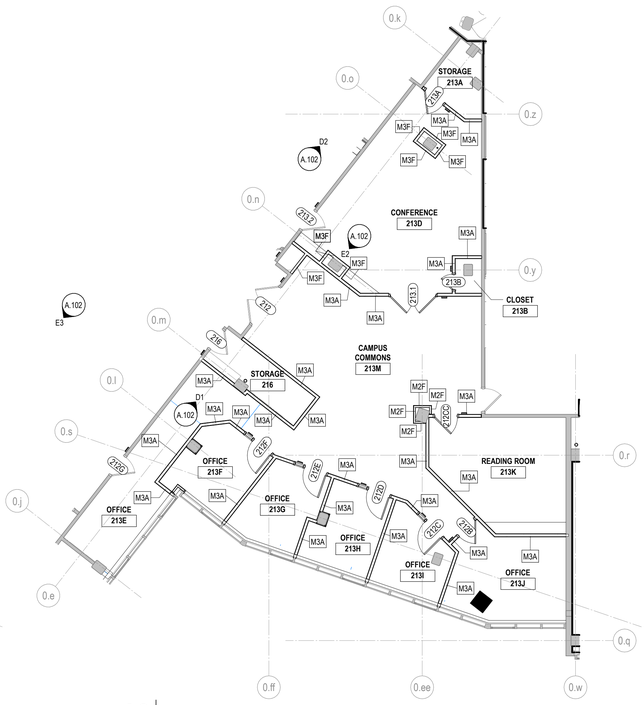


A1 PPHI SUITE DEMOLITION PLAN - ALTERNATE #1

A-201	A.402	1/8" = 1'-0"



A3 PPHI SUITE FLOOR PLAN - ALTERNATE #1

A-201	A.402	1/8" = 1'-0"

RCP GENERAL NOTES

1. ALL CEILING ELEVATIONS TO BE DIMENSIONED FROM SLAB ELEVATION BELOW OR FINISH FLOOR AT RECESSED SLAB LOCATIONS.
2. CENTER CEILING TILES WITHIN ROOM (UNLESS NOTED OTHERWISE)
3. CENTER ALL DEVICES, SPRINKLER HEADS, ETC. IN CEILING TILE. FINAL LOCATIONS FOR AL CEILING DEVICES TO BE COORDINATED WITH ALL TRADES.
4. PROVIDE CONTINUOUS SOUND BATT INSULATION ABOVE TOILET ROOM CEILINGS.
5. PAINT ALL EXPOSED STRUCTURE (BEAMS, JOISTS, DECK), EXPOSED CONDUIT, EXPOSED DUCT AND PIPING (INCLUDING INSULATION). REFER TO FINISH LEGEND FOR COLOR.
6. EXISTING CEILINGS TO BE REMOVED, STORED, REPAIRED, AND REINSTALLED AS REQUIRED FOLLOWING PIPING DEMOLITION AND INSTALLATION. ASSUME 25-50% DAMAGE TO ACOUSTIC CEILING PANELS (ACP) DURING REMOVAL, WITH REPLACEMENT AS NECESSARY. WHEN THE REMOVAL OF CEILING GRIDS IS REQUIRED, THEY NEED TO BE REPLACED WITH NEW GRIDS. REFER TO CONSULTANT DRAWINGS FOR SPECIFIC LOCATIONS.

MEP WORK CEILING LEGEND

- AREAS NOT IN CONTRACT
- AREAS WHERE DEMOLITION OR NEW MEP WORK OCCURS WITHIN AN EXPOSED STRUCTURE ABOVE. PROTECT ALL EXISTING EQUIPMENT BEFORE STARTING WORK. REFER TO MEP DRAWINGS FOR SPECIFIC LOCATIONS.
- AREAS WHERE DEMOLITION OR NEW MEP WORK OCCURS WITHIN A GYPSUM OR ACP CEILING. EXISTING CEILINGS SHALL BE REMOVED AND REINSTALLED AS NEEDED AFTER PIPING DEMOLITION OR INSTALLATION. EXPECT 25-50% DAMAGE TO ACOUSTIC CEILING PANELS (ACP) DURING REMOVAL, WITH REPLACEMENT AS NECESSARY. IF CEILING GRID REMOVAL IS REQUIRED, INSTALL NEW GRIDS. REFER TO MEP DRAWINGS FOR SPECIFIC LOCATIONS.

CEILING PLAN LEGEND

CEILING TYPE

- ACP-1 OR ACP-2 - 2'x2' SUSPENDED ACOUSTICAL TILE CEILING W/ EXPOSED SUSPENSION GRID
- AP-1 - 2'x4' SUSPENDED FELT ACOUSTICAL TILE CEILING
- GYP-1 AND GYP-2 - GYPSUM BOARD CEILING ON METAL STUD FRAME

CEILING DEVICES

- EXIT SIGN (RE: ELECTRICAL DRAWINGS)
- SECURITY CAMERA (RE: TA DRAWINGS)
- WIRELESS ACCESS POINT (RE: TA DRAWINGS)
- CEILING RECESSED LOUD SPEAKER (RE: TA DRAWINGS)
- MASS NOTIFICATION BOARDS (RE: TA DRAWINGS)

NOTE: SEE ELEC. DRAWINGS FOR LIGHT FIXTURES TYPES AND MECHANICAL DRAWINGS FOR GRILLE TYPES.

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CASEWORK KEY:

SHEET KEYNOTES

NUM.	NOTE
AD3	DEMO (E) DOOR(S) AND FRAMES, SALVAGE DOOR HARDWARE AND RETURN TO OWNER
AD6	DEMO (E) FLOOR FINISHES, WALL BASE, AND ADHESIVES DOWN TO THE STRUCTURAL SLAB BELOW FOR EXTENT SHOWN. PREPARE SLAB TO RECEIVE PROPOSED FINISHES.
AD14	DEMO (E) WALLS
AD18	DEMO (E) DRYWALL & WOOD FRAMING ON EXTERIOR KNEE WALL UNDER CURTAINWALL SILL. PREPARE FOR NEW WORK. SEE A-503
AR2	DEMO (E) ACOUSTICAL PANEL CEILING AND METAL SUSPENSION GRID. FOR WORK TO CEILING MOUNTED DEVICES. REFER TO MEP DRAWINGS.

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MC PROJECT # FP24-021 / BUILDING # 206

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Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
ENLARGED PLANS & INTERIOR ELEVATIONS, PPHI SUITE ALTERNATE #1

A.402

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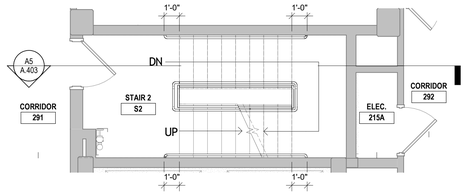
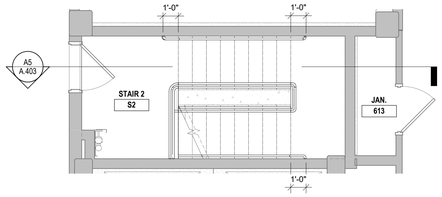


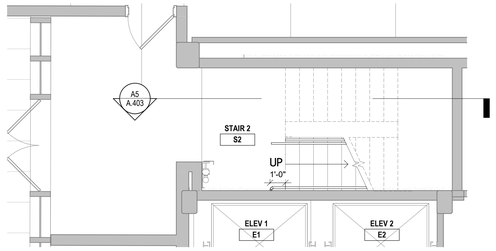
E1 STAIR 2 PLAN @ SECOND FLOOR

A-201	A.403	1/4" = 1'-0"



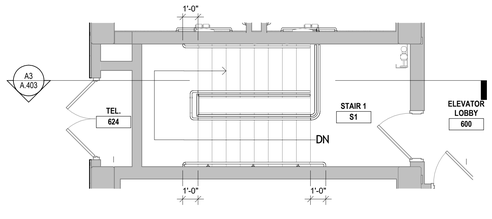
E3 STAIR 2 PLAN @ ROOF FLOOR

A-201	A.403	1/4" = 1'-0"



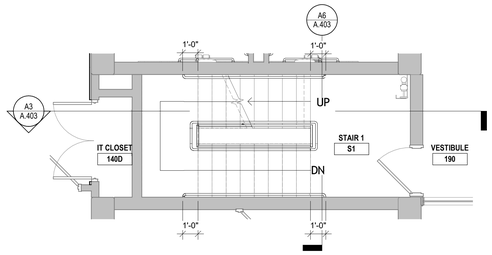
D1 STAIR 2 PLAN @ FIRST FLOOR

A-201	A.403	1/4" = 1'-0"



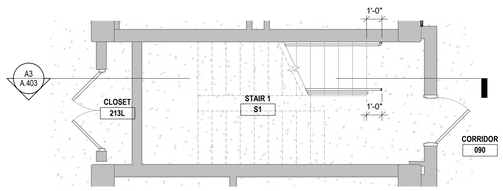
C1 STAIR 1 PLAN @ SIXTH FLOOR

A-201	A.403	1/4" = 1'-0"



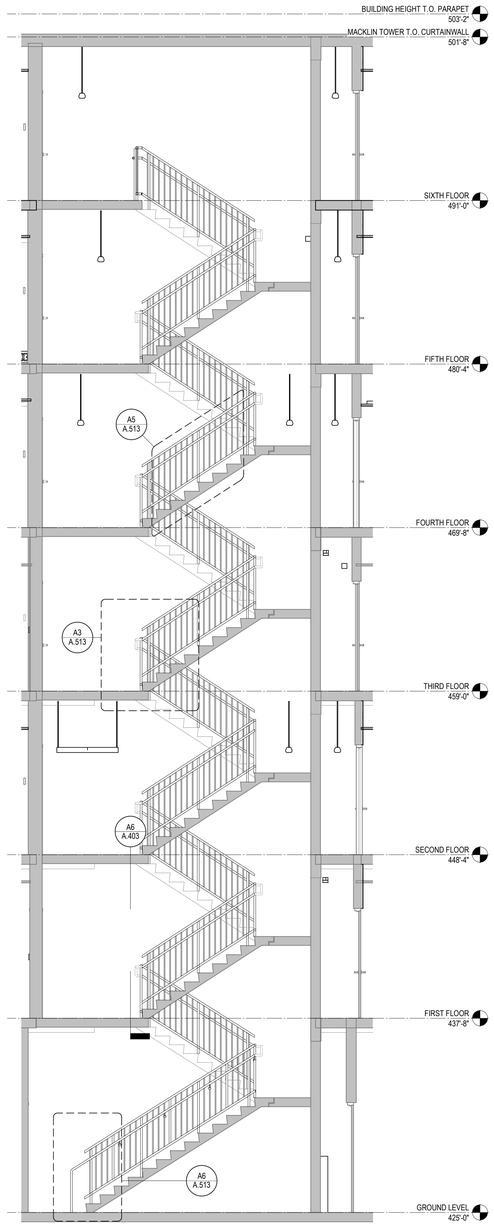
B1 STAIR 1 PLAN @ FIRST FLOOR

A-201	A.403	1/4" = 1'-0"



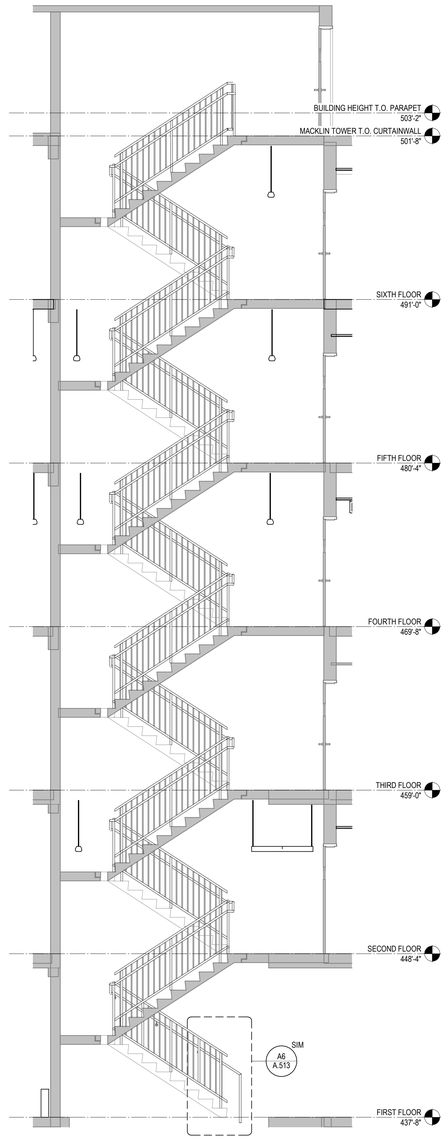
A1 STAIR 1 PLAN @ GROUND LEVEL

A-201	A.403	1/4" = 1'-0"



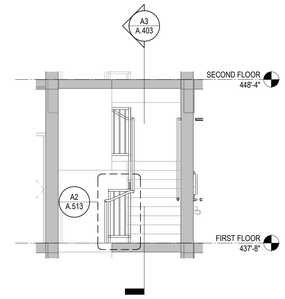
A3 STAIR 1 SECTION DETAIL

A.403	A.403	1/4" = 1'-0"



A5 STAIR 2 SECTION DETAIL

A.1Q1	A.403	1/4" = 1'-0"



A6 STAIR TYPICAL SECTION DETAIL

A.403	A.403	1/4" = 1'-0"

STAIR AND RAIL GENERAL NOTES

1. HANDRAIL - 1 1/2" I.D. PIPE, CENTER 34" ABOVE STAIR NOSING LINE.
2. RETURN RAIL TO WALL WITH RADIUS FITTINGS.
3. HANDRAIL EXTENSIONS: AT BOTTOM OF STAIR RUN, EXTEND ONE TREAD WIDTH ON SLOPE, RETURN AROUND POST SUPPORT OR BACK TO WALL. AT TOP OF STAIR RUN, EXTEND 1 TREAD WIDTH HORIZONTALLY.
4. PROVIDE BLOCKING BEHIND ALL BRACKET LOCATIONS IN STUD FRAMED WALLS.
5. NOSING SHALL BE SLOPED WITH A 1" NOSING DIMENSION.
6. WALL BRACKETS TO BE JULIUS BLUM #386, LOCATED 4'-0" OC, MAX. SPACING. CENTER RAILING 3" FROM WALL TO PROVIDE 2 1/4" CLEAR SPACE BETWEEN WALL AND RAIL.
7. ALL METAL COMPONENTS TO BE PAINTED.
8. PATCH & REPAIR CMU WALL. MATCH FINISH OF WALL TO ADJACENT WALL WITH RAILING INSTALLATION, TYP.

SHEET KEYNOTES

NUM.	NOTE

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Drawn By:	MRA
Checked By:	MF

Drawing
ENLARGED PLANS & INTERIOR ELEVATIONS

A.403

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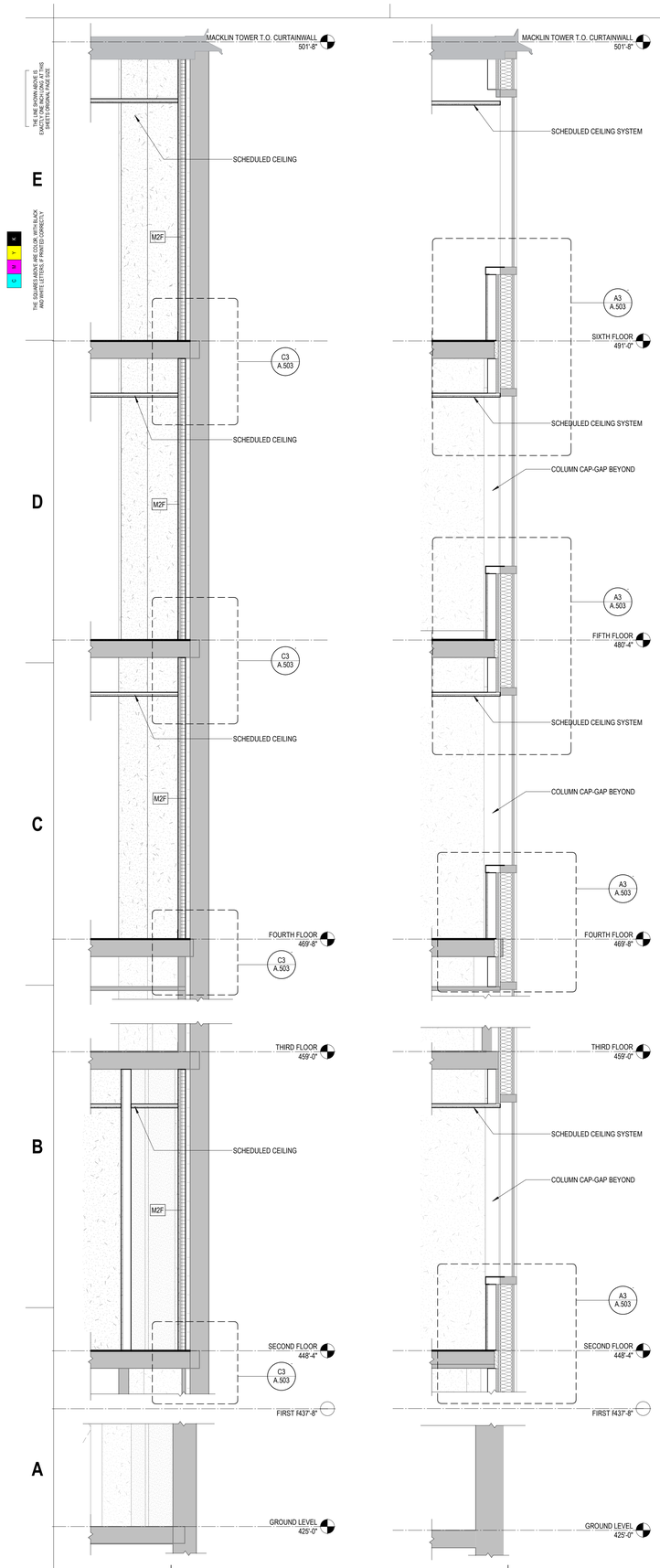
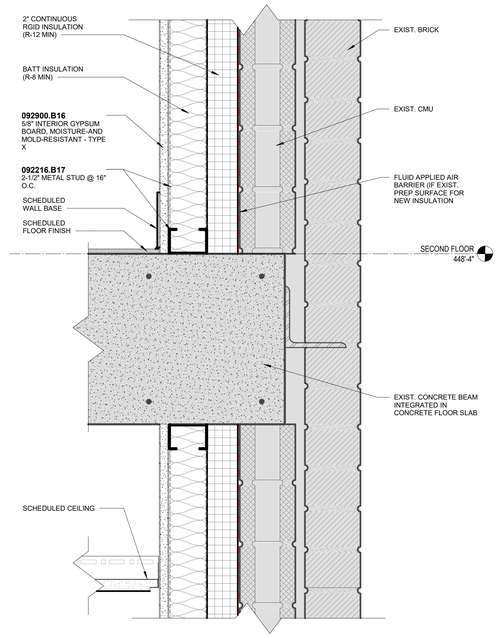


A1 WALL SECTION @ MASONRY

A-102	A.503	1/2" = 1'-0"

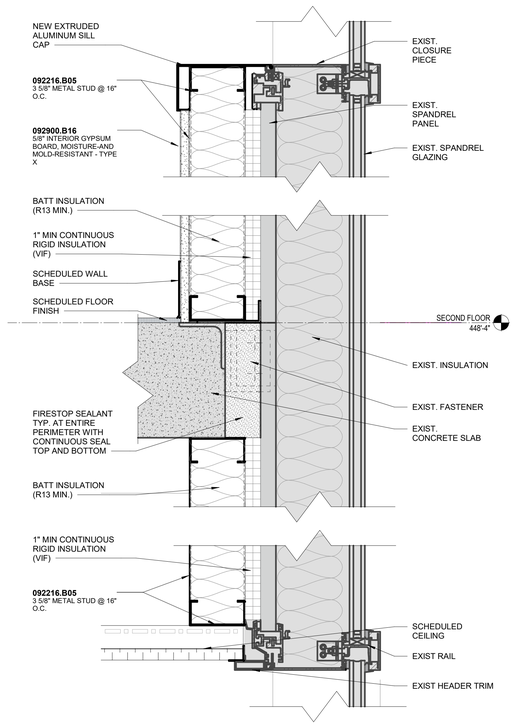
A2 CURTAIN WALL SECTION

A-102	A.503	1/2" = 1'-0"



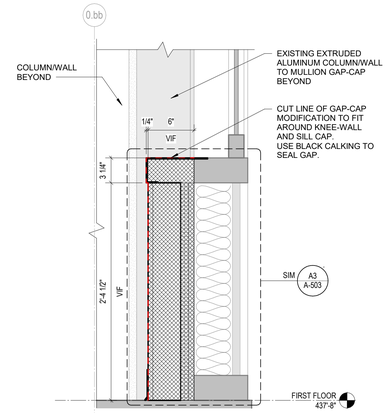
C3 TYP. MASONARY WALL INSULATION SECTION DETAIL

A-503	A.503	3" = 1'-0"



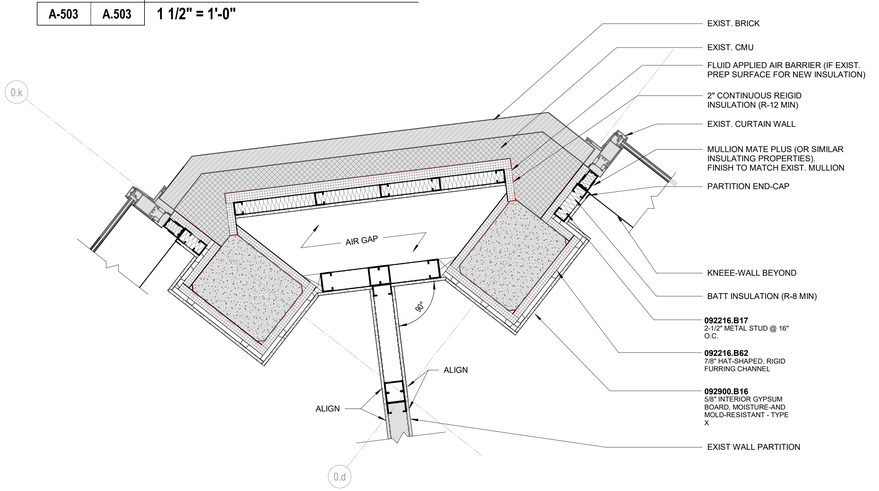
A3 TYP. KNEE WALL INSULATION SECTION DETAIL

A-503	A.503	3" = 1'-0"



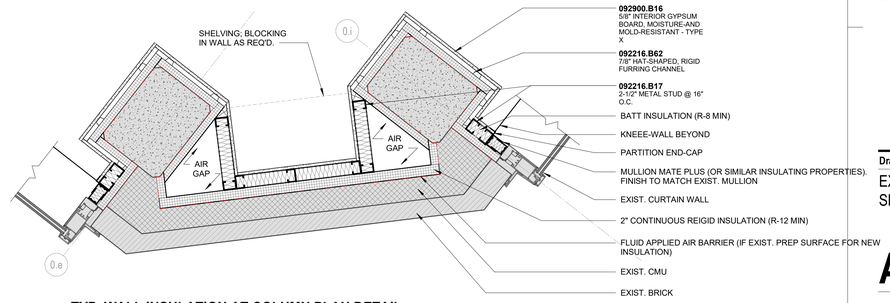
C5 GAP-CAP MODIFICATION DETAIL

A-503	A.503	1 1/2" = 1'-0"



B5 TYP. WALL INSULATION AT COLUMN PLAN DETAIL - TWO OFFICES

A.102	A.503	1" = 1'-0"



A5 TYP. WALL INSULATION AT COLUMN PLAN DETAIL - SHELVES CAVITY

A-103	A.503	1" = 1'-0"

SECTION GENERAL NOTES

1. REFER TO SHEET A-001 FOR ARCHITECTURAL ABBREVIATIONS AND SYMBOLS.
2. REFER TO AND COORDINATE WITH STRUCTURAL, MECHANICAL, PLUMBING AND ELECTRICAL FOR ADDITIONAL INFORMATION NOT SHOWN ON THIS SHEET.
3. REFER TO SHEET [A-011, A-012 & A-014] FOR WALL ASSEMBLIES.
4. ROOFING NOT IN CONTRACT. COORDINATE WITH ROOFING DRAWINGS FOR DETAILS WITHIN THAT SCOPE.

SHEET KEYNOTES

NUM.	NOTE

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Checked By: MF

Drawing
EXTERIOR ENVELOPE SECTIONS & DETAILS

A.503

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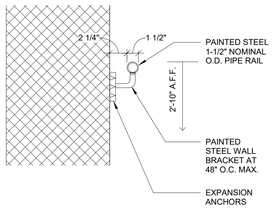
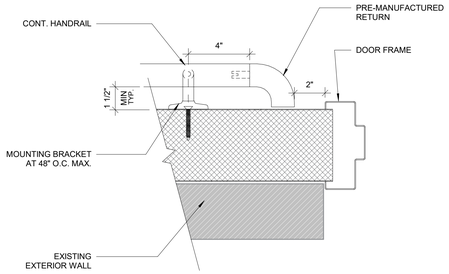
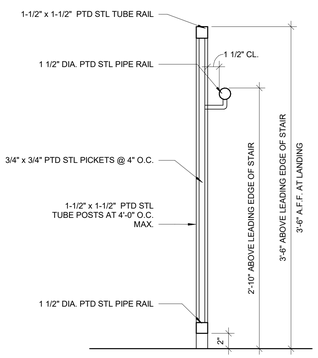


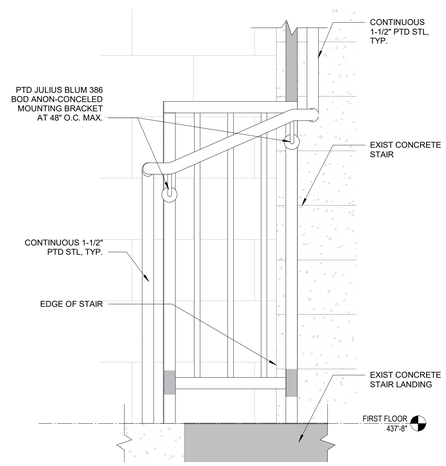
C1 STAIR HANDRAIL DETAIL
A.513 | 1 1/2" = 1'-0"



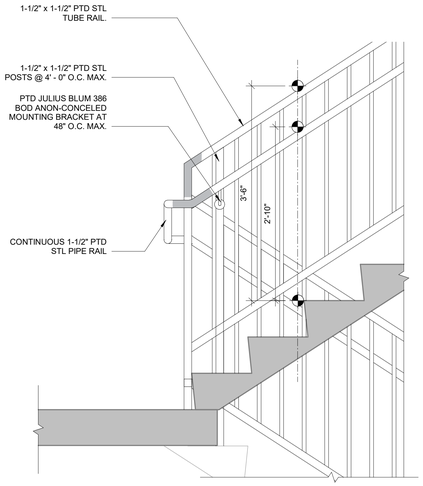
C2 TYP. HANDRAIL TERMINATION
A.513 | 3" = 1'-0"



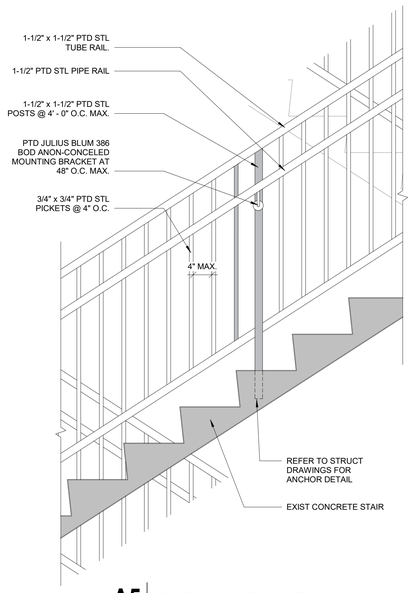
A1 STAIR GUARDRAIL DETAIL
A.513 | 1 1/2" = 1'-0"



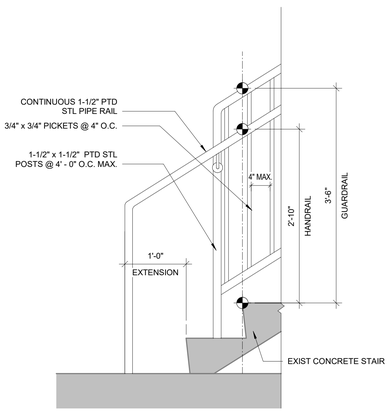
A2 HANDRAIL TRANSITION DETAIL
A.403 | A.513 | 1 1/2" = 1'-0"



A3 STAIR GUARDRAIL TRANSITION DETAIL
A.403 | A.513 | 1" = 1'-0"



A5 STAIR GUARDRAIL DETAIL
A.403 | A.513 | 1" = 1'-0"



A6 HANDRAIL DETAIL AT BOTTOM OF STAIR, TYPICAL
A.403 | A.513 | 1" = 1'-0"

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Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
EGRESS STAIR PLAN SECTION DETAILS

A.513

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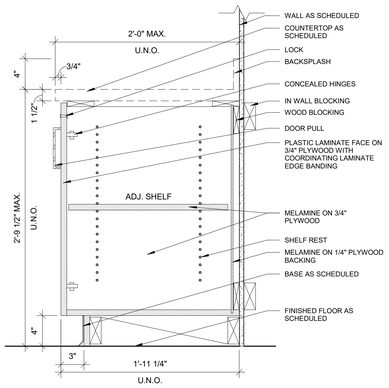
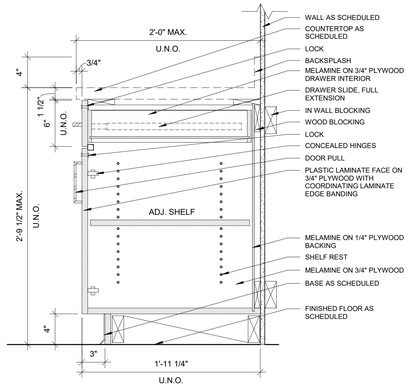


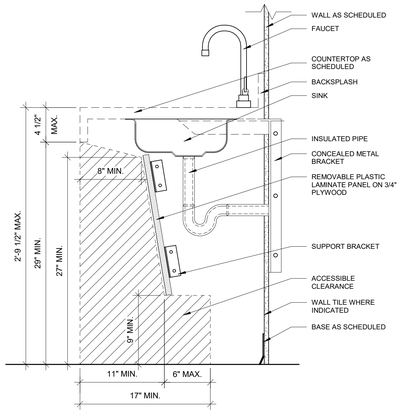
D1 CASEWORK SECTION - B11/B12 - FULL DOOR(S)

A.531 — 1 1/2" = 1'-0"



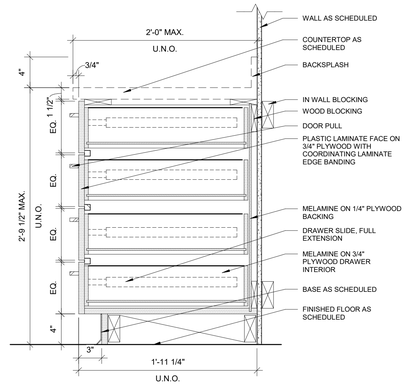
D3 CASEWORK SECTION - B21/B22 - DRAWER & DOOR

A.531 — 1 1/2" = 1'-0"



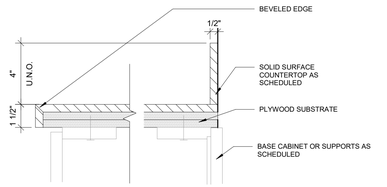
D4 CASEWORK SECTION - B73 - FRONT APPROACH SINK

A.531 — 1 1/2" = 1'-0"



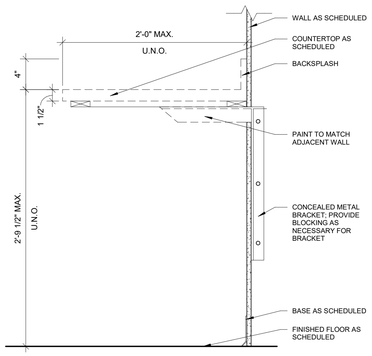
D5 CASEWORK SECTION - B34 - 4 EQ. DRAWERS

A.531 — 1 1/2" = 1'-0"



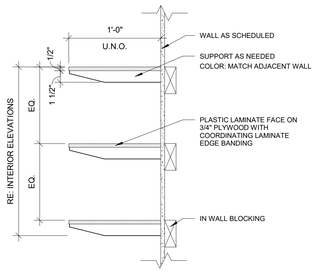
C1 COUNTERTOP SECTION-SOLID SURFACE

A.531 — 3" = 1'-0"



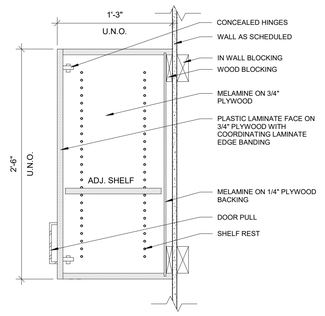
C3 CASEWORK SECTION - OPEN W/ CONCEALED BRACKET

A.531 — 1 1/2" = 1'-0"



C4 CASEWORK SECTION - OPEN SHELVING

A.531 — 1 1/2" = 1'-0"



C5 CASEWORK SECTION - U11B/U12B - UPPER FULL DOOR(S)

A.531 — 1 1/2" = 1'-0"

ARCHITECT
HORD COPLAN MACHT
1925 BALLENGER AVENUE, SUITE 525
ALEXANDRIA, VA 22314
571.388.7761

STRUCTURAL ENGINEER
A + F ENGINEERS, INC.
1112 16TH ST NW UNIT 920
WASHINGTON, DC 20036
202.828.1600

FPME ENGINEER
JAMES POSEY ASSOCIATES INC
11150 RED RUN BLVD.
OWINGS MILLS, MD 21117
410.265.6100

AVI IT/ ACOUSTICS ENGINEER
CTDG, INC.
6921 YORK ROAD
BALTIMORE, MD 21212
410.532.2396

MONTGOMERY COLLEGE
MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
51 MANNAKEE STREET
ROCKVILLE, MD 20850

MC PROJECT # FP24-021 / BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME — ARCH ##

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: LL
Checked By: LL

Drawing
CASEWORK DETAILS

A.531

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

© Hord Coplan Macht, Inc.

PN USED	FR USED
TYPE	TYPE
PNL.F.HM	FRM.001.HM1
PNL.F.WD	FRM.201.HM1
PNL.FG.AL	
PNL.FG.HM	
PNL.FG.WD	
PNL.L.WD	
PNL.NP	
PNL.V1.WD	

MARK	THICKNESS	TYPE
GL-1B	DOUBLE PANE	TRANSLUCENT INSULATED GLAZING
GL-1T	DOUBLE PANE	CLEAR TEMPERED INSULATED GLAZING
GL-2B	DOUBLE PANE	TRANSLUCENT LAMINATED ACOUSTIC INSULATED GLAZING (STC 42+)

BASE BID = EXISTING DOOR PANEL, FRAME & HARDWARE TO REMAIN. SEE ADA REPORT. NON-COMPLIANT HARDWARE TO BE REPLACED.

ALTERNATE #4 = NEW DOOR PANELS, FRAME AND HARDWARE. PATCH & REPAIR ADJACENT DRYWALL AS REQUIRED.

DOOR SCHEDULE

NUMBER	ROOM NAME	FIRE RATING (MIN)	PANELS: SINGLE / PAIR	PANEL TYPE: PANEL 1	PANEL TYPE: PANEL 2	PANEL DIMENSIONS: WIDTH: PANEL 1	PANEL DIMENSIONS: WIDTH: PANEL 2	PANEL DIMENSIONS: WIDTH: HEIGHT	PANEL DIMENSIONS: TOTAL: WIDTH	PANEL DIMENSIONS: TOTAL: HEIGHT	FINISH: THICKNESS	FINISH: UNDERCUT	FINISH: PANEL	FINISH: GLAZING / LOUVER	FRAME: FRAME	FRAME: DIMENSIONS: FACE: JAMB	FRAME: DIMENSIONS: FACE: HEAD	FRAME: DIMENSIONS: DEPTH	FRAME: FINISH: FRAME	FRAME: FINISH: GLAZING / LOUVER	DETAILS: HEAD	DETAILS: JAMB	HW SET	COMMENTS	NUMBER	CURRENT REV	GATE FRAME HEIGHT	ALTERNATE #4: PANEL: TYPE	ALTERNATE #4: PANEL: FINISH	ALTERNATE #4: FRAME: TYPE	ALTERNATE #4: FRAME: FINISH	ALTERNATE #4: HW SET
GROUND LEVEL																															
GS1	STAIR 1		S	PNL.V1.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	ETR	2"	2"	10 5/8"	WHITE PTD HM	NONE			ETR	BASE BID: EXISTING TO REMAIN.	GS1			PNL.V1.WD	WD-1	FRM.001.HM1	BLACK PTD HM	02-ALT4
FIRST FLOOR																															
1S1	STAIR 1		S	PNL.V1.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	ETR	2"	2"	10 5/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN. REPLACE KNOB	1S1			PNL.V1.WD	WD-1	FRM.001.HM1	BLACK PTD HM	02-ALT4
104A	ELEC		S	PNL.F.HM		2'-0"		7'-0"	2'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN. REPLACE KNOB	104A			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08B-ALT4
107A	MECH		S	PNL.V1.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN. REPLACE KNOB	107A			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08A-ALT4
140B	UNISEX 1		S	PNL.F.HM		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	6 7/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN. REPLACE KNOB	140B			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	04-ALT4
140C	UNISEX 2		S	PNL.F.HM		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	6 7/8"	ETR	NONE			ETR	BASE BID: ETR. REPLACE KNOB & CLOSER	140C			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	04-ALT4
SECOND FLOOR																															
2S1	STAIR 1		S	PNL.V1.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	ETR	2"	2"	10 5/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	2S1			PNL.V1.WD	WD-1	FRM.001.HM1	BLACK PTD HM	02-ALT4
2S2	STAIR 2		S	PNL.V1.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	ETR	2"	2"	10 5/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	2S2			PNL.V1.WD	WD-1	FRM.001.HM1	BLACK PTD HM	02-ALT4
209C	MECHANICAL		P	PNL.F.WD	PNL.F.WD	2'-6"	2'-6"	7'-0"	5'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	4 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	209C			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08A-ALT4
212	PPHI SUITE		P	PNL.FG10.WD	PNL.FG10.WD	3'-0"	3'-0"	7'-0"	6'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	ETR	2"	2"	4 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	212			PNL.FG10.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06B-ALT4
212B	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	212B			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
212C	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	FRM.201.HM1	2"	2"	5 3/4"	WHITE PTD HM	NONE			ETR	BASE BID: DOOR AND FRAME. REPAIR DRYWALL AS REQD.	212C			PNL.F.WD	WD-1	FRM.201.HM1	BLACK PTD HM	05A-ALT4
212D	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	FRM.201.HM1	2"	2"	5 3/4"	WHITE PTD HM	NONE			ETR	BASE BID: DOOR AND FRAME. REPAIR DRYWALL AS REQD.	212D			PNL.F.WD	WD-1	FRM.201.HM1	BLACK PTD HM	05A-ALT4
212E	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	FRM.201.HM1	2"	2"	5 3/4"	WHITE PTD HM	NONE			ETR	BASE BID: DOOR AND FRAME. REPAIR DRYWALL AS REQD.	212E			PNL.F.WD	WD-1	FRM.201.HM1	BLACK PTD HM	05A-ALT4
212F	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	FRM.201.HM1	2"	2"	5 3/4"	WHITE PTD HM	NONE			ETR	BASE BID: DOOR AND FRAME. REPAIR DRYWALL AS REQD.	212F			PNL.F.WD	WD-1	FRM.201.HM1	BLACK PTD HM	05A-ALT4
212G	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	212G			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05B-ALT4
213.1	PPHI SUITE		P	PNL.F.WD	PNL.F.WD	3'-0"	3'-0"	7'-0"	6'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	4 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	213.1			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	01-ALT4
213.2	CONFERENCE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	213.2			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06-ALT4
213A	CONFERENCE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	213A			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08B-ALT4
214	ELITE TRAINING SUITE		P	PNL.G.HM	PNL.F.WD	3'-0"	2'-0"	7'-0"	5'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	ETR	2"	2"	4 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	214			PNL.G.WD / PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06B-ALT4
214A	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	214A			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
214B	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	214B			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
215A	ELEC		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	215A			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08B-ALT4
216	STORAGE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	216			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08C-ALT4
218.1	OPEN OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218.1			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06-ALT4
218.2	OPEN OFFICE		S	PNL.G.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218.2			PNL.G.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06-ALT4
218A	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218A			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
218B	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218B			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
218C	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218C			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
218D	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218D			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
218E	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218E			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
218F	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218F			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
218G	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218G			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
218H	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218H			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
218I	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218I			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
218J	OPEN OFFICE		P	PNL.F.WD	PNL.F.WD	2'-6"	2'-6"	7'-0"	5'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	4 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218J			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08A-ALT4
218K	CONFERENCE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218K			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06-ALT4
218L	STORAGE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	218L			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08C-ALT4
219	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	219			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
220	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	220			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
221	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	221			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
222	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	222			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
223	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	223			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
224	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	224			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
225	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	225			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
226	GENERAL STUDIES SUITE		S	PNL.G.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	226			PNL.G.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06-ALT4
226A	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	226A			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
227A	ELEV. LOBBY		S	PNL.F.WD		2'-0"		7'-0"	2'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	227A			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08B-ALT4
227B	UNISEX 1		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	6 1/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	227B			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	04-ALT4
227C	UNISEX 2		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	6 1/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	227C			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	04-ALT4
227D	CORRIDOR		P	PNL.F.WD	PNL.F.WD	2'-6"	2'-6"	7'-0"	5'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	4 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	227D			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08A-ALT4
FOURTH FLOOR																															
4S1	STAIR 1		S	PNL.V1.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	10 5/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	4S1			PNL.V1.WD	WD-1	FRM.001.HM1	BLACK PTD HM	02-ALT4
4S2	STAIR 2		S	PNL.V1.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	10 5/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	4S2			PNL.V1.WD	WD-1	FRM.001.HM1	BLACK PTD HM	02-ALT4
401	UNISEX 1		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	NONE	ETR	2"	2"	6 1/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	401			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	04-ALT4
402	UNISEX 2		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	NONE	ETR	2"	2"	6 1/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	402			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	04-ALT4
403	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	403			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
404	SOUTH CORRIDOR		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	404			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
405	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	405			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
406	SOUTH CORRIDOR		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	406			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
407	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	407			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
408	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	408			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
409	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	409			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
410	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	410			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
411	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	411			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
412	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	412			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
413	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	413			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
414	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	414			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
415	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	415			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
416	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	416			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
417	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	417			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
418	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	418			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
419	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	419			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
420	NORTH CORRIDOR		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	420			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
421	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	421			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
422	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	422			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
423	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	423			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
424	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	424			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
425	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	425			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
426	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	426			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
427	OFFICE		S	PNL.G.WD		3'-0"		7'-0"	3'-0"	7'-0"	1

PN USED	FR USED
TYPE	TYPE
PNL.F.HM	FRM.001.HM1
PNL.F.WD	FRM.201.HM1
PNL.FG.AL	
PNL.FG.HM	
PNL.FG.WD	
PNL.L.WD	
PNL.NP	
PNL.V1.WD	

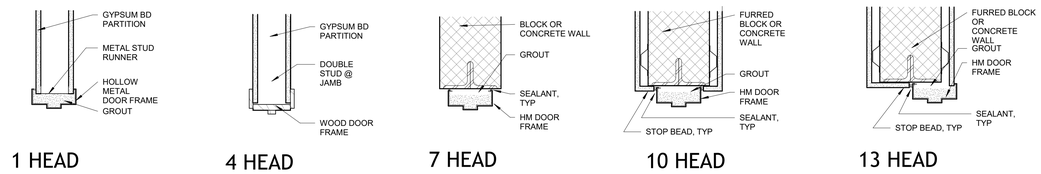
MARK	THICKNESS	TYPE
GL-1B	DOUBLE PANE	TRANSLUCENT INSULATED GLAZING
GL-1T	DOUBLE PANE	CLEAR TEMPERED INSULATED GLAZING
GL-2B	DOUBLE PANE	TRANSLUCENT LAMINATED ACOUSTIC INSULATED GLAZING (STC 42+)

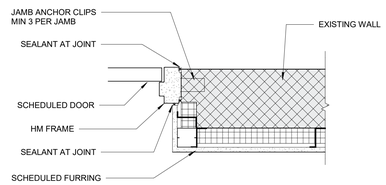
BASE BID = EXISTING DOOR PANEL, FRAME & HARDWARE TO REMAIN. SEE ADA REPORT. NON-COMPLIANT HARDWARE TO BE REPLACED.

ALTERNATE #4 = NEW DOOR PANELS, FRAME AND HARDWARE. PATCH & REPAIR ADJACENT DRYWALL AS REQUIRED.

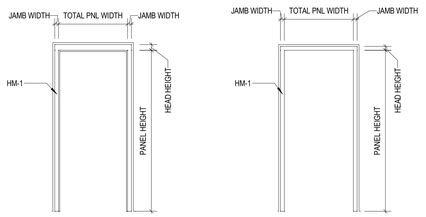
DOOR SCHEDULE

NUMBER	ROOM NAME	FIRE RATING (MIN)	PANELS: SINGLE / PAIR	PANEL TYPE: PANEL 1	PANEL TYPE: PANEL 2	PANEL DIMENSIONS: WIDTH: PANEL 1	PANEL DIMENSIONS: WIDTH: PANEL 2	PANEL DIMENSIONS: TOTAL: HEIGHT	PANEL DIMENSIONS: TOTAL: WIDTH	PANEL DIMENSIONS: TOTAL: HEIGHT	FINISH: THICKNESS	FINISH: UNDERCUT	FINISH: PANEL	FINISH: GLAZING / LOUVER	FRAME	FRAME: DIMENSIONS: FACE: JAMB	FRAME: DIMENSIONS: FACE: HEAD	FRAME: DIMENSIONS: DEPTH	FRAME: FINISH: FRAME	FRAME: FINISH: GLAZING / LOUVER	DETAILS: HEAD	DETAILS: JAMB	HW SET	COMMENTS	NUMBER	CURRENT REV	GATE FRAME HEIGHT	ALTERNATE #4: PANEL: TYPE	ALTERNATE #4: PANEL: FINISH	ALTERNATE #4: FRAME: TYPE	ALTERNATE #4: FRAME: FINISH	ALTERNATE #4: HW SET
SIXTH FLOOR																															
6S1	STAIR 1		S	PNL.V1.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	10 5/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	6S1			PNL.V1.WD	WD-1	FRM.001.HM1	BLACK PTD HM	02-ALT4
6S2	STAIR 2		S	PNL.V1.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	10 5/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	6S2			PNL.V1.WD	WD-1	FRM.001.HM1	BLACK PTD HM	02-ALT4
600A	UNISEX 1		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	NONE	ETR	2"	2"	6 1/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	600A			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	04-ALT4
600B	UNISEX 2		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	NONE	ETR	2"	2"	6 1/8"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	600B			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	04-ALT4
600C	ELEVATOR LOBBY		S	PNL.F.WD		2'-0"		7'-0"	2'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	600C			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08B-ALT4
603	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	603			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
605	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	605			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
606	COPY		S	PNL.G.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	606			PNL.G.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
607	CONFERENCE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	607			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06-ALT4
608	KITCHENETTE		S	PNL.G.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	608			PNL.G.WD	WD-1	FRM.001.HM1	BLACK PTD HM	07-ALT4
609	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	609			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
610	MECHANICAL		P	PNL.F.WD	PNL.F.WD	2'-6"	2'-6"	7'-0"	5'-0"	7'-0"	1 3/4"	5/8"	ETR	NONE	ETR	2"	2"	4 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	610			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08A-ALT4
611	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	611			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
612	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	612			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
613	OPEN OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	613			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08B-ALT4
614	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	614			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
615	OFFICE		S	PNL.N.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	615			PNL.N.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05-ALT4
616	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	616			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
617	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	617			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
618	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	618			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
621	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	621			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
622	OFFICE		S	PNL.F.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	622			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	05A-ALT4
624	TEL		P	PNL.F.WD	PNL.F.WD	2'-6"	2'-6"	7'-0"	5'-0"	7'-0"	1 3/4"	0"	ETR	NONE	ETR	2"	2"	4 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	624			PNL.F.WD	WD-1	FRM.001.HM1	BLACK PTD HM	08A-ALT4
625.1	ELEVATOR LOBBY		P	PNL.FG10.WD	PNL.FG10.WD	3'-0"	3'-0"	7'-0"	6'-0"	7'-0"	1 3/4"	0"	ETR	GL-1	ETR	2"	2"	4 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	625.1			PNL.FG10.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06B-ALT4
625.2	ELEVATOR LOBBY		S	PNL.N.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	625.2			PNL.N.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06-ALT4
625.3	ELEVATOR LOBBY		S	PNL.N.WD		3'-0"		7'-0"	3'-0"	7'-0"	1 3/4"	5/8"	ETR	GL-1	ETR	2"	2"	5 3/4"	ETR	NONE			ETR	BASE BID: EXISTING TO REMAIN.	625.3			PNL.N.WD	WD-1	FRM.001.HM1	BLACK PTD HM	06A-ALT4

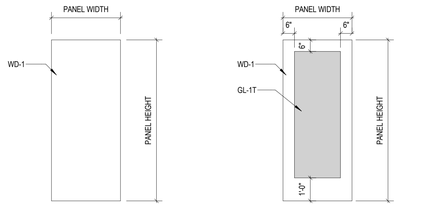




DOOR HEAD AND JAMB DETAILS



EGRESS STAIR DOOR JAMB DETAIL, TYP.



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MC PROJECT # FP24-021 / BUILDING # 206

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ARCH NAME ARCH ##

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Δ	DATE	DESCRIPTION
1	2025-05-13	Addendum No. 3
2	2025-06-12	ASI # 01

Project Number: 225012.00
Drawn By: MRA
Checked By: MF

Drawing
DOOR SCHEDULE & TYPES

A.602

NOT FOR CONSTRUCTION

08/29/2025
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THE SQUARES ABOVE ARE COLOR WITH BLACK AND WHITE LETTERS IF PRINTED CORRECTLY

1 2 3 4 5 6

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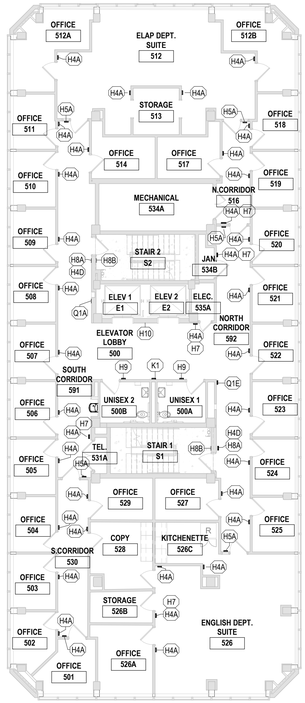
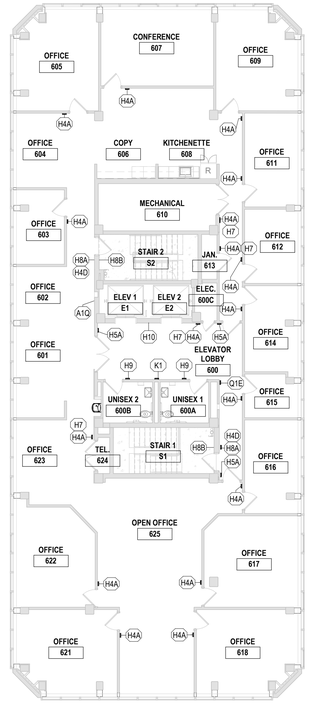


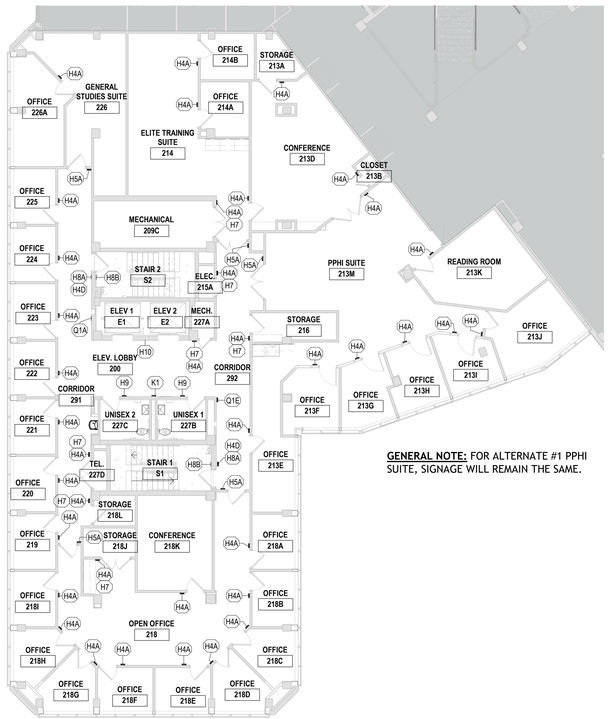
C2 FIFTH FLOOR SIGNAGE PLAN

A-201	A.620	3/32" = 1'-0"



C4 SIXTH FLOOR SIGNAGE PLAN

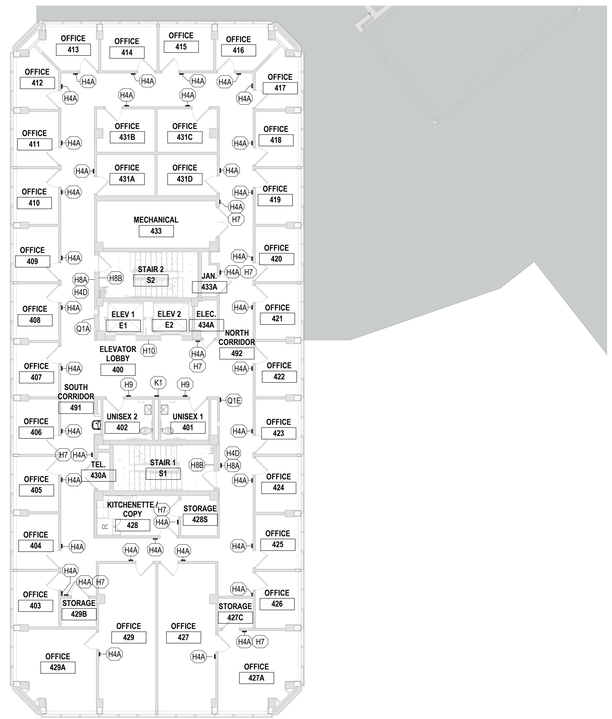
A-201	A.620	3/32" = 1'-0"



GENERAL NOTE: FOR ALTERNATE #1 PPHI SUITE, SIGNAGE WILL REMAIN THE SAME.

A4 SECOND FLOOR SIGNAGE PLAN

A-201	A.620	3/32" = 1'-0"



C1 FOURTH PLAN SIGNAGE PLAN

A-201	A.620	3/32" = 1'-0"

SIGNAGE LEGEND

H4B — SIGNAGE TYPE: SEE A-621 & A-622 FOR SIGN SPECIFICATIONS

ARCHITECT
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1925 BALLENGER AVENUE, SUITE 525
ALEXANDRIA, VA 22314
571.388.7761

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Project Number: 225012.00
Drawn By: FT
Checked By: FT

Drawing
SIGNAGE PLANS

A.620

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TRUE NORTH PROJECT NORTH

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Checked By: FT

Drawing
SIGNAGE TYPES

A.621

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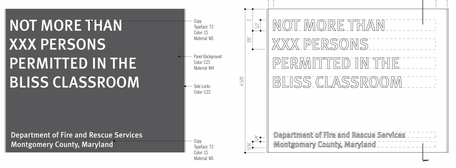
3.80 SIGN TYPE H6 — **SIGN TYPE SPECIFICATIONS**

H6
OCCUPANCY

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.



1 Graphic Layout - Sign Type H6 — Half Scale

2 Elevation - Sign Type H6 — Half Scale

1 Section - Sign Type H6 — Half Full

2 Installation Elevation - Sign Type H6 — 1/4" = 1'-0"

3.80 SIGN TYPEH6
PAGE 95

H6

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3.81 SIGN TYPE H7 — **SIGN TYPE SPECIFICATIONS**

H7
RESTRICTED AREA

COLOR SCHEDULE
C1 : Dorian Standard SW7005 Pure White C21
C22 : Natural Satin Anodized Aluminum

MATERIAL SCHEDULE
M4 : Painted Aluminum

TYPEFACE SCHEDULE
T2 : MetaPlus LF Medium

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s): Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T2 (Upper/Lower Case) +10

GENERAL NOTE
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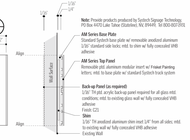
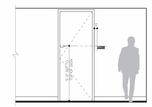
1 Graphic Layout - Sign Type H7 — Half Scale

2 Elevation - Sign Type H7 — Half Scale



3 Section - Sign Type H7 — Half Scale



4 Installation Elevation - H7 — 1/4" = 1'-0"

3.81 SIGN TYPE H7
PAGE 96

H7

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3.75 SIGN TYPE H4A — **SIGN TYPE SPECIFICATIONS**

H4A
ROOM NUMBER ID WITH INSERT

COLOR SCHEDULE
C1 : Dorian Standard SW7005 Pure White
C21 : Dorian Standard SW1237 Shale Gray
C22 : Natural Satin Anodized Aluminum
C23 : Non-glare clear acrylic

MATERIAL SCHEDULE
M3 : Frosted Painting Color
M6 : Painted Photopolymer

TYPEFACE SCHEDULE
T2 : MetaPlus LF Medium

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s): Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T2 (Upper Case) +0

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

1 Graphic Layout - Sign Type H4a — Half Scale

2 Elevation - Sign Type H4a — Half Scale

3 Section - Sign Type H4a — Half Scale

4 Installation Elevation - Sign Type H4a — 1/4" = 1'-0"

3.75 SIGN TYPE H4A
PAGE 90

H4A

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3.75 SIGN TYPE H5A — **SIGN TYPE SPECIFICATIONS**

H5A
ROOM NUMBER ID WITH INSERT

COLOR SCHEDULE
C1 : Dorian Standard SW7005 Pure White
C21 : Dorian Standard SW1237 Shale Gray
C22 : Natural Satin Anodized Aluminum
C23 : Non-glare clear acrylic

MATERIAL SCHEDULE
M3 : Frosted Painting Color
M6 : Painted Photopolymer

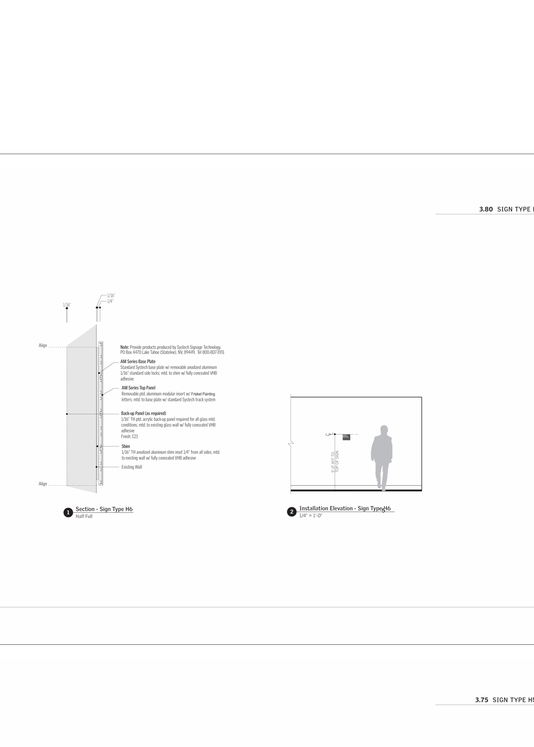
TYPEFACE SCHEDULE
T2 : MetaPlus LF Medium

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s): Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T2 (Upper Case) +0

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

1 Graphic Layout - Sign Type H5a — Half Scale



2 Elevation - Sign Type H5a — Half Scale

3 Section - Sign Type H5a — Half Scale

4 Installation Elevation - Sign Type H5a — 1/4" = 1'-0"

3.75 SIGN TYPE H5A
PAGE 90

H5A

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3.78 SIGN TYPE H4D — **SIGN TYPE SPECIFICATIONS**

H4D
EXIT ID/ROOM NUMBER ID

COLOR SCHEDULE
C1 : Dorian Standard SW7005 Pure White
C21 : Dorian Standard SW1237 Shale Gray
C22 : Natural Satin Anodized Aluminum

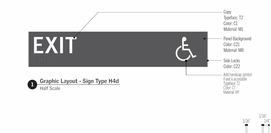
MATERIAL SCHEDULE
M3 : Frosted Painting Color
M6 : Painted Photopolymer

TYPEFACE SCHEDULE
T2 : MetaPlus LF Medium

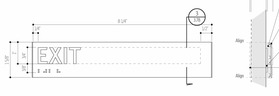
KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s): Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T2 (Upper Case) +0

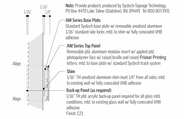
GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.



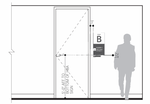
1 Graphic Layout - Sign Type H4d — Half Scale



2 Elevation - Sign Type H4d — Half Scale



3 Section - Sign Type H4d — Half Scale



4 Installation Elevation - Sign Type H4d, H8a — 1/4" = 1'-0"

3.78 SIGN TYPE H4D
PAGE 93

H4D

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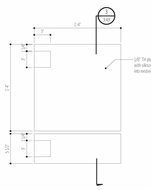
3.43 SIGN TYPE B2, B3 — **SIGN TYPE SPECIFICATIONS**

B2
BUILDING ENTRANCE ID

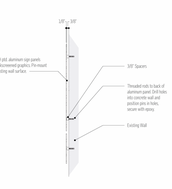
B3
BUILDING ENTRANCE ID, ADA DIRECTIONAL

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

1 Elevation - Sign Type B2, B3 — 1 1/2" = 1'-0"



2 Elevation - Sign Type B2, B3 — 1 1/2" = 1'-0"



3 Detail Section - Sign Type B2, B3 — 1 1/2" = 1'-0"

3.43 SIGN TYPES
PAGE 58

B2

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3.71 SIGN TYPE H1 — **SIGN TYPE SPECIFICATIONS**

H1
INTERIOR BUILDING ID (WALL MOUNTED)

COLOR SCHEDULE
C21 : Dorian Standard SW1237 Shale Gray

MATERIAL SCHEDULE
M4 : Painted Aluminum

TYPEFACE SCHEDULE
T1 : MetaPlus LF Bold

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s): Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T1 (Upper Case) +100

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

1 Graphic Layout - Sign Type H1 — 3" = 1'-0"

4 Installation Elevation - Sign Type H1 — 1/4" = 1'-0"

2 Elevation - Sign Type H1 — 3" = 1'-0"

3 Section - Sign Type H1 — Half Scale

NOTE: THIS SIGN IS SALVAGED FROM TEMPORARY LIBRARY

3.71 SIGN TYPE H1
PAGE 86

H1

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3.74 SIGN TYPE H3 — **SIGN TYPE SPECIFICATIONS**

H3
SERVICE FLAG ID

COLOR SCHEDULE
C1 : Dorian Standard SW7005 Pure White
C21 : Dorian Standard SW1237 Shale Gray
C22 : Natural Satin Anodized Aluminum

MATERIAL SCHEDULE
M3 : Frosted Painting Color
M4 : Painted Aluminum

SYMBOL SCHEDULE
Electronic artwork for all symbols to be provided by Owner to Sign Contractor prior to fabrication.

S1 : (Man_Cut, Mom.eps)
S2 : (Man_Cut, Women.eps)
S4 : (Man_Cut, MenAccessible.eps)
S5 : (Man_Cut, WomenAccessible.eps)
S30 : (Man_Cut, Unisex.eps)

GENERAL NOTE
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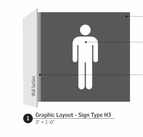
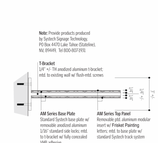
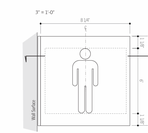


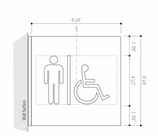
1 Graphic Layout - Sign Type H3 — 3" = 1'-0"



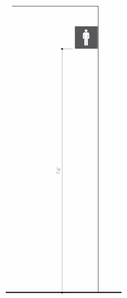
2 Plan Section - Sign Type H3 — 3" = 1'-0"



3 Elevation - Layout 1 - Sign Type H3 — 3" = 1'-0"



4 Elevation - Layout 2 - Sign Type H3 — 3" = 1'-0"



5 Installation Elevation - Sign Type H3 — 1/4" = 1'-0"

Signage Type H3a - Men
Signage Type H3b - Women
Signage Type H3c - All Gender
Signage Type H3d - Family

3.74 SIGN TYPE H3
PAGE 89

H3(A-D)

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NOTE: INTENT OF THIS SIGN IS TO SATISFY ADA 2010 SECTION 216.4.1. EXIT DOORS, DOORS AT EXIT PASSAGEWAYS, EXIT DISCHARGE, AND EXIT STAIRWAYS SHALL BE IDENTIFIED BY TACTILE SIGNS COMPLYING WITH 703.1, 703.2 AND 703.5

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1 2 3 4 5 6

A B C D E

THE LINE SHOWN ABOVE IS EXACTLY ONE INCH LONG AT THIS SHEET'S ORIGINAL PAGE SIZE

THE SQUARES BESIDE ARE COLOR, WITH BLACK AND WHITE, LETTERS IF PRINTED CORRECTLY

E

D

C

B

A

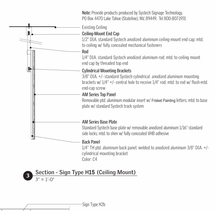
1 2 3 4 5 6

3.73 SIGN TYPE H15

SIGN TYPE SPECIFICATIONS

1 Graphic Layout - Sign Type H15 (Ceiling Mount)
1 1/2" = 1'-0"

2 Elevation - Sign Type H15 (Ceiling Mount)
1 1/2" = 1'-0"



3 Section - Sign Type H15 (Ceiling Mount)
3" = 1'-0"

4 Installation Elevation - Sign Types H15, H4c
1/4" = 1'-0"

H15
OVERHEAD ROOM ID (CEILING MOUNT)

COLOR SCHEDULE
C1: Duron Standard SW7005 Pure White
C21: Duron Standard SW1237 Shale Gray
C22: Natural Satin Anodized Aluminum

MATERIAL SCHEDULE
M1: Frosst Painting Color
M4: Painted Aluminum

TYPEFACE SCHEDULE
T2: MetaPlus LF Medium

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s). Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

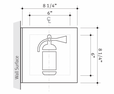
T2 (Upper Case): +0
T2 (Upper/Lower Case): +10

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

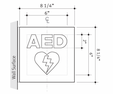
H15

4.01 SIGN TYPE Q1

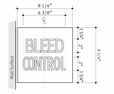
SIGN TYPE SPECIFICATIONS



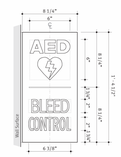
2 Graphic Layout - Sign Type Q1A
1 1/2" = 1'-0"



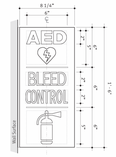
3 Elevation - Sign Type Q1B
1 1/2" = 1'-0"



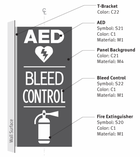
4 Elevation - Sign Type Q1C
1 1/2" = 1'-0"



6 Elevation - Sign Type Q1D
1 1/2" = 1'-0"

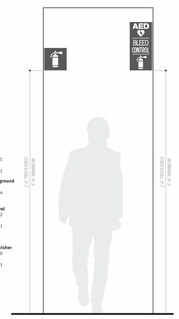


5 Elevation - Sign Type Q1E
1 1/2" = 1'-0"



6 Graphic Layout - Sign Type Q1E
1 1/2" = 1'-0"

NOTE:
Do not use sign type **Q1E**, if the ceiling height is less than 8'-2". In order to comply with Section 307 of the ADA standards for accessible design.



7 Installation Elevation - Sign Type Q1
3/4" = 1'-0"

Q1
Fire Extinguisher, AED, Bleed Control

COLOR SCHEDULE
C1: DURON STANDARD SW7005 PURE WHITE
C21: DURON STANDARD SW 7069 IRON ORE
C23: NATURAL SATIN ANODIZED ALUMINUM

MATERIAL SCHEDULE
M1: Frosst Painting Color
M4: Painted Aluminum

SYMBOL SCHEDULE
Electronic artwork for all symbols to be provided by Owner to Sign Contractor prior to fabrication.

S20: FIRE EXTINGUISHER
S21: AED & HEART
S22: BLEED CONTROL

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

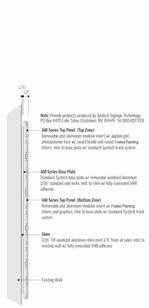
Q1(A-E)

3.85 SIGN TYPE H10

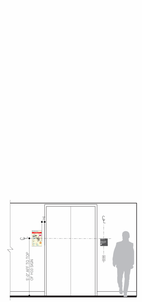
SIGN TYPE SPECIFICATIONS

1 Graphic Layout - Sign Type H10
3" = 1'-0"

2 Elevation - Sign Type H10
3" = 1'-0"



3 Section - Sign Type H10
Half Full Scale



4 Installation Elevation - Sign Types H10, H11
1/4" = 1'-0"

H10
EMERGENCY EGRESS

COLOR SCHEDULE
C1: Duron Standard SW7005 Pure White
C21: Duron Standard SW1237 Shale Gray
C22: Natural Satin Anodized Aluminum

MATERIAL SCHEDULE
M1: Frosst Painting Color
M4: Painted Aluminum
M6: Painted Photopolymer

TYPEFACE SCHEDULE
T2: MetaPlus LF Medium

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s). Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T2 (Upper Case): +0
T2 (Upper/Lower Case): +10

SYMBOL SCHEDULE
Electronic artwork for all symbols to be provided by Owner to Sign Contractor prior to fabrication.

S9: [Mon_Col_FireSafety.eps].

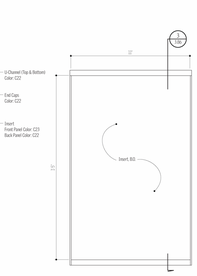
GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

H10

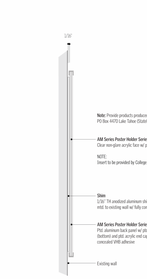
3.86 SIGN TYPE H11

SIGN TYPE SPECIFICATIONS

1 Graphic Layout - Sign Type H11
3" = 1'-0"



2 Elevation - Sign Type H11
3" = 1'-0"



3 Section - Sign Type H11
3" = 1'-0"

H11
EMERGENCY EGRESS, (MAP INSERT)

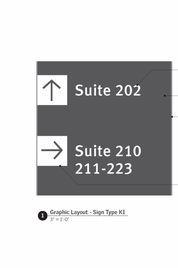
COLOR SCHEDULE
C23: Natural Anodized Aluminum
C23: Non-glare Clear Acrylic

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

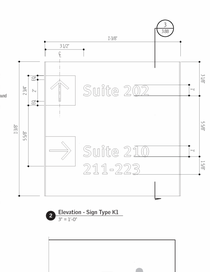
H11

3.88 SIGN TYPE K1

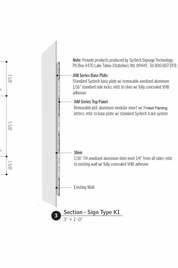
SIGN TYPE SPECIFICATIONS



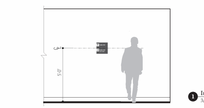
1 Graphic Layout - Sign Type K1
3" = 1'-0"



2 Elevation - Sign Type K1
3" = 1'-0"



3 Section - Sign Type K1
3" = 1'-0"



4 Installation Elevation - Sign Type K1
1/4" = 1'-0"

K1
ROOM DIRECTIONAL

COLOR SCHEDULE
C1: Duron Standard SW7005 Pure White C21: Duron Standard SW1237 Shale Gray
C22: Natural Satin Anodized Aluminum

MATERIAL SCHEDULE
M1: Frosst Painting Color
M4: Painted Aluminum

TYPEFACE SCHEDULE
T2: MetaPlus LF Medium

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s). Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T2 (Upper/Lower Case): +25

SYMBOL SCHEDULE
Electronic artwork for all symbols to be provided by Owner to Sign Contractor prior to fabrication.

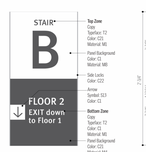
S13 [Mon_Col_Arrow.eps]

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

K1

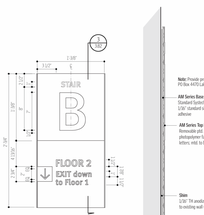
3.82 SIGN TYPE H8A

SIGN TYPE SPECIFICATIONS

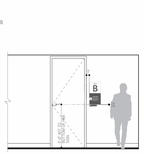


1 Graphic Layout - Sign Type H8a
1 1/2" = 1'-0"

2 Elevation - Sign Type H8a
1 1/2" = 1'-0"



3 Section - Sign Type H8a
1 1/2" = 1'-0"



4 Installation Elevation - Sign Type H4d, H8a
1/4" = 1'-0"

H8A
STAIR ID, OCCUPANCY SIDE

COLOR SCHEDULE
C1: Duron Standard SW7005 Pure White
C21: Duron Standard SW1237 Shale Gray
C22: Natural Satin Anodized Aluminum

MATERIAL SCHEDULE
M1: Frosst Painting Color
M4: Painted Aluminum
M6: Painted Photopolymer

TYPEFACE SCHEDULE
T2: MetaPlus LF Medium

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s). Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T2 (Upper Case): +25
T2 (Upper/Lower Case): +10

SYMBOL SCHEDULE
Electronic artwork for all symbols to be provided by Owner to Sign Contractor prior to fabrication.

S13 [Mon_Col_Arrow.eps]

GENERAL NOTE
All constructional, engineering and anchoring details indicated on the drawings are meant as suggestions for design intent only. The Sign Contractor shall take full responsibility for the correct and safe engineering of all sign types and the way in which they are supported and anchored, and shall submit in the shop drawings any alternative details which are necessary to result in a satisfactory and safe final product. The Sign Contractor shall indemnify and hold harmless the Owner and Design Consultant against any claim resulting from failure of, or damage caused by, the installed signs.

H8A

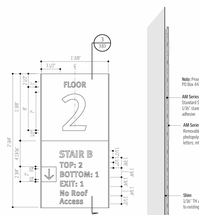
3.83 SIGN TYPE H8B

SIGN TYPE SPECIFICATIONS

1 Graphic Layout - Sign Type H8b
1 1/2" = 1'-0"

3 Graphic Layout - Sign Type H8c
1 1/2" = 1'-0"

2 Elevation - Sign Type H8b
1 1/2" = 1'-0"



4 Elevation - Sign Type H8c
1 1/2" = 1'-0"

5 Section - Sign Type H8b
3" = 1'-0"

6 Installation Elevation - H8b, H8c
1/4" = 1'-0"

H8B, H8C
STAIR ID, STAIR SIDE

COLOR SCHEDULE
C1: Duron Standard SW7005 Pure White
C21: Duron Standard SW1237 Shale Gray
C22: Natural Satin Anodized Aluminum

MATERIAL SCHEDULE
M1: Frosst Painting Color
M4: Painted Aluminum
M6: Painted Photopolymer

TYPEFACE SCHEDULE
T2: MetaPlus LF Medium

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s). Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T2 (Upper Case): +25
T2 (Upper/Lower Case): +10

SYMBOL SCHEDULE
Electronic artwork for all symbols to be provided by Owner to Sign Contractor prior to fabrication.

S13 [Mon_Col_Arrow.eps]

GENERAL NOTE
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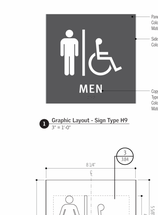
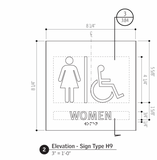
H8B, H8C

3.84 SIGN TYPE H9

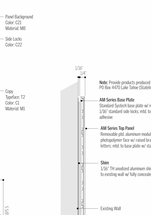
SIGN TYPE SPECIFICATIONS



1 Graphic Layout - Sign Type H9
3" = 1'-0"



2 Elevation - Sign Type H9
3" = 1'-0"



3 Section - Sign Type H9
Half Full Scale

4 Installation Elevation - Sign Type H9
1/4" = 1'-0"

H9
RESTROOM ID, ADA

COLOR SCHEDULE
C1: Duron Standard SW7005 Pure White
C21: Duron Standard SW1237 Shale Gray
C22: Natural Satin Anodized Aluminum

MATERIAL SCHEDULE
M1: Frosst Painting Color
M6: Painted Photopolymer

TYPEFACE SCHEDULE
T2: MetaPlus LF Medium

KERNING/LETTER SPACING SCHEDULE
Kerning/letter spacing of all typography is to match the examples in the Sign System Manual which were prepared in Adobe Illustrator CS3, Version 13.0.0, with the following numeric value(s) in the kerning/letter spacing option(s). Sign Contractor shall compare their resulting kerning/letter spacing with the examples provided and adjust accordingly.

T2 (Upper Case): +25

SYMBOL SCHEDULE
Electronic artwork for all symbols to be provided by Owner to Sign Contractor prior to fabrication.

S1: [Mon_Col_Mon.eps]
S2: [Mon_Col_Women.eps]
S4: [Mon_Col_MenAccessible.eps]
S5: [Mon_Col_WomenAccessible.eps]
S16: [Mon_Col_Unisex.eps]

GENERAL NOTE
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Signage Type H9a - Men
Signage Type H9b - Women
Signage Type H9c - All Gender
Signage Type H9d - Family

H9(A-D)

ARCHITECT
HORD COPLAN MACHT
1925 BALLENGER AVENUE, SUITE 525
ALEXANDRIA, VA 22314
571.388.7761

STRUCTURAL ENGINEER
A + F ENGINEERS, INC.
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MONTGOMERY COLLEGE
MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
51 MANNAKEE STREET
ROCKVILLE, MD 20850

MC PROJECT # FP24-021 / BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

ARCH NAME ARCH ##

PROFESSIONAL CERTIFICATION. I CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND
LICENSE NUMBER:
EXPIRATION DATE:

Δ	DATE	DESCRIPTION

Project Number: 225012.00
Drawn By: FT
Checked By: FT

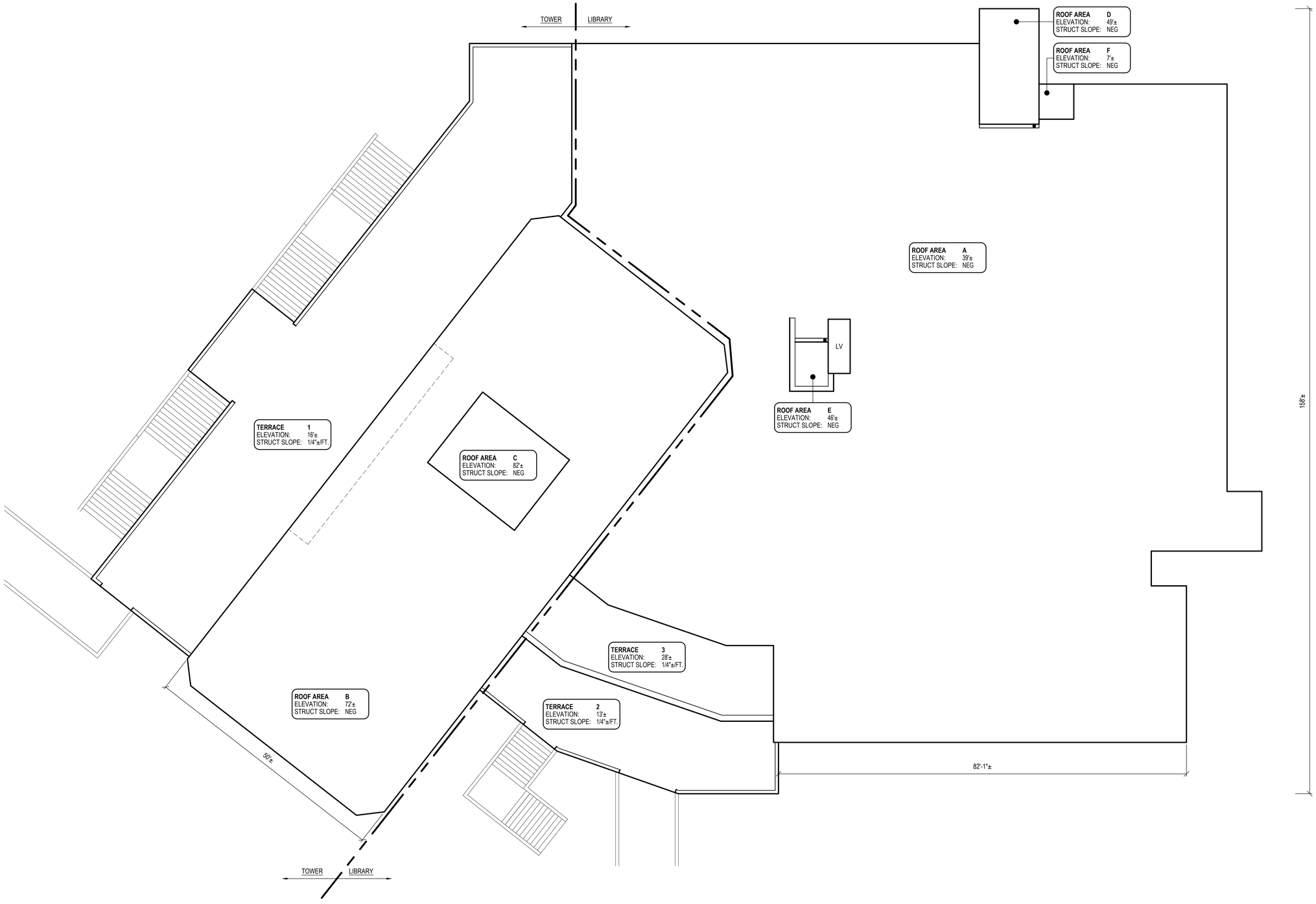
Drawing
SIGNAGE TYPES

A.622

NOT FOR CONSTRUCTION

08/29/2025
PERMIT & BID SET

© Hord Coplan Macht, Inc.



A AR-100 OVERALL EXISTING ROOF AREA PLAN

SCALE: 1/8" = 1'

PLAN NORTH

NORTH

GENERAL NOTE

A LIBRARY RENOVATION PROJECT WILL OCCUR, WHICH WILL INCLUDE BUT IS NOT LIMITED TO INSTALLATION OF NEW ROOFTOP MECHANICAL EQUIPMENT, A ROOFTOP CLERESTORY ADDITION, AND SIGNIFICANT CHANGES TO THE ROOFTOP DRAINAGE ASSEMBLIES. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES TO MAINTAIN THE ROOF IN A WATERTIGHT CONDITION.

ARCHITECT
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EXTERIOR ENVELOPE CONSULTANT
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MONTGOMERY COLLEGE
MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
51 MANNAKEE STREET
ROCKVILLE, MD 20850

MC PROJECT # FP24-021 / BUILDING # 206

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

License No. 36513, Expiration Date: 3/27/2027

Δ	DATE	DESCRIPTION

Project Number:	FP24-021
Drawn By:	MLF
Checked By:	SLB
Sheet Issue Date:	8/29/2025

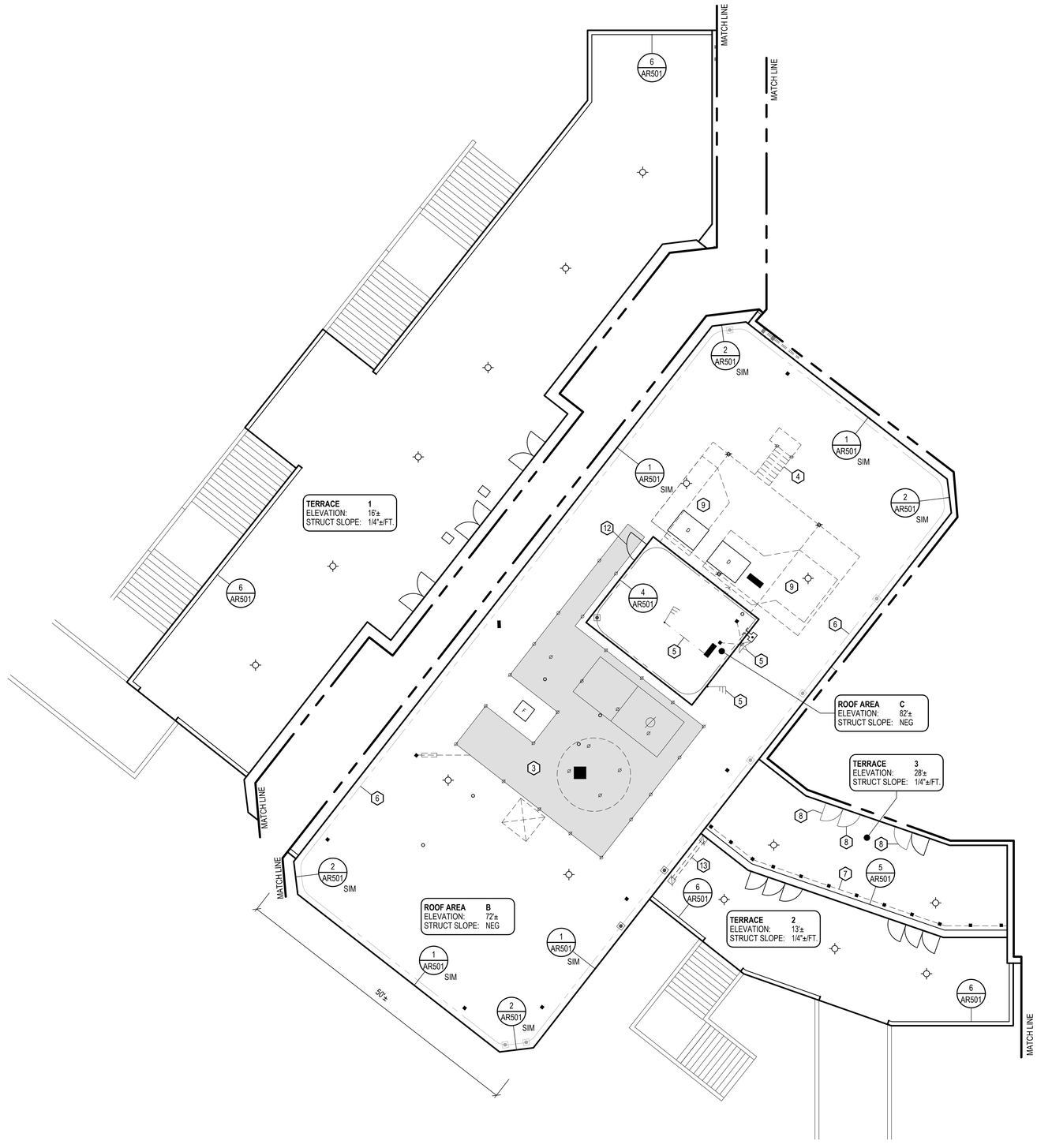
Drawing
OVERALL EXISTING ROOF AREA PLAN

AR-100

NOT FOR CONSTRUCTION

8/29/2025
PERMIT/BID SET

© Hord Coplan Macht, Inc.



A AR-101 PARTIAL ROOF AREA PLAN - EXISTING CONDITIONS

SCALE: 1/8" = 1'

PLAN NORTH / NORTH

GENERAL NOTES

- REMOVE ALL WINDOW-WASHING ANCHORS FROM AREA A. CUT STEEL FLUSH WITH DECK. SEE PHOTO 1/AR-901 FOR EXISTING CONDITIONS.
- REFER TO THE ARCHITECTURAL, STRUCTURAL, AND MECHANICAL DRAWINGS OF THE LIBRARY RENOVATION PROJECT FOR NEW ROOF STRUCTURES, DRAIN LAYOUTS, PENETRATIONS, ETC. PROVIDE TEMPORARY FLASHINGS AT ALL NEW STRUCTURES AND PENETRATIONS.
- REFER TO AR-301 FOR EXISTING ROOF SYSTEM CROSS SECTIONS.

STANDARD LEGEND

NOTE: NOT ALL SYMBOLS NECESSARILY USED

- ROOF EDGE
- PARAPET
- GUTTER WITH DOWNSPOUT
- CONDUIT
- STEEL/ALUMINUM RAILING
- NON-PENETRATING SAFETY RAILING
- AC — CONDENSER UNIT
- F — FAN
- V — VENT
- D — DUCT PENETRATION
- LV — LOUVER VENT ON MASONRY SHAFT
- RTU — ROOF TOP MECHANICAL UNIT
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- LIGHT
- POURABLE SEALER POCKET
- ROOF DRAIN
- SCUPPER WITH CONDUCTOR HEAD AND DS
- ROOF ACCESS DOOR
- ANTENNA
- SATELLITE DISH
- STRUCTURAL SLOPE
- WINDOW WASHING ANCHORS, TO BE DEMOLISHED
- LIGHTNING PROTECTION
- ABANDONED CURB
- SQUARE TUBE PENETRATION

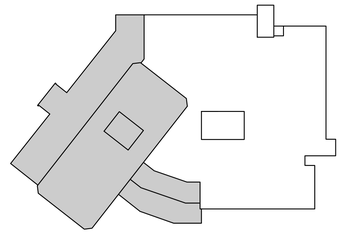
DEMOLITION NOTES

1. THE INFORMATION SHOWN ON THE DRAWINGS HAS BEEN COMPILED FROM VARIOUS SOURCES, AND MAY NOT REFLECT THE ACTUAL CONDITIONS AT THE TIME OF CONSTRUCTION.
2. THE ROOF REPLACEMENT WILL BE COMPLETED AS PART OF A BUILDING RENOVATION PROJECT. CONTRACTOR SHALL COORDINATE WORK WITH OTHER TRADES AS REQUIRED. CONTRACTOR SHALL PROVIDE TEMPORARY MEMBRANE AND FLASHING AS REQUIRED FOR NEW ROOFTOP MECHANICAL EQUIPMENT CURBS AND PENETRATIONS INSTALLED BY OTHERS. REFER TO MECHANICAL DRAWINGS FOR SCOPE OF WORK.
3. THE CONTRACTOR SHALL REPORT DETERIORATED OR UNSUITABLE ROOF DECK OR SUBSTRATE COMPONENTS TO THE OWNER PRIOR TO PERFORMING ROOFING INSTALLATION WORK.
4. REMOVE AND DISPOSE OF EXISTING ROOF SYSTEM AND ALL ASSOCIATED MATERIALS DOWN TO THE STRUCTURAL DECK UNLESS OTHERWISE INDICATED ON THE DETAIL DRAWINGS TO REMAIN. REMOVE AND DISPOSE OF ALL ITEMS TO INCLUDE DRAINS, WOOD BLOCKING AND APPURTENANCES SCHEDULED TO BE REMOVED.
5. REMOVALS SHALL BE PERFORMED IN ACCORDANCE WITH THE SUBMITTED AND APPROVED REMOVAL PLAN, THE DETAIL DRAWINGS AND SPECIFICATIONS.
6. REMOVE ALL ABANDONED EQUIPMENT, CONDUIT AND CURBS AND ENCLOSE OPENINGS UNLESS SPECIFICALLY INDICATED TO REMAIN.

KEYNOTES

1. REMOVE EXISTING ROOF DRAIN, PROVIDE A 1/4" THICK STEEL PLATE OVER THE OPENING AND REPAIR/INFILL THE ROOF ASSEMBLY. INTERIOR PIPING TO BE REMOVED BY OTHERS.
2. EXISTING STUB WALL AND FRAMING TO BE REMOVED BY OTHERS. CONTRACTOR SHALL REPAIR THE EXISTING ROOF FOLLOWING DEMOLITION.
3. REMOVE EXISTING WOOD-FRAMED PLATFORM AND OBSERVATION STRUCTURES. DOME STRUCTURE AND STEEL TELESCOPE PLATFORM BOLTED TO CONCRETE DECK. ALL ELECTRICAL COMPONENTS TO BE REMOVED AS A PART OF THIS PROJECT. SEE PHOTOS 2, 3, & 4/AR-901.
4. REMOVE EXISTING STAIR STRUCTURE FROM ELEVATED PLATFORM. EXISTING STAIR IS ATTACHED TO FRAMING WITH BOLTS. SEE PHOTOS 5/AR-901 AND 2 & 3/PH-902.
5. REMOVE EXISTING WALL-MOUNTED SATELLITE DISH AND ANTENNA. SEE 8/AR-901 FOR EXISTING CONDITIONS.
6. EXISTING LIGHTNING PROTECTION TO BE REMOVED AND REPLACED AS PART OF THIS PROJECT. REFER TO THE LIGHTNING PROTECTION DRAWINGS FOR SCOPE OF WORK.
7. REMOVE EXISTING STEEL RAILING.
8. REMOVE EXISTING TERRACE DOOR AND INFILL WITH FIXED GLAZING. SEE ELEVATIONS FOR ADDITIONAL WORK AND 11/AR-901 FOR EXISTING CONDITIONS.
9. REMOVE EXISTING EPDM AND FOIL-FACED WRAP AND INSULATION FROM EXISTING DUCTWORK IN PREPARATION FOR NEW. SEE 12/AR-901 & 4/AR-902 FOR EXISTING CONDITIONS.
10. REMOVE EXISTING METAL LOUVER VENT AND ENCLOSE ABANDONED AIR SHAFT. SEE 1/AR-902 FOR EXISTING CONDITIONS.
11. EXISTING CONDENSER UNIT TO BE REMOVED BY OTHERS. PROVIDE A 1/4" STEEL PLATE OVER OPENING IN CURB AND REPAIR EXISTING ROOF AS REQUIRED.
12. REMOVE EXISTING ROOF ACCESS DOOR AND FRAME IN PREPARATION FOR NEW.
13. REMOVE EXISTING ABANDONED FRAMING.

KEY PLAN



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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

License No. 36513, Expiration Date: 3/27/2027

Δ	DATE	DESCRIPTION

Project Number:	FP24-021
Drawn By:	MLF
Checked By:	SLB
Sheet Issue Date:	8/29/2025

Drawing
PARTIAL ROOF AREA PLAN EXISTING CONDITIONS

AR-101

NOT FOR CONSTRUCTION

8/29/2025
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THE SQUARES ABOVE ARE COLOR, WITH BLACK AND WHITE LETTERS. IF PRINTED CORRECTLY

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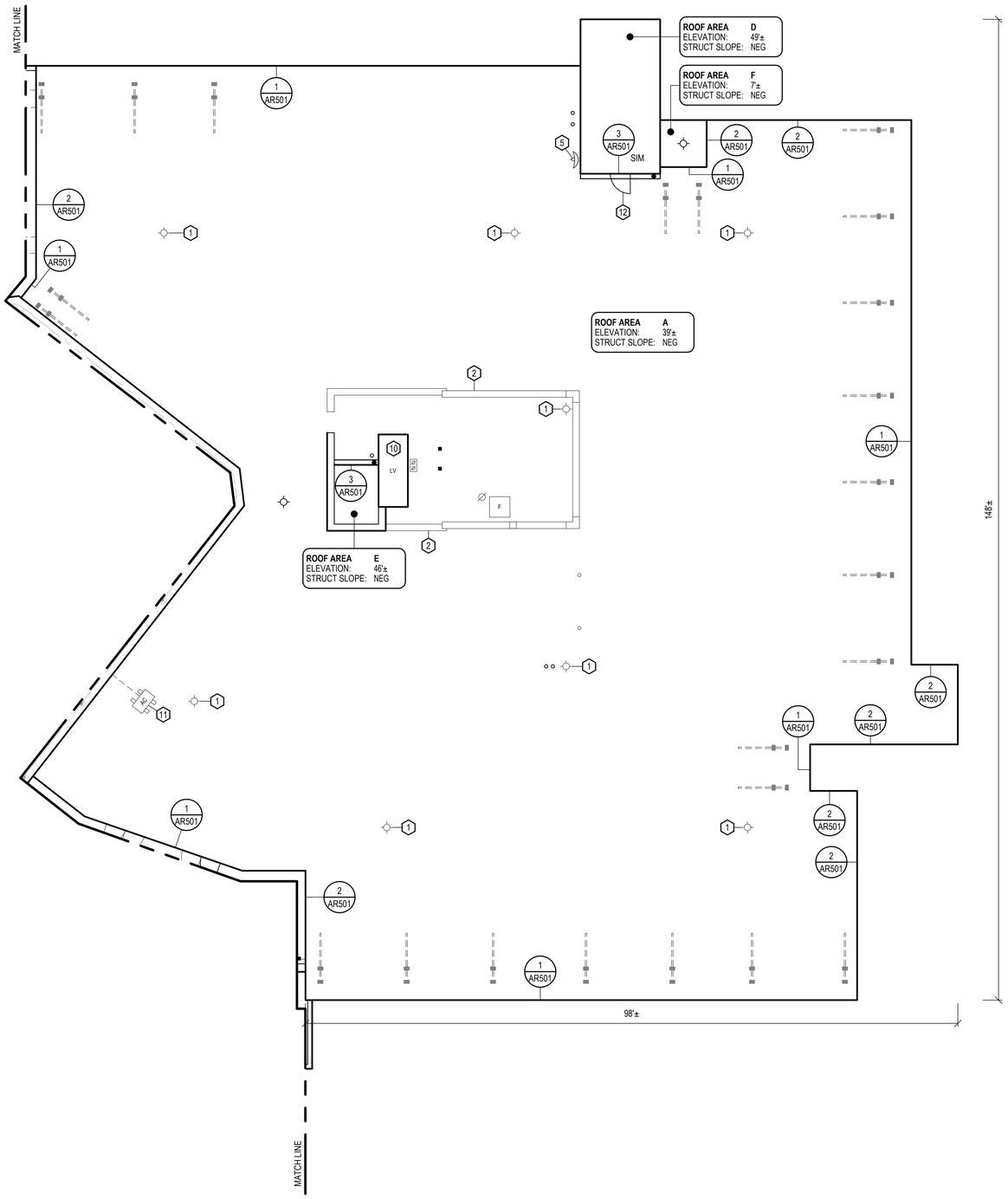

A AR-102 PARTIAL ROOF AREA PLAN - EXISTING CONDITIONS

SCALE: 1/8" = 1'

PLAN NORTH / NORTH

GENERAL NOTES

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STANDARD LEGEND

NOTE: NOT ALL SYMBOLS NECESSARILY USED

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- CONDUIT
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DEMOLITION NOTES

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KEYNOTES

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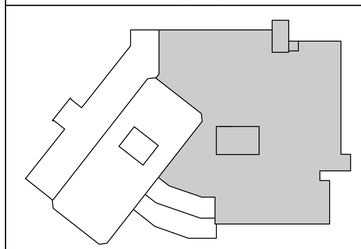
KEY PLAN



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Drawing
PARTIAL ROOF AREA PLAN EXISTING CONDITIONS

AR-102

NOT FOR CONSTRUCTION

8/29/2025
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A AR-103 PARTIAL ROOF AREA PLAN - NEW CONSTRUCTION

SCALE: 1/8" = 1'

PLAN NORTH

NORTH

GENERAL NOTES

- REFER TO AR-201 THROUGH AR-204 FOR SCOPE OF WORK RELATED TO EXTERIOR MASONRY WALLS AND CURTAINWALLS.
- REFER TO LANDSCAPING DRAWINGS FOR NEW WORK ON TERRACES 1 & 2. NEW STRUCTURES THAT WILL ATTACH TO THE EXISTING DECK HAVE BEEN SHOWN ON OUR PLAN (TERRACE 1 ONLY). ALL OTHER LANDSCAPING FEATURES NOT SHOWN ON OUR PLANS WILL BE NON-PENETRATING.
- REFER TO AR-301 FOR NEW ROOF SYSTEM CROSS SECTIONS.

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NOTE: NOT ALL SYMBOLS NECESSARILY USED

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- LIGHTNING PROTECTION
- ABANDONED CURB
- SQUARE TUBE PENETRATION

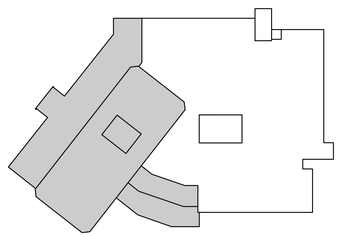
REPLACEMENT NOTES

1. FOR THE SAKE OF CLARITY, EACH INDIVIDUAL DETAIL ON THE ROOF PLANS HAS NOT BEEN INDICATED. EXISTING AND NEW DETAILS HAVE BEEN INDICATED FOR TYPICAL COMPONENTS AT RANDOM LOCATIONS.
2. COMPONENTS SHOWN ON THE DETAIL DRAWINGS SHALL BE NEW UNLESS SPECIFICALLY INDICATED AS EXISTING.
3. ITEMS OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS APPLICABLE TO THE PROJECT.
4. FOR THE SAKE OF CLARITY, SECUREMENT FASTENERS ARE NOT SHOWN ON THE DRAWING. REFER TO SPECIFICATIONS FOR FASTENER TYPES AND SPACING.
5. ANY DISCREPANCIES ON THE DRAWINGS NOTED BY THE CONTRACTOR SHALL BE BROUGHT TO THE OWNERS ATTENTION PRIOR TO BID SUBMISSION.
6. ITEMS OF CONSTRUCTION SHALL BE 100% WATERTIGHT ON A DAILY BASIS. REMOVE ONLY AS MUCH MATERIAL AS CAN BE MADE WATERTIGHT ON THE SAME DAY OF WORK.
7. FLASHING AND STRIPPING CONFIGURATIONS SHOWN ON THE ARCHITECTURAL DRAWING SHEETS ARE PROVIDED TO CONVEY GENERAL FLASHING AND STRIPPING CONFIGURATIONS. REFER TO THE SPECIFICATIONS FOR SPECIFIC CONFIGURATIONS AND REQUIREMENTS.
8. DETAILS NOT DEPICTED SHALL BE CONSTRUCTED IN A MANNER CONSISTENT WITH THE DETAIL DRAWINGS.
9. IF THERE IS A POTENTIAL HAZARDOUS MATERIAL ENCOUNTERED DURING THE COURSE OF WORK THAT IS NOT IDENTIFIED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR WILL STOP WORK IMMEDIATELY AND CONTACT THE OWNER WHO IS TO MAKE A DETERMINATION IF THE MATERIAL IS HAZARDOUS.
10. LOCATIONS AND QUANTITIES OF NEW ROOF PENETRATIONS MAY VARY FROM WHAT IS SHOWN. COORDINATE WITH ARCHITECTURAL, LANDSCAPE AND MEP DRAWINGS. REFER TO STRUCTURAL DRAWINGS FOR NEW CONCRETE DECK AT TERRACE 3.

KEYNOTES

1. CONTINUE THROUGHWALL FLASHING MINIMUM 6" BEYOND EDGE. PROVIDE SHEET METAL CLOSURE, FULL HEIGHT OF FLASHING. SEE DETAIL 2/AR-510.
2. STEP THROUGHWALL FLASHING UP AND OVER PARAPET. SEE DETAIL 1/AR-510.
3. EXISTING ABANDONED PLATFORM WITHIN ROOF TO REMAIN. SEE PHOTO 6/AR-901. PROVIDE TAPERED EDGE AND INSULATION FILL AS REQUIRED TO CREATE SMOOTH TRANSITION IN ROOF.
4. STEP AREA DIVIDER DOWN AT EDGE AND PROVIDE END CLOSURE. SEE DETAIL 3/AR-510.
5. TURN AREA DIVIDER CAP UP ONTO ADJACENT CURB AND PROVIDE END CLOSURE. SEE DETAIL 4/AR-510.
6. STEP THROUGHWALL FLASHING OR COUNTERFLASHING UP AND OVER AREA DIVIDER. PROVIDE END CLOSURE. SEE DETAIL 1/AR-510 FOR SIMILAR.
7. STEP THROUGHWALL FLASHING UP AND OVER STEEL I-BEAM. SEE PHOTO 7/AR-901 FOR EXISTING CONDITIONS.
8. PROVIDE NON-PENETRATING SAFETY RAILING. SEE 6/AR-507 AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
9. PROVIDE 1½" ISOCYANURATE INSULATION AND WHITE EPDM MEMBRANE ON EXISTING DUCT.
10. NEW CABANA, SEE LANDSCAPE DRAWINGS. EACH CABANA WILL BE SUPPORTED BY 4 POSTS, ATTACHED TO THE CONCRETE DECK. REFER TO DETAIL C/S-400 FOR ATTACHMENT. CONTRACTOR SHALL PROVIDE LIQUID-APPLIED FLASHING ON PLATE AND POST. TERMINATE FLASHING JUST SHORT OF TOP OF NEW PAVERS.
11. NEW AMPHITHEATER SEATING, REFER TO LANDSCAPE DRAWINGS. REFER TO L-302 FOR AMPHITHEATER FRAMING LOCATIONS AND ATTACHMENT. SEE DETAIL 6/AR-509 FOR WATERPROOFING.

KEY PLAN



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Drawn By:	MLF
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Drawing
PARTIAL ROOF AREA PLAN
NEW CONSTRUCTION

AR-103

NOT FOR CONSTRUCTION

8/29/2025
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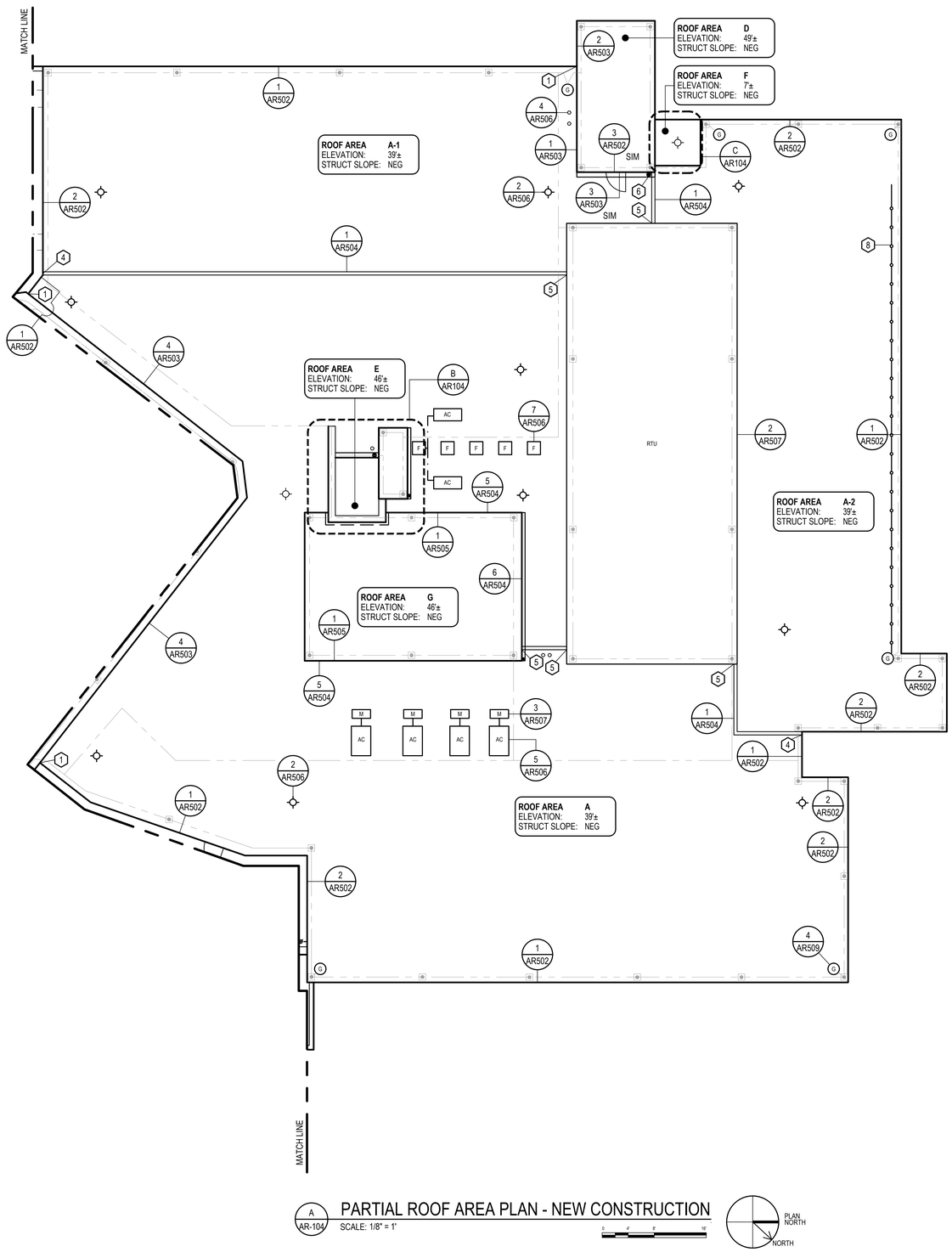
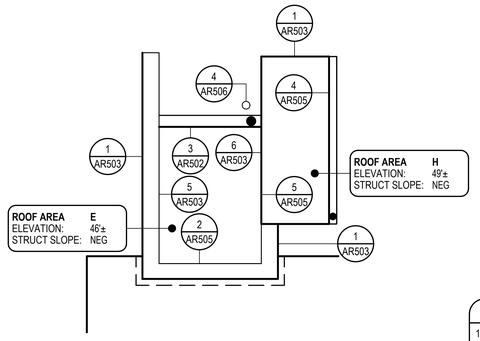
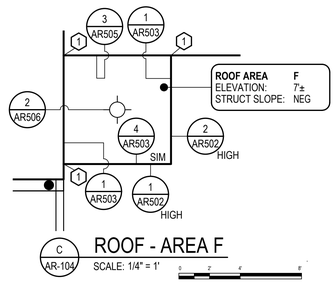


A AR-104 PARTIAL ROOF AREA PLAN - NEW CONSTRUCTION
SCALE: 1/8" = 1'



B AR-104 ROOF - AREAS E & H
SCALE: 1/4" = 1'



C AR-104 ROOF - AREA F
SCALE: 1/4" = 1'

STANDARD LEGEND

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- PARAPET
- GUTTER WITH DOWNSPOUT
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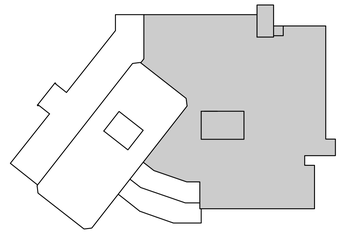
8. DETAILS NOT DEPICTED SHALL BE CONSTRUCTED IN A MANNER CONSISTENT WITH THE DETAIL DRAWINGS.
9. IF THERE IS A POTENTIAL HAZARDOUS MATERIAL ENCOUNTERED DURING THE COURSE OF WORK THAT IS NOT IDENTIFIED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR WILL STOP WORK IMMEDIATELY AND CONTACT THE OWNER WHO IS TO MAKE A DETERMINATION IF THE MATERIAL IS HAZARDOUS.
10. LOCATIONS AND QUANTITIES OF NEW ROOF PENETRATIONS MAY VARY FROM WHAT IS SHOWN. COORDINATE WITH ARCHITECTURAL, LANDSCAPE AND MEP DRAWINGS. REFER TO STRUCTURAL DRAWINGS FOR NEW CONCRETE DECK AT TERRACE 3.

KEYNOTES

1. CONTINUE THROUGHWALL FLASHING MINIMUM 6" BEYOND EDGE. PROVIDE SHEET METAL CLOSURE, FULL HEIGHT OF FLASHING. SEE DETAIL 2/AR-510.
2. STEP THROUGHWALL FLASHING UP AND OVER PARAPET. SEE DETAIL 1/AR-510.
3. EXISTING ABANDONED PLATFORM WITHIN ROOF TO REMAIN. SEE PHOTO 6/AR-901. PROVIDE TAPERED EDGE AND INSULATION FILL AS REQUIRED TO CREATE SMOOTH TRANSITION IN ROOF.
4. STEP AREA DIVIDER DOWN AT EDGE AND PROVIDE END CLOSURE. SEE DETAIL 3/AR-510.
5. TURN AREA DIVIDER CAP UP ONTO ADJACENT CURB AND PROVIDE END CLOSURE. SEE DETAIL 4/AR-510.
6. STEP THROUGHWALL FLASHING OR COUNTERFLASHING UP AND OVER AREA DIVIDER. PROVIDE END CLOSURE. SEE DETAIL 1/AR-510 FOR SIMILAR.
7. STEP THROUGHWALL FLASHING UP AND OVER STEEL I-BEAM. SEE PHOTO 7/AR-901 FOR EXISTING CONDITIONS.
8. PROVIDE NON-PENETRATING SAFETY RAILING. SEE 6/AR-507 AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
9. PROVIDE 1½" ISOCYANURATE INSULATION AND WHITE EPDM MEMBRANE ON EXISTING DUCT.
10. NEW CABANA, SEE LANDSCAPE DRAWINGS. EACH CABANA WILL BE SUPPORTED BY 4 POSTS, ATTACHED TO THE CONCRETE DECK. REFER TO DETAIL C/S-400 FOR ATTACHMENT. CONTRACTOR SHALL PROVIDE LIQUID-APPLIED FLASHING ON PLATE AND POST. TERMINATE FLASHING JUST SHORT OF TOP OF NEW PAVERS.
11. NEW AMPHITHEATER SEATING, REFER TO LANDSCAPE DRAWINGS. REFER TO L-302 FOR AMPHITHEATER FRAMING LOCATIONS AND ATTACHMENT. SEE DETAIL 6/AR-509 FOR WATERPROOFING.

KEY PLAN



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Project Number:	FP24-021
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Sheet Issue Date:	8/29/2025

Drawing
PARTIAL ROOF AREA PLAN
NEW CONSTRUCTION

AR-104

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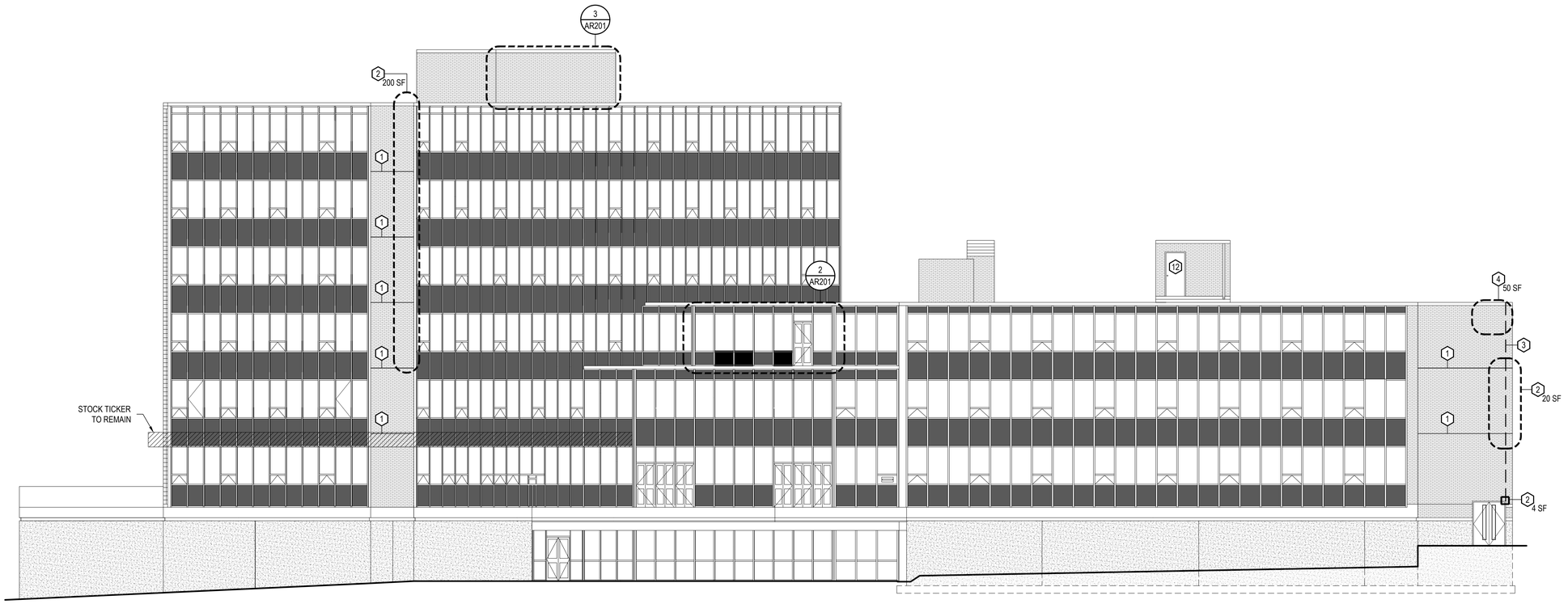
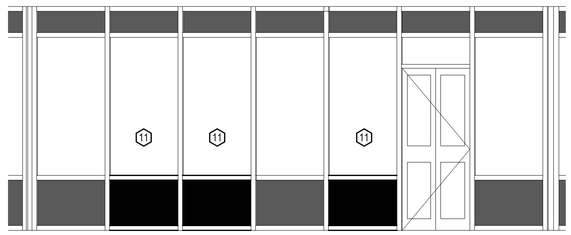
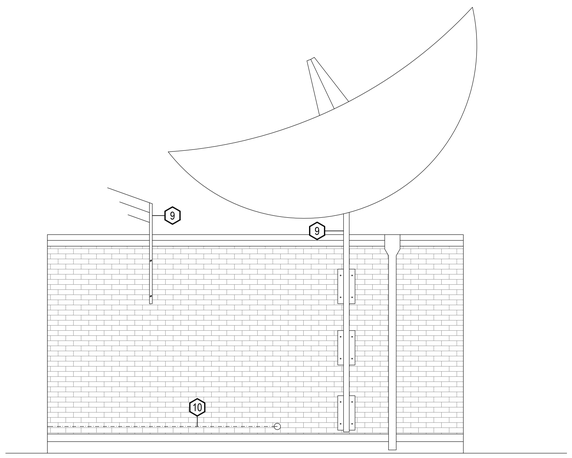


1 AR-201 **EAST ELEVATION**
SCALE: 1/8" = 1'



2 AR-201 **PROPOSED NEW PARTIAL EAST ELEVATION - TERRACE 3**
SCALE: 3/8" = 1'



3 AR-201 **EAST ELEVATION - PENTHOUSE**
SCALE: 3/8" = 1'

KEY NOTES

1. PROVIDE NEW THROUGHWALL FLASHING AT EXISTING SHELF ANGLE. SEE DETAIL 1/AR-506.
2. REBUILD BRICK MASONRY. SEE ELEVATION FOR APPROXIMATE QUANTITIES.
3. SAWCUT NEW VERTICAL CONTROL JOINT IN EXISTING BRICK. PROVIDE SEALANT AND BACKER ROD. SEE DETAIL 1/AR-508.
4. CLEAN MASONRY. SEE ELEVATION FOR APPROXIMATE QUANTITIES.
5. ADD ALTERNATE: PROVIDE NEW WATERPROOFING, THIS LOCATION. SEE DETAILS 3/AR-508 AND 4/AR-508.
6. PROVIDE NEW PRESSURE BAR CAP WHERE EXISTING IS MISSING.
7. REMOVE EXISTING ABANDONED LOUVER AND INFILL BRICK AND CMU.
8. REPOINT BRICK MASONRY. SEE ELEVATION FOR APPROX. QUANTITIES.
9. REMOVE EXISTING SATELLITE AND REPLACE BRICK WHERE BRACKETS WERE ATTACHED.
10. REMOVE AND REINSTALL WALL-MOUNTED CONDUIT AS REQUIRED TO ACCOMMODATE NEW FLASHING. RAISE WALL PENETRATION AS REQUIRED.
11. REMOVE EXISTING DOOR AND INFILL WITH GLAZING AND SPANDREL PANELS TO MATCH ADJACENT CONFIGURATION. EXISTING SYSTEM IS KAWNEER TRI-FAB VG 451, WITH 1" GLAZING (1/4" BRONZE, 1/2" AIR SPACE, 1/4") AND 1" SPANDREL INFILLS. SEE 11/AR-901 FOR EXISTING CONDITIONS AND DETAILS 1 & 2/AR-509.
12. REMOVE EXISTING AND PROVIDE NEW STEEL DOOR AND HARDWARE. SEE DETAIL 3/AR-503.

GENERAL NOTES

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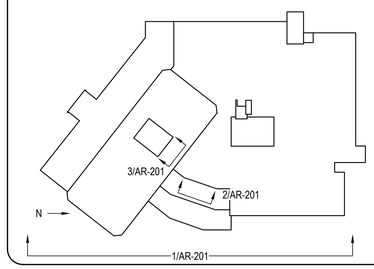
KEY PLAN



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Drawing
ELEVATIONS

AR-201

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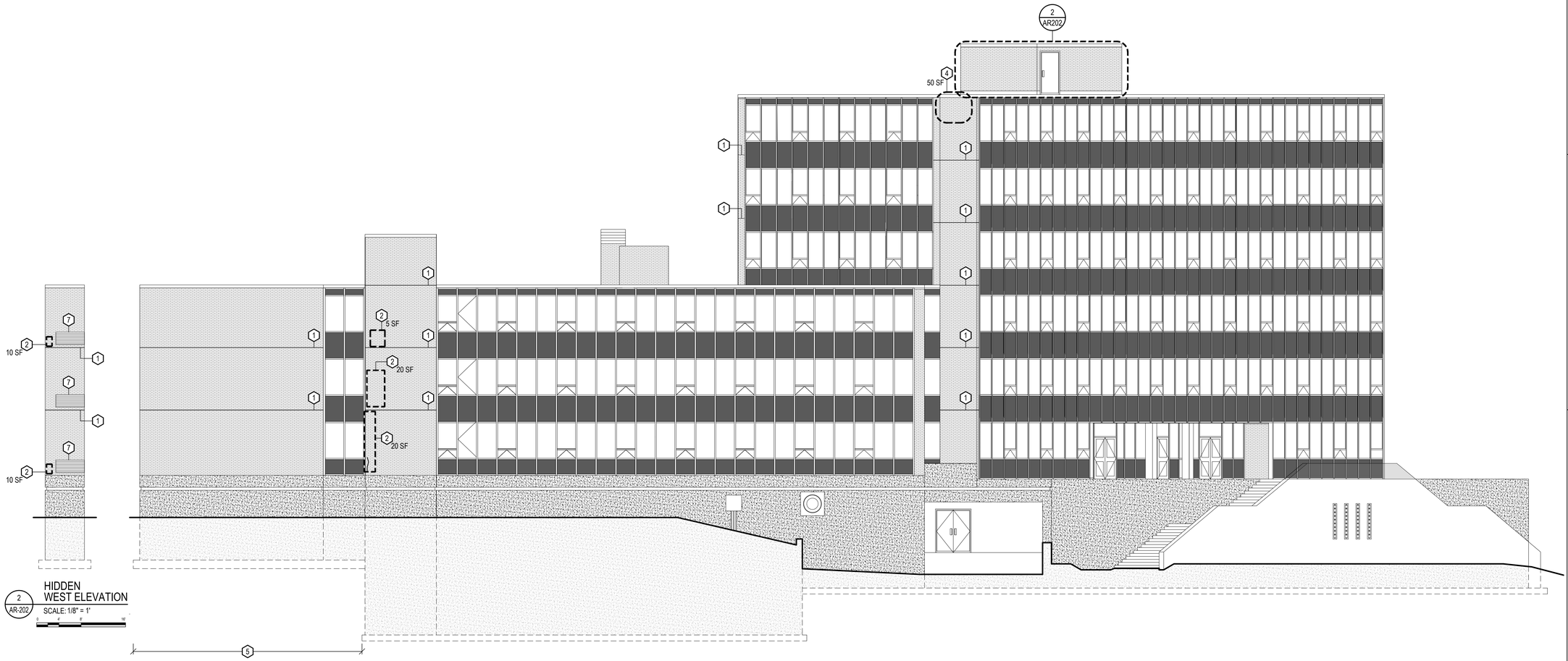
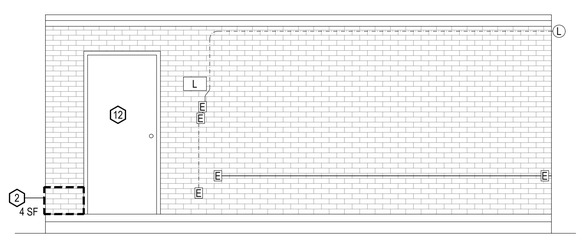


2 AR-202 HIDDEN WEST ELEVATION
SCALE: 1/8" = 1'

1 AR-202 WEST ELEVATION
SCALE: 1/8" = 1'



3 AR-202 WEST ELEVATION - PENTHOUSE
SCALE: 3/8" = 1'

KEY NOTES

1. PROVIDE NEW THROUGHWALL FLASHING AT EXISTING SHELF ANGLE. SEE DETAIL 1/AR-506.
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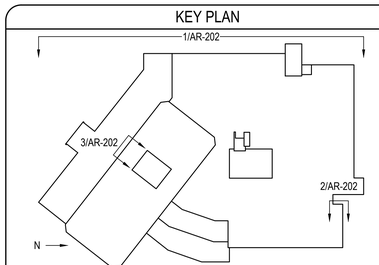

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Drawing
ELEVATIONS

AR-202

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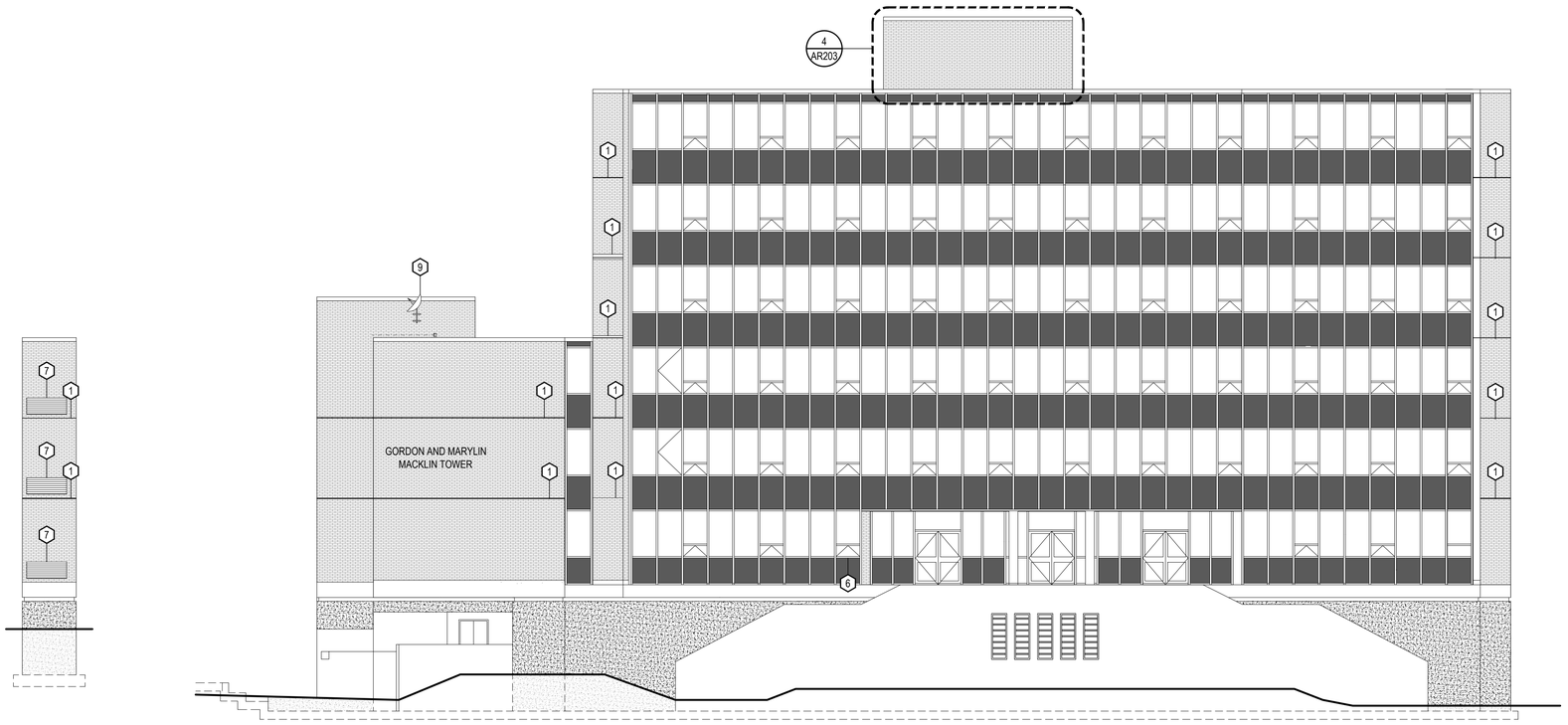
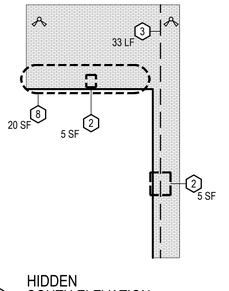
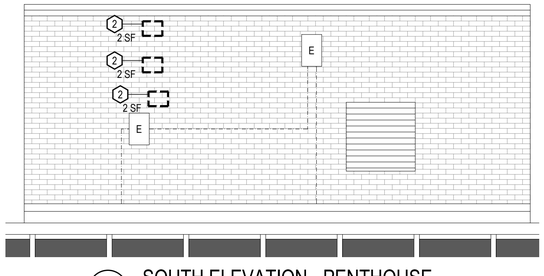


2 AR-203 HIDDEN SOUTH ELEVATION
SCALE: 1/8" = 1'

1 AR-203 SOUTH ELEVATION
SCALE: 1/8" = 1'



3 AR-203 HIDDEN SOUTH ELEVATION
SCALE: 1/8" = 1'



4 AR-203 SOUTH ELEVATION - PENTHOUSE
SCALE: 3/8" = 1'

KEY NOTES

1. PROVIDE NEW THROUGHWALL FLASHING AT EXISTING SHELF ANGLE. SEE DETAIL 1/AR-506.
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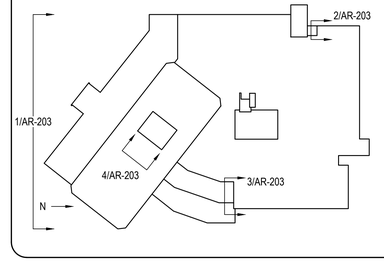

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ELEVATIONS

AR-203

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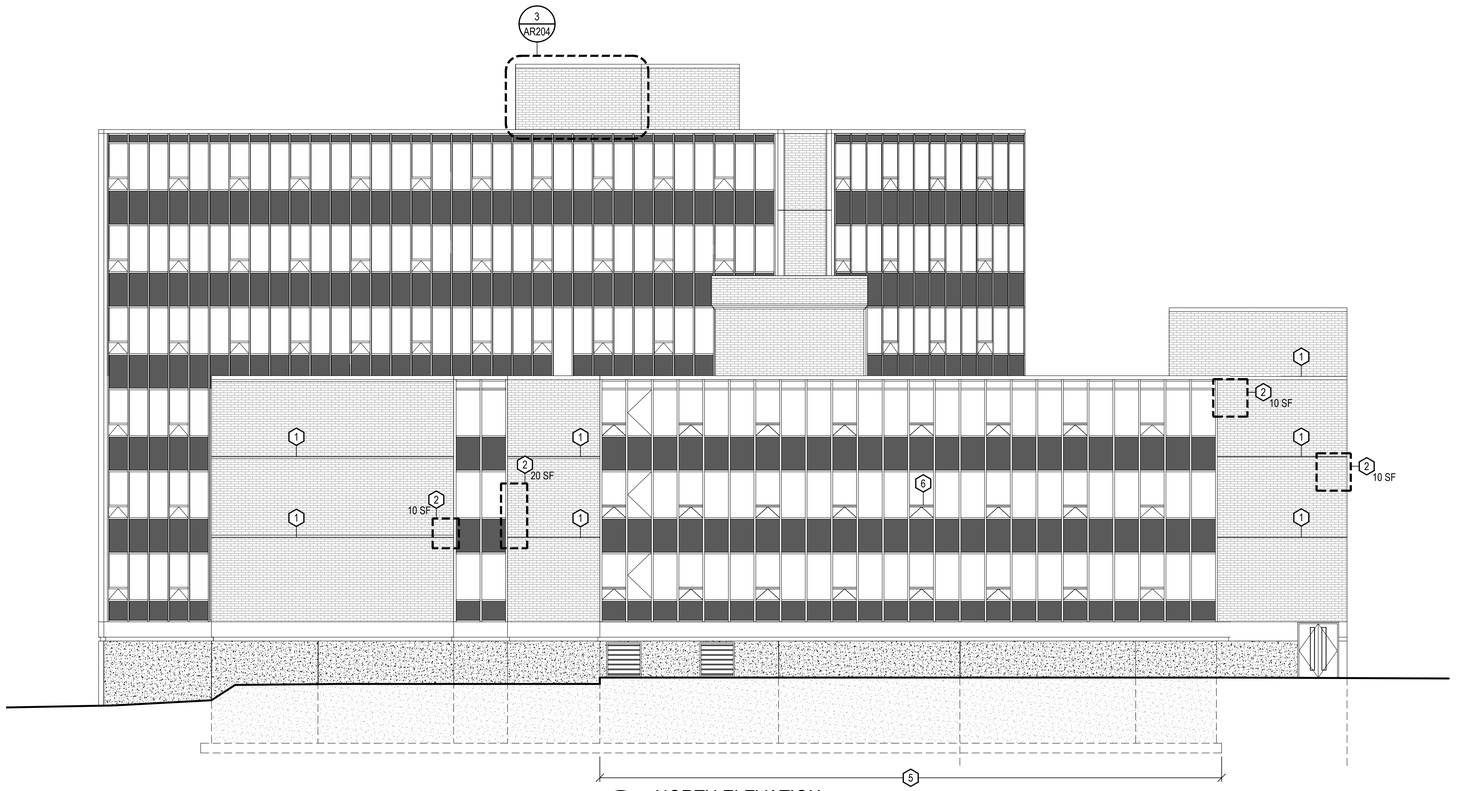
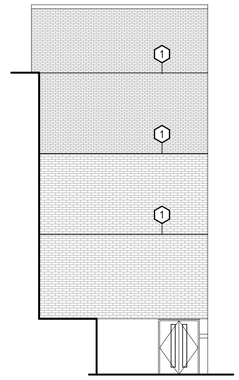
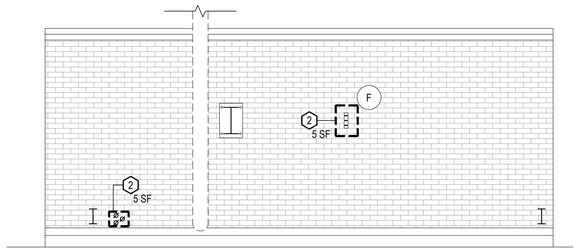


1 AR-204 **NORTH ELEVATION**
SCALE: 1/8" = 1'



2 AR-204 **HIDDEN NORTH ELEVATION**
SCALE: 1/8" = 1'



3 AR-204 **NORTH ELEVATION - PENTHOUSE**
SCALE: 3/8" = 1'

KEY NOTES

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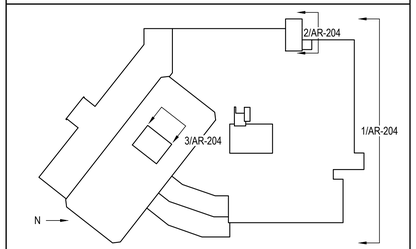

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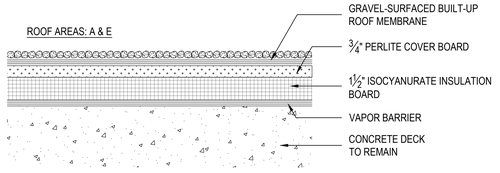
EXISTING CONDITIONS SCALE: 3" = 1'

ROOF AREAS: A & E



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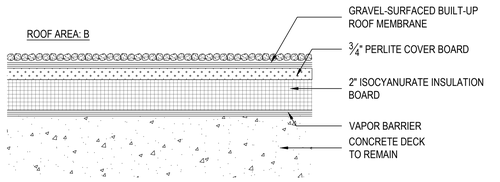
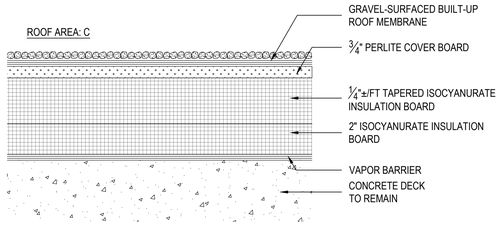
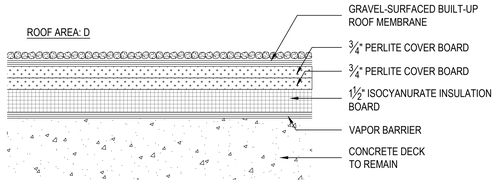


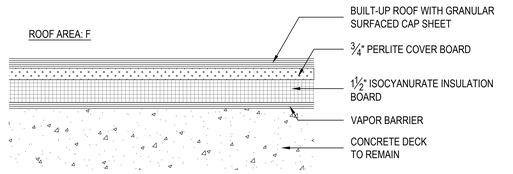
ROOF AREA: C



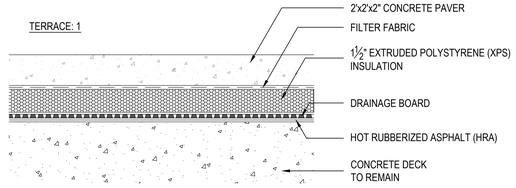
ROOF AREA: D



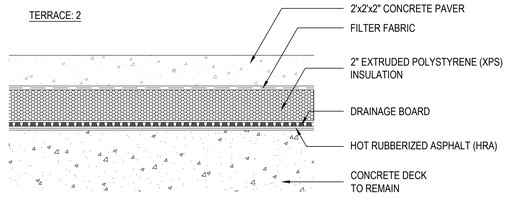
ROOF AREA: F



TERRACE: 1

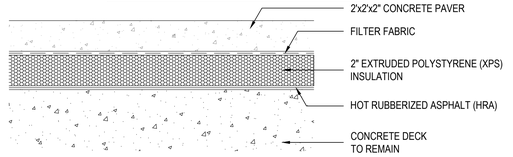


TERRACE: 2



NOTE:
- THE EXISTING CONCRETE DECK ON TERRACE 3 IS SUSPECTED TO BE DETERIORATED. SIGNIFICANT REPAIRS SHALL BE ANTICIPATED. REFER TO STRUCTURAL DRAWINGS FOR MORE INFORMATION.

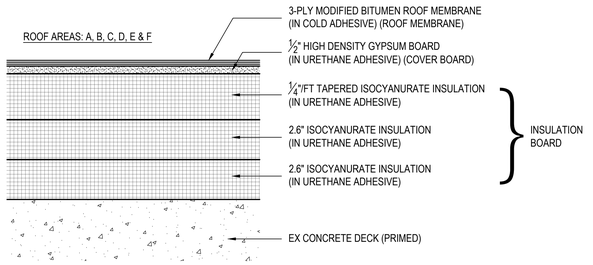
TERRACE: 3



REMOVE ALL ITEMS UNLESS DESIGNATED TO REMAIN

NEW CONSTRUCTION SCALE: 3" = 1'

ROOF AREAS: A, B, C, D, E & F



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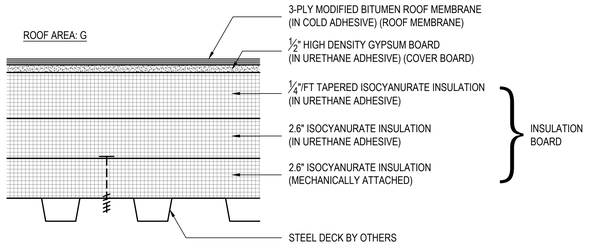
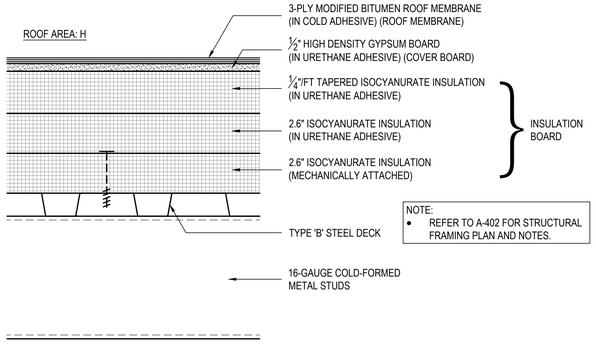
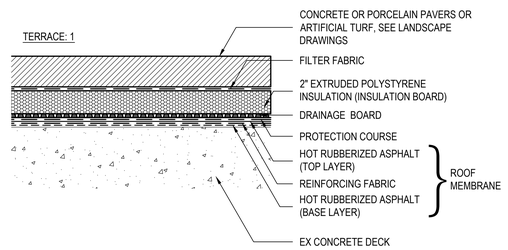


ROOF AREA: H



NOTE:
- REFER TO A-402 FOR STRUCTURAL FRAMING PLAN AND NOTES.

TERRACE: 1



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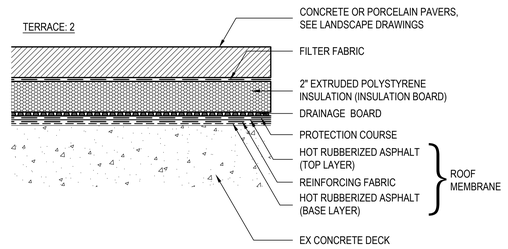

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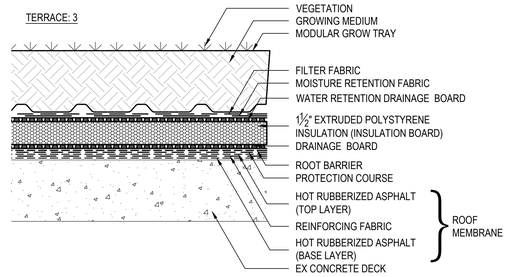
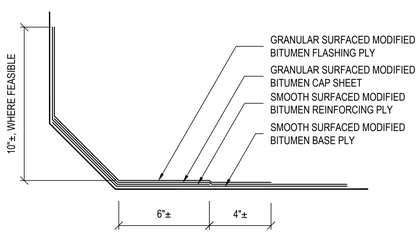
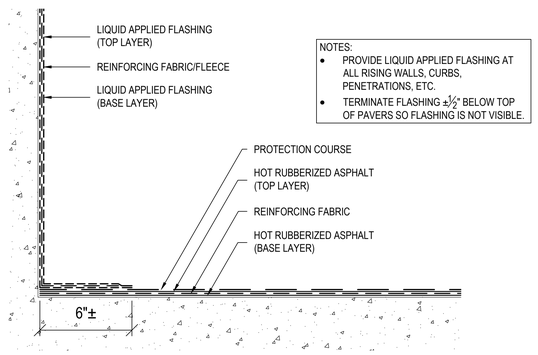




TYPICAL BASE FLASHING - 2-PLY MODIFIED BITUMEN ROOF AREAS



TYPICAL BASE FLASHING - TERRACES

ALL ITEMS ARE NEW UNLESS DESIGNATED AS EXISTING (EX)

THE JIM BOWMAN MEDAL IS EXACTLY ONE INCH LONG AT THIS SIZE (OPTIONAL PAGE ICON)

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Project Number:	FP24-021
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Checked By:	SLB
Sheet Issue Date:	8/29/2025

Drawing
ROOF SYSTEM CROSS SECTIONS

AR-301

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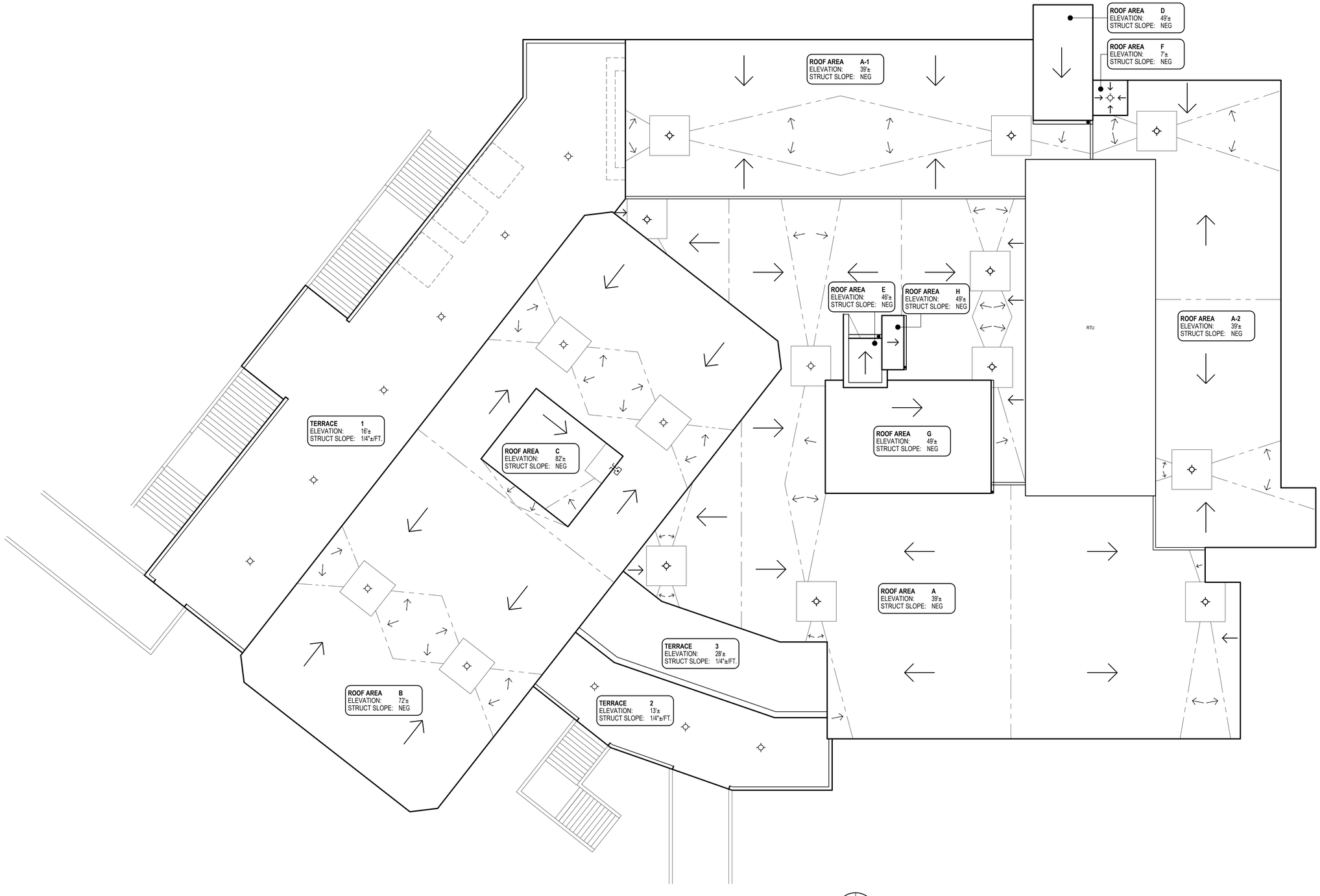

A AR-401 CONCEPTUAL TAPERED INSULATION PLAN

SCALE: 1/8" = 1'

PLAN NORTH

NORTH

LEGEND

- CRICKET
- STRUCTURAL SLOPE
- TAPERED INSULATION SLOPE
- INSULATION CRICKET SLOPE
- ROOF DRAIN WITH SUMP

NOTES

1. PROVIDE CRICKETS ON UPSLOPE SIDE OF ALL ROOF TOP PENETRATIONS AND SADDLES BETWEEN ALL ROOF DRAINS AND SCUPPERS.
2. PROVIDE 8 FOOT WIDE MIN. CRICKETS AND SADDLES UNLESS OTHERWISE INDICATED.
3. PROVIDE 8 FT X 8 FT DRAIN SUMPS AT ALL INTERIOR ROOF DRAINS AND SCUPPERS.
4. THE TAPERED CRICKET LAYOUT IS CONCEPTUAL IN NATURE AND INTENDED TO PROVIDE A BASIC CONCEPT FOR BIDDING PURPOSES. THE ACTUAL LAYOUT MAY VARY FROM THAT SHOWN.
5. PROVIDE CRICKET OR INSULATION MATERIAL ALONG PERIMETER ROOF EDGE AS REQUIRED TO PROVIDE A SMOOTH TRANSITION AT ROOF EDGES.

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Drawing
CONCEPTUAL TAPERED INSULATION PLAN

AR-401

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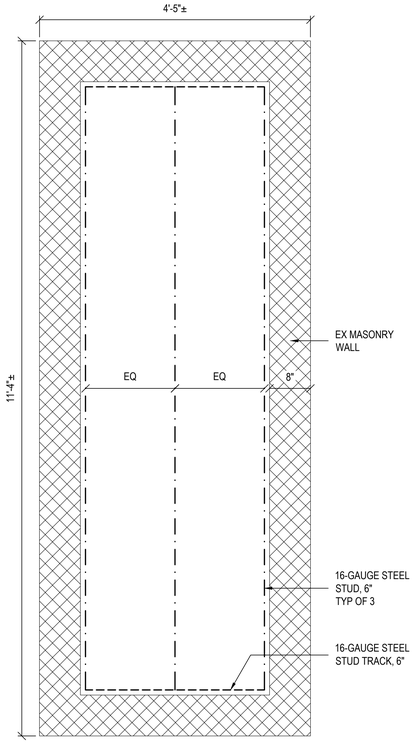

A AR-402 AREA H FRAMING PLAN
SCALE: 1" = 1'

LEGEND

- MASONRY WALL
- LIGHT GAUGE STEEL TRACK
- LIGHT GAUGE STEEL STUD

STEEL DECKING NOTES

1. STEEL DECK SHALL CONFORM TO STEEL DECK INSTITUTE (SDI) SPECIFICATIONS. STEEL DECK SHALL BE FORMED STEEL SHEETS CONFORMING TO ASTM A653 GRADE 40 MINIMUM. BEOFRE FORMING, STEEL SHEETS SHALL BE COATED WITH A ZINC COATING CONFORMING TO ASTM A653, G-90 COATING, UNO.
2. ALL SHOP AND FIELD WELDS SHOWN SHALL BE MADE BY APPROVED CERTIFIED WELDERS AND SHALL CONFORM TO THE A W.S. CODE FOR BUILDINGS. ALL WELDS SHALL DEVELOP THE FULL STRENGTH OF THE MATERIAL BEING WELDED. USE E70XX ELECTRODES.
3. STEEL DECK SHALL BE 1-1/2" DEPTH 18 GAUGE, COMPOSITE, AS MANUFACTURED BY O'DONNELL METAL DECK, OR AN ENGINEER APPROVED EQUIVALENT PRODUCT OF ANY MEMBER OF THE STEEL DECK INSTITUTE (SDI) AND SHALL CONFORM TO ASTM DESIGNATION A446 GRADE A (FOR GALVANIZED DECK).
4. MINIMUM STRUCTURAL PROPERTIES BASE ON MINIMUM YIELD STRENGTH OF 33,000 PSI WITH A WORKING STRESS NOT TO EXCEED 20,000 PSI.
5. THE DEFLECTION OF THE DECK UNDER DESIGN LIVE LOAD SHALL NOT EXCEED L/240 OF THE SPAN.
6. STEEL DECK CAPACITIES, DETAILS, INSTALLATION REQUIREMENTS, FASTENER PATTERNS, REQUIRED LAPS, PLANS, ETC. SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION AND INSTALLATION.

STRUCTURAL DESIGN PARAMETERS

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITIONS OF THE INTERNATIONAL BUILDING CODE (IBC) INCLUDING ALL STANDARDS AND REFERENCES THEREIN, AS MODIFIED BY LOCAL AMENDMENTS.
2. DESIGN LOADS:

   DEAD LOADS

   ROOF SYSTEM 8.3 PSF

   LIVE LOADS

   ROOF LIVE LOAD 20 PSF

   SNOW LOADS

   GROUND SNOW LOAD, Pg 30 PSF
   NOTE: DRIFT, SLIDING, AND UNBALANCED LOADS IN ACCORDANCE WITH ASCE / SEI 7-22.

MATERIALS SCHEDULE

PRODUCT	GAGE / SIZE	TYPE	SPACING	ATTACHMENT	NOTES
LATERAL BRACING	20GA / 6" NOM		3RD POINTS	TOP AND BOTTOM FLANGE: 2" LONG #12 TEK55 SCREWS	
STEEL STUDS	16GA / 6" NOM WITH 2" FLANGE		AS SHOWN	TO STUD TRACKS: #10 SERIES STAINLESS STEEL PANHEAD SCREWS, 1/2-INCH LONG	FASTEN TOP AND BOTTOM
STEEL STUD TRACK	16GA / 6" NOM WITH 2" FLANGE		CONTINUOUS	TO MASONRY: 1/4" DIAMETER MASONRY SCREWS, TAPCON OR APPROVED EQUAL, @ 16" O.C. STAGGERED	PROVIDE CONTINUOUS TRACK TOP AND BOTTOM
STEEL DECK	20GA	TYPE B		TO STEEL STUDS: 2" LONG #12 TEKS 5 SCREWS @12" O.C. SECTION JOINTS: 2" LONG #12 TEKS 5 SCREWS @ 16" O.C.	LAP SHEETS 1 FULL FLUTE

COLD-FORMED METAL FRAMING NOTES

1. ALL MEMBERS AND ACCESSORIES 16 GAUGE OR HEAVIER SHALL BE FORMED FROM STEEL THAT CONFORMS TO THE REQUIREMENTS OF ASTM A653, GRADE D, WITH A SPECIFIED MINIMUM YIELD STRENGTH OF 50,000 PSI.
2. ALL MEMBERS AND ACCESSORIES 18 GAUGE OR LIGHTER SHALL BE FORMED FROM STEEL THAT CONFORMS TO THE REQUIREMENTS OF ASTM A446, GRADE A, WITH A SPECIFIED MINIMUM YIELD STRENGTH OF 33,000 PSI
3. ALL STUDS BRIDGING, STRIPPING, BLOCKING AND ACCESSORIES SHALL BE OF THE TYPE, SIZE, STEEL THICKNESS AND SPACING SHOWN ON THE PLANS OR AS INDICATED IN THESE NOTES OR SPECIFICATIONS. PARAMETER FOR DETAILING NOT EXPLICITLY DEFINED BY THE ENGINEER SHALL BE COMPLETED BY THE SSE. PRODUCTS FAILING TO MEET THESE MINIMUM PROPERTIES WILL BE REJECTED.
4. ALL CONNECTIONS OF COLD-FORMED STEEL AND ACCESSORIES SHALL BE MADE WITH SELF-DRILLING, SELF-TAPPING SCREWS OF APPROPRIATE LENGTH UNLESS OTHERWISE INDICATED. PENETRATION OF JOINED MATERIAL SHALL NOT BE LESS THAN 3 EXPOSED THREADS.
5. SPLICING OF COLD FORMED STEEL SECTIONS ARE NOT PERMITTED UNDER ANY CIRCUMSTANCES. CUTTING OF STEEL MEMBERS SHALL BE PERFORMED WITH SAWS OR SHEARS. FLAME CUTTING IS NOT PERMITTED.
6. STUDS, TRACK AND BRACING SHALL BE MANUFACTURE RED PER ASTM SPECIFICATION C-955.
7. ALL MEMBERS AND ACCESSORIES SHALL BE FORMED FROM STEEL HAVING A GALVANIZED COATING MEETING THE REQUIREMENTS OF ASTM A653 WITH G-90 COATING.

STRUCTURAL GENERAL NOTES

1. DESIGN REQUIREMENTS AS INDICATED IN THE DESIGN DRAWINGS SHALL BE FOLLOWED ENTIRELY. WHERE COMPLIANCE WITH CONFLICTING REQUIREMENTS IN THE DESIGN DOCUMENTS ARE SPECIFIED, NOTIFY THE ENGINEER AND ENFORCE THE MOST STRINGENT REQUIREMENTS.
2. SHOP DRAWINGS PREPARED BY CONTRACTORS, SUPPLIERS, ETC. SHALL BE PROVIDED TO THE ARCHITECT AND ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION AND/OR CONSTRUCTION. GENERAL CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMITTING TO THE ARCHITECT AND ENGINEER.
3. THE CONTRACTOR SHALL PROVIDE ALL BRACING NECESSARY PRIOR TO DEMOLITION.
4. ALL DIMENSIONS, ELEVATIONS, AND CONDITIONS RELATED TO EXISTING CONDITIONS SHALL BE FIELD VERIFIED. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER BEFORE PROCEEDING WITH THE WORK.
5. TEMPORARY BRACING, SHORING, OR ANY WORK THAT MAY BE REQUIRED TO PROTECT THE EXISTING SURROUNDING BUILDING, UTILITIES, ETC. SHALL BE PROVIDED BY THE CONTRACTOR.
6. SHOP DRAWINGS PREPARED BY CONTRACTORS, SUPPLIERS, ETC. SHALL BE PROVIDED TO THE ARCHITECT AND ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION AND/OR CONSTRUCTION. GENERAL CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMITTING TO THE ARCHITECT AND ENGINEER. REFER TO PROJECT SPECIFICATIONS FOR REQUIRED SUBMITTALS.

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Drawing
AREA H FRAMING PLAN AND NOTES

AR-402

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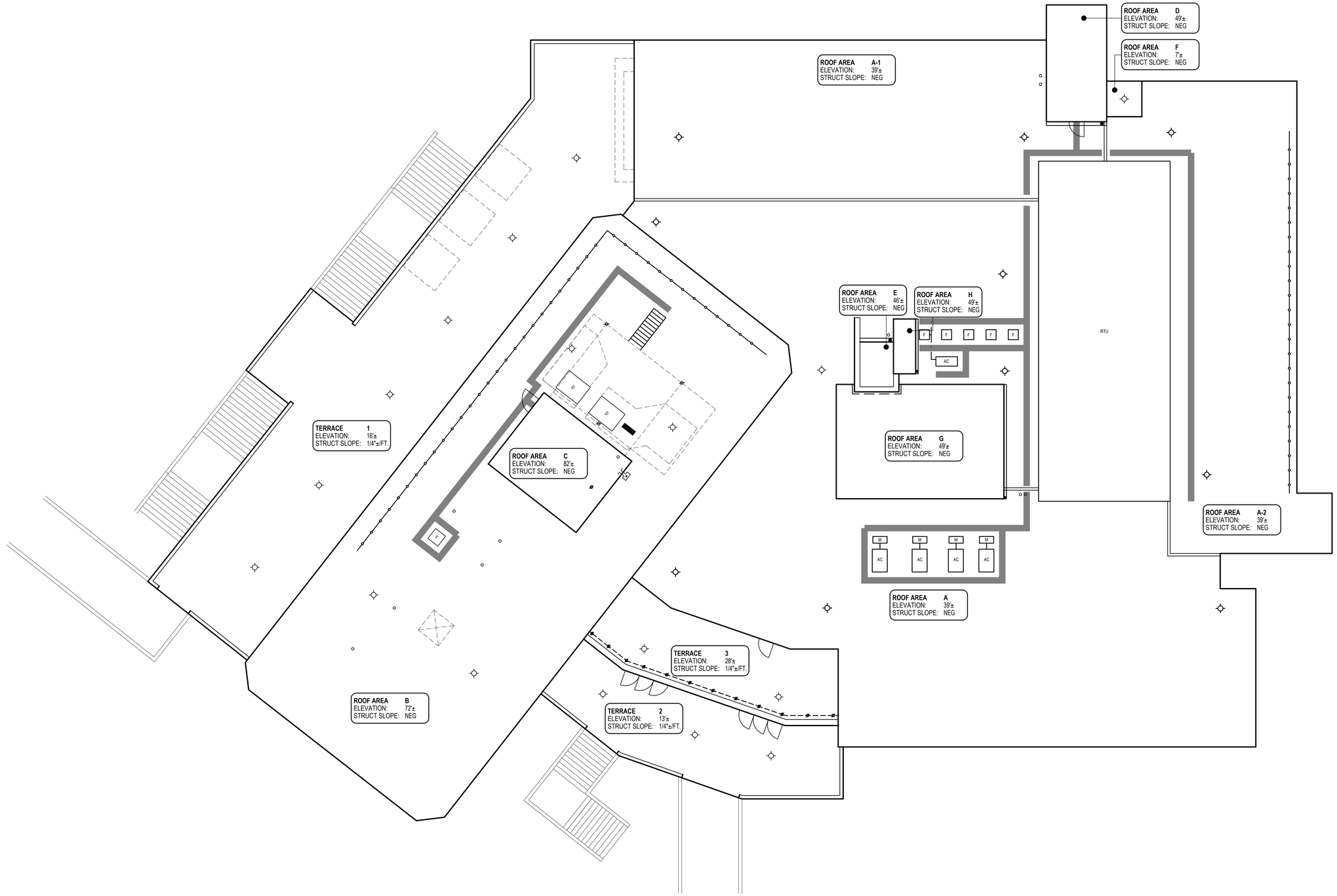

A AR-403 CONCEPTUAL WALKWAY PLAN

SCALE: 1/8" = 1'

PLAN NORTH

NORTH

LEGEND

WALKWAY

ARCHITECT
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Drawing
CONCEPTUAL WALKWAY PLAN

AR-403

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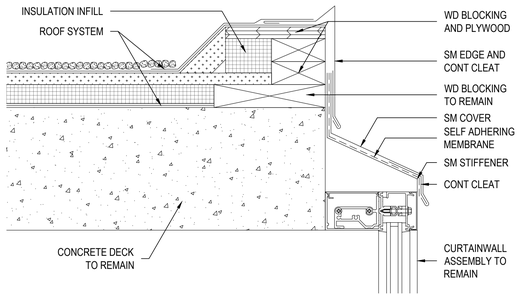
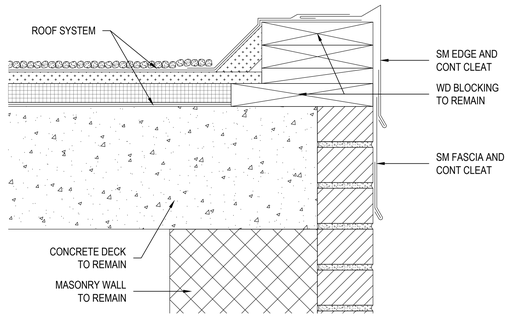
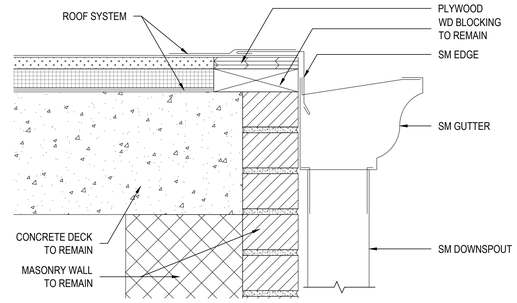


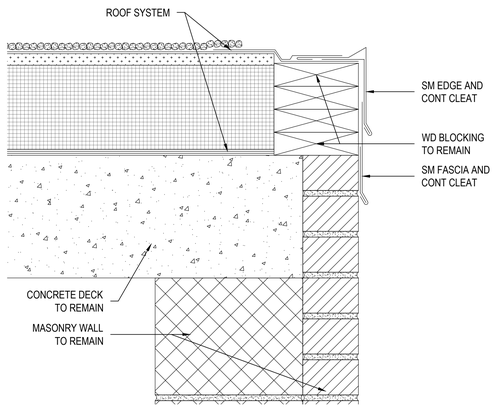
1 AR-501 EDGE AT CURTAINWALL
SCALE: 3" = 1'



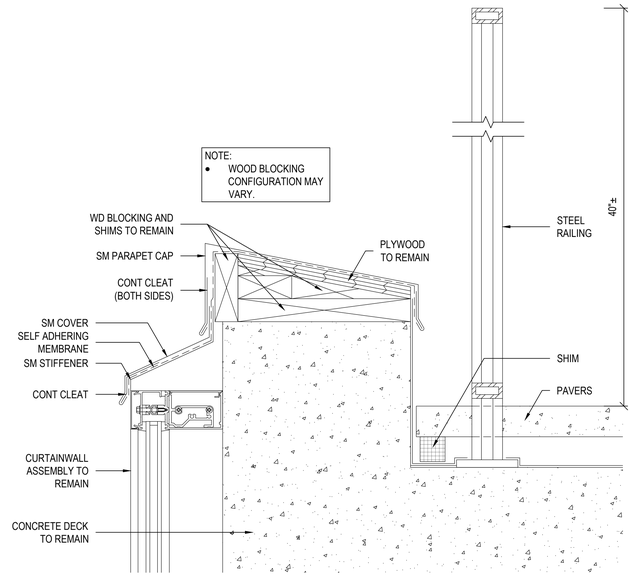
2 AR-501 EDGE AT BRICK
SCALE: 3" = 1'



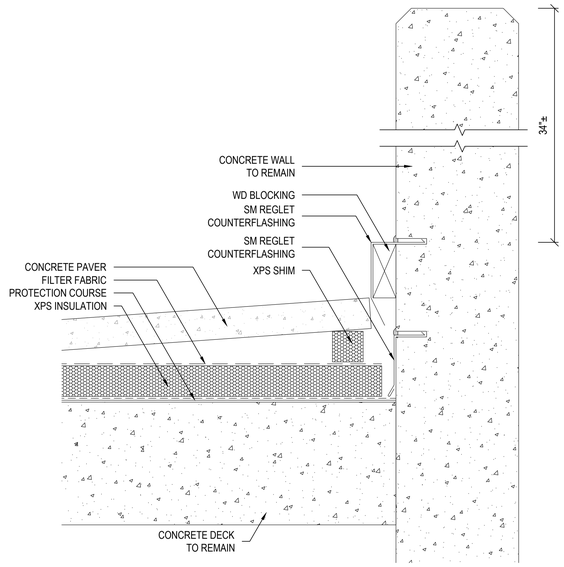
3 AR-501 GUTTER EDGE - AREA E
SCALE: 3" = 1'



4 AR-501 EDGE - AREA C
SCALE: 3" = 1'



5 AR-501 PARAPET - TERRACE 3
SCALE: 3" = 1'



6 AR-501 PARAPET - TERRACES 1 & 2
SCALE: 3" = 1'

REMOVE ALL ITEMS UNLESS DESIGNATED TO REMAIN

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Drawing
DETAILS
EXISTING CONDITIONS

AR-501

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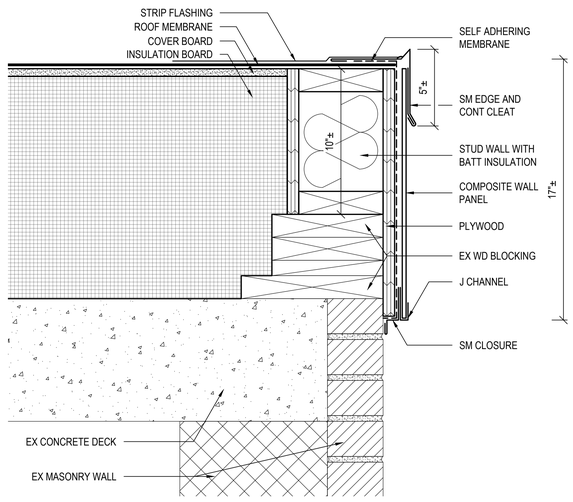
NOTES:
- CONSTRUCT STUD WALL TO A HEIGHT AS REQUIRED TO MATCH THE HIGHEST INSULATION THICKNESS ON EACH ROOF AREA.
- PROVIDE INSULATION FILL AND/OR TAPERED EDGE STRIP AT AREAS WHERE INSULATION IS LOWER THAN STUD WALL TO PROVIDE SMOOTH TRANSITION AT EDGE.

1 AR-502 EDGE AT CURTAINWALL
SCALE: 3" = 1'

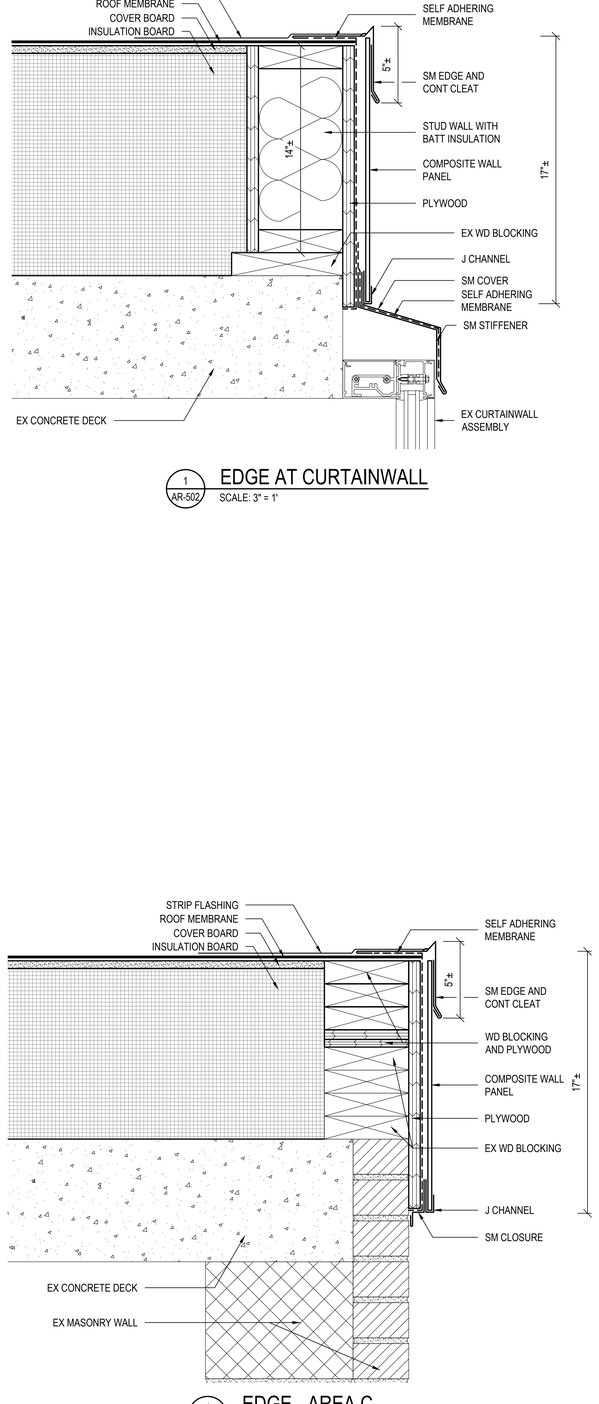
NOTES:
- CONSTRUCT STUD WALL TO A HEIGHT AS REQUIRED TO MATCH THE HIGHEST INSULATION THICKNESS ON EACH ROOF AREA.
- PROVIDE INSULATION FILL AND/OR TAPERED EDGE STRIP AT AREAS WHERE INSULATION IS LOWER THAN STUD WALL TO PROVIDE SMOOTH TRANSITION AT EDGE.



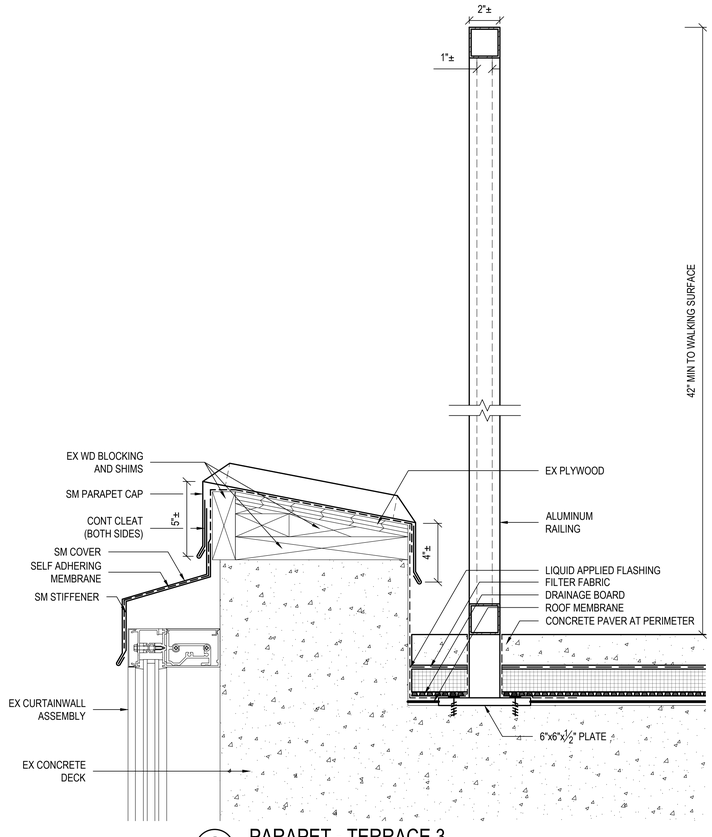
2 AR-502 EDGE AT BRICK
SCALE: 3" = 1'

NOTE:
- PROVIDE SPLASH BLOCK ON WALKWAY PAD BELOW DOWNSPOUT.

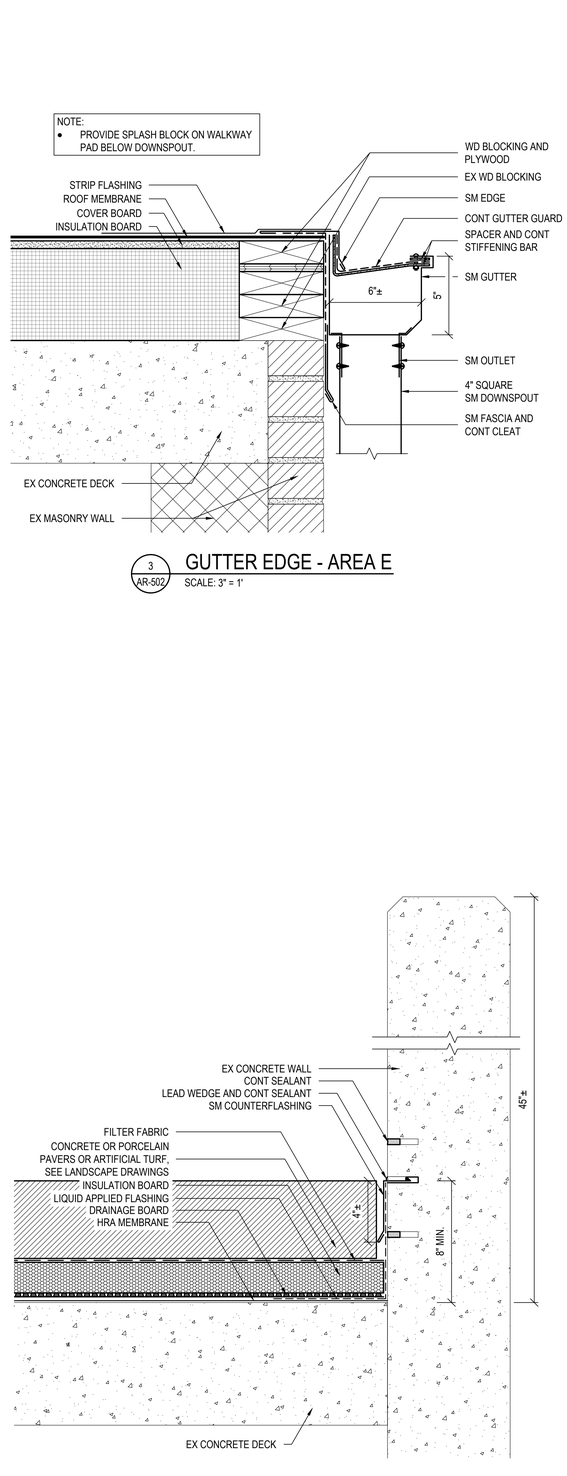
3 AR-502 GUTTER EDGE - AREA E
SCALE: 3" = 1"



4 AR-502 EDGE - AREA C
SCALE: 3" = 1'



5 AR-502 PARAPET - TERRACE 3
SCALE: 3" = 1'



6 AR-502 PARAPET - TERRACES 1 & 2
SCALE: 3" = 1'

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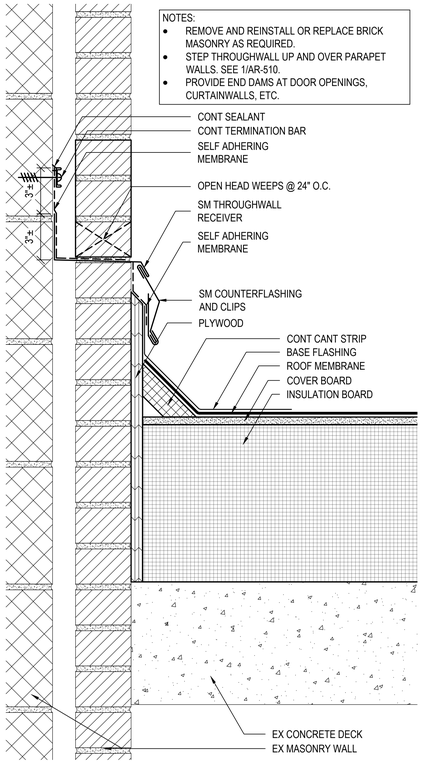
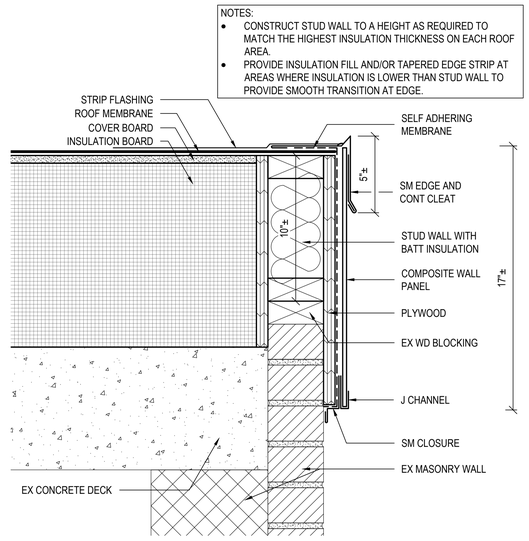
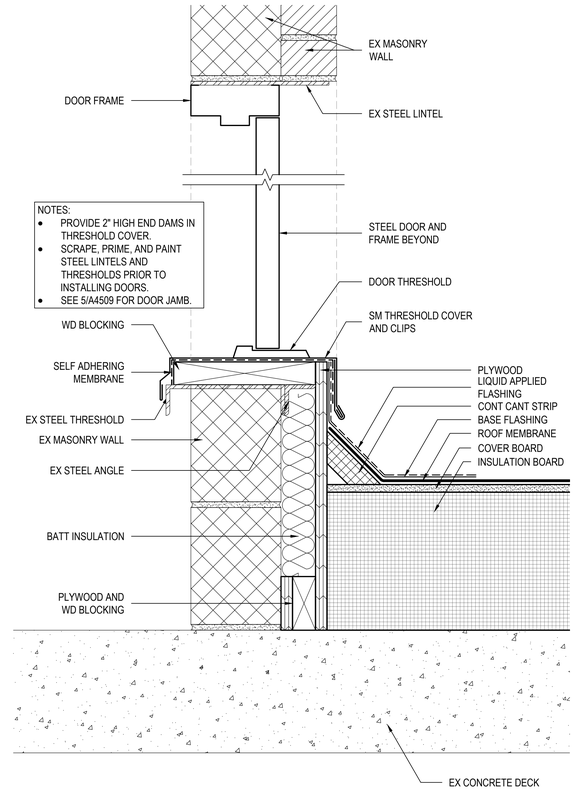


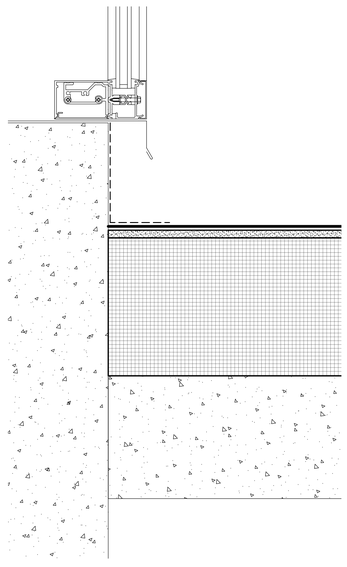
1 AR-503 THROUGHWALL FLASHING
SCALE: 3" = 1'



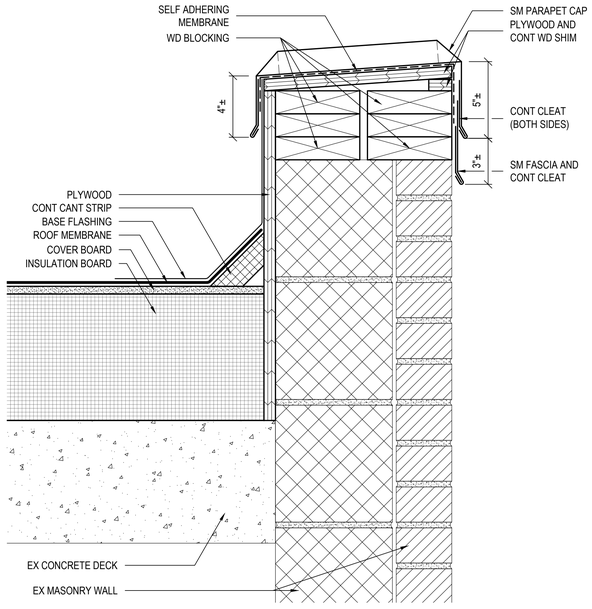
2 AR-503 EDGE - AREA D
SCALE: 3" = 1'



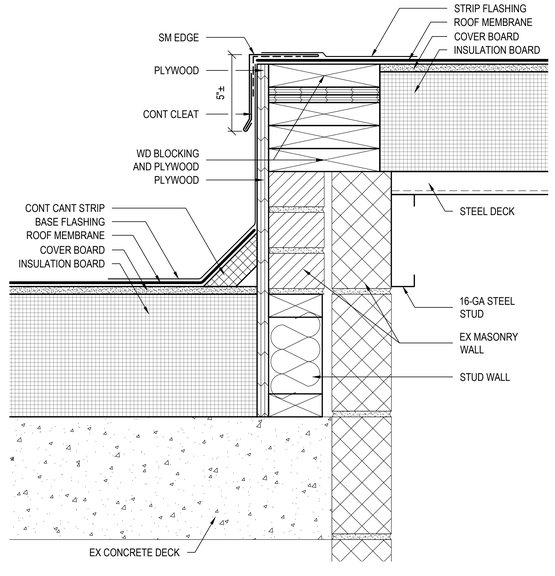
3 AR-503 STEEL ACCESS DOOR - AREAS A AND B
SCALE: 3" = 1'



4 AR-503 ROOF TO CURTAINWALL - AREA A
SCALE: 3" = 1'



5 AR-503 PARAPET - AREA E
SCALE: 3" = 1'



6 AR-503 ROOF TRANSITION - AREA E TO H
SCALE: 3" = 1'

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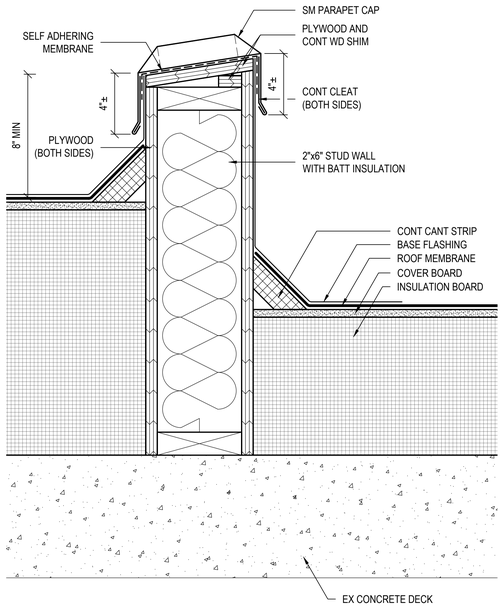
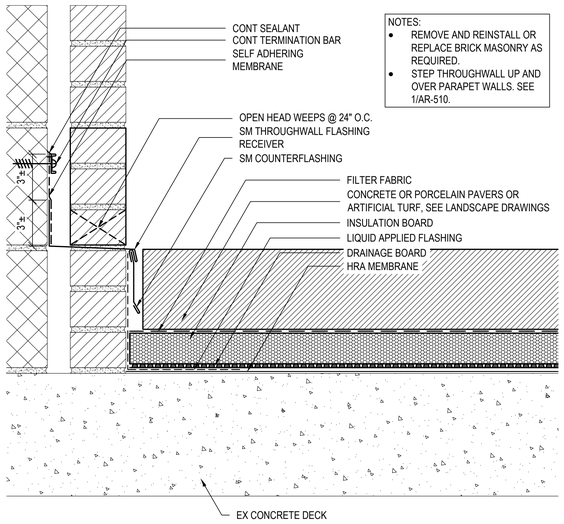
NOTES:
- CONSTRUCT AREA DIVIDERS TO A HEIGHT REQUIRED FOR MINIMUM 8" BASE FLASHING HEIGHT.
- SEE 3/AR-510 FOR TRANSITION AT EDGE AND 4/AR-510 FOR TRANSITION AT CURBS.

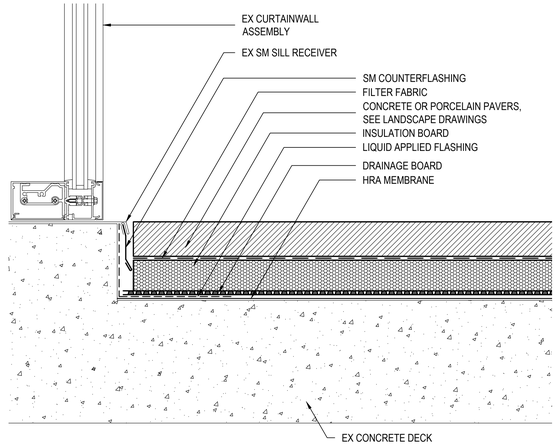


1 / AR-504 AREA DIVIDER
SCALE: 3" = 1'

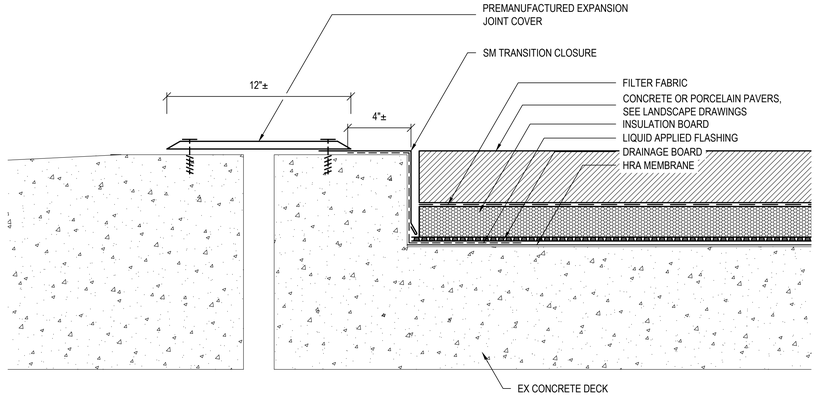
NOTES:
- REMOVE AND REINSTALL OR REPLACE BRICK MASONRY AS REQUIRED.
- STEP THROUGHWALL UP AND OVER PARAPET WALLS. SEE 1/AR-510.



2 / AR-504 THROUGHWALL FLASHING AT TERRACES
SCALE: 3" = 1'

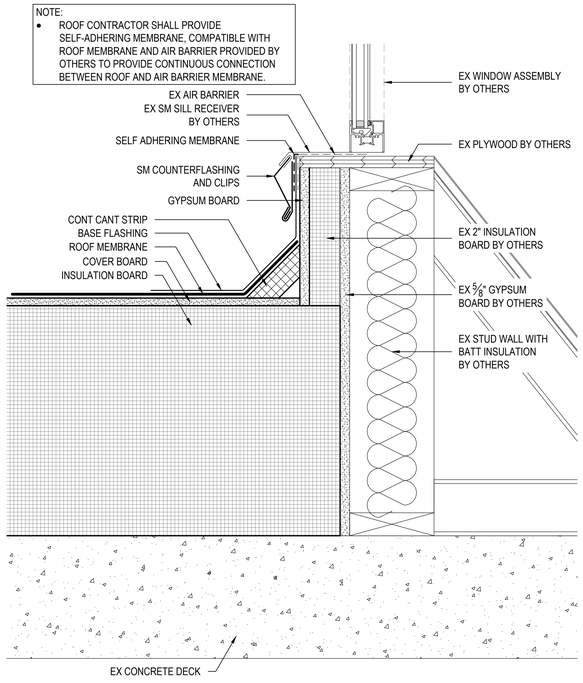


3 / AR-504 ROOF TO CURTAINWALL AT TERRACES
SCALE: 3" = 1'



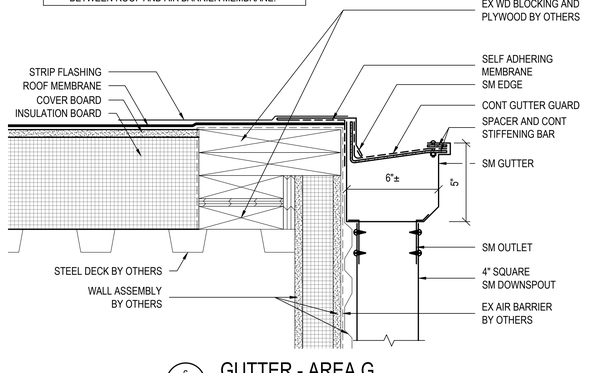
4 / AR-504 TRANSITION TO RAMP
SCALE: 3" = 1'

NOTE:
- ROOF CONTRACTOR SHALL PROVIDE SELF-ADHERING MEMBRANE, COMPATIBLE WITH ROOF MEMBRANE AND AIR BARRIER PROVIDED BY OTHERS TO PROVIDE CONTINUOUS CONNECTION BETWEEN ROOF AND AIR BARRIER MEMBRANE.



5 / AR-504 ROOF TO WALL - AREAS A TO G
SCALE: 3" = 1'

NOTE:
- ROOF CONTRACTOR SHALL PROVIDE SELF-ADHERING MEMBRANE, COMPATIBLE WITH ROOF MEMBRANE AND AIR BARRIER PROVIDED BY OTHERS TO PROVIDE CONTINUOUS CONNECTION BETWEEN ROOF AND AIR BARRIER MEMBRANE.



6 / AR-504 GUTTER - AREA G
SCALE: 3" = 1'

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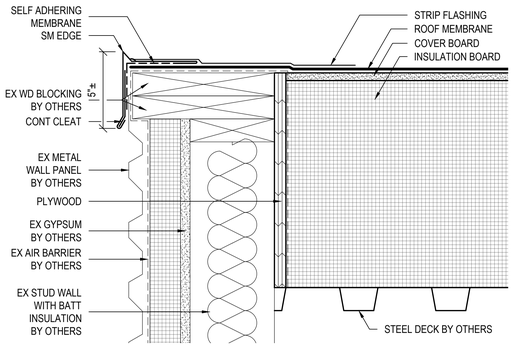
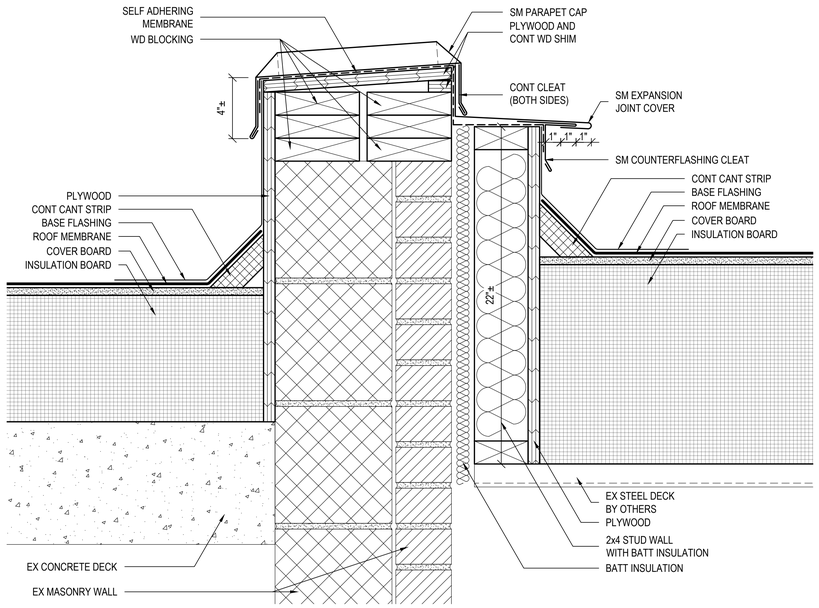
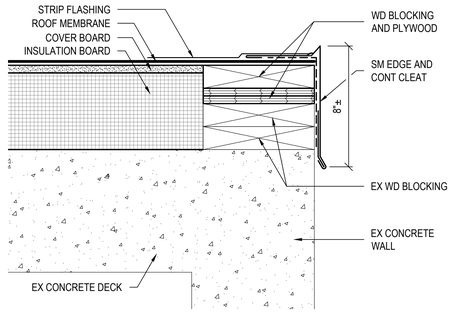


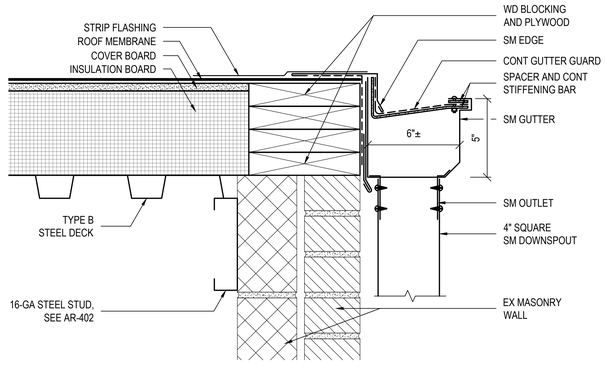
1 AR-505 PARAPET - AREA G
SCALE: 3" = 1'



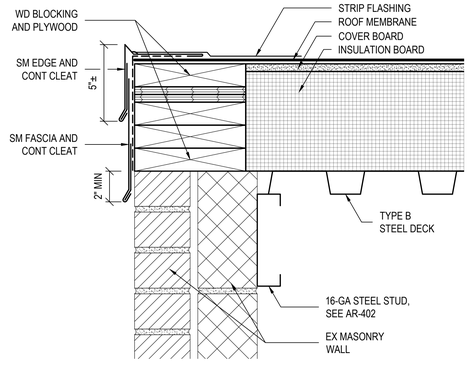
2 AR-505 TRANSITION - AREAS E TO G
SCALE: 3" = 1'



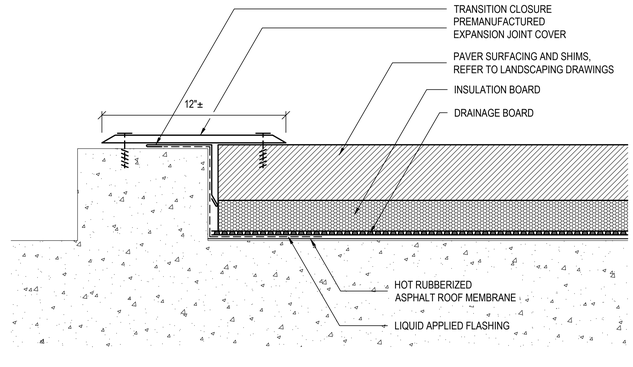
3 AR-505 EDGE - AREA F
SCALE: 3" = 1'



4 AR-505 GUTTER EDGE - AREA H
SCALE: 3" = 1'



5 AR-505 EDGE - AREA H
SCALE: 3" = 1'



6 AR-505 TERRACE TRANSITION TO STAIR
SCALE: 3" = 1'

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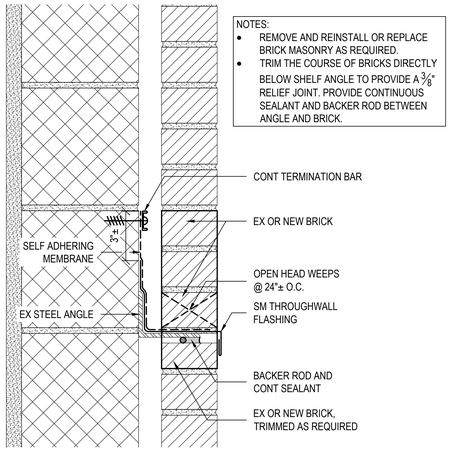
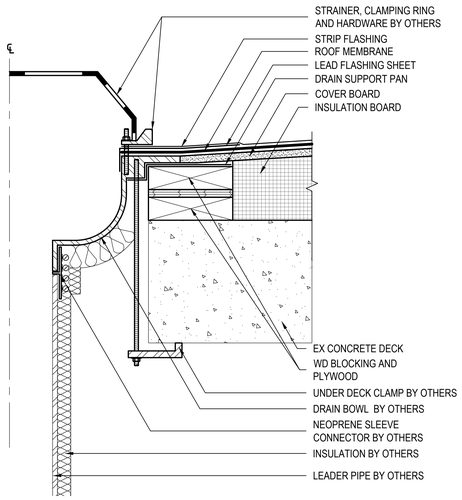
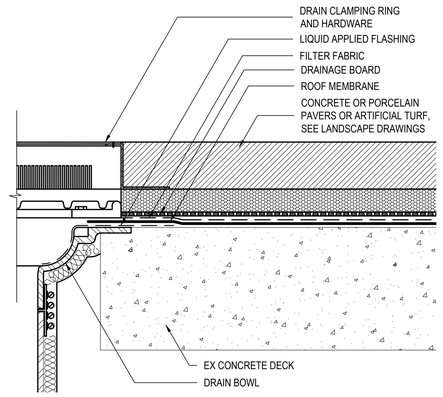


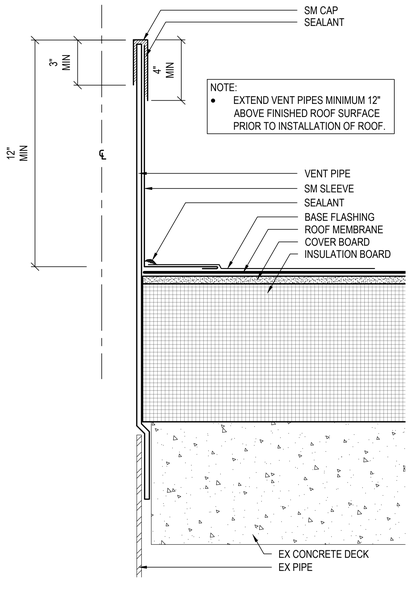
1 AR-506 THROUGHWALL FLASHING AT SHELF ANGLE
SCALE: 3" = 1'



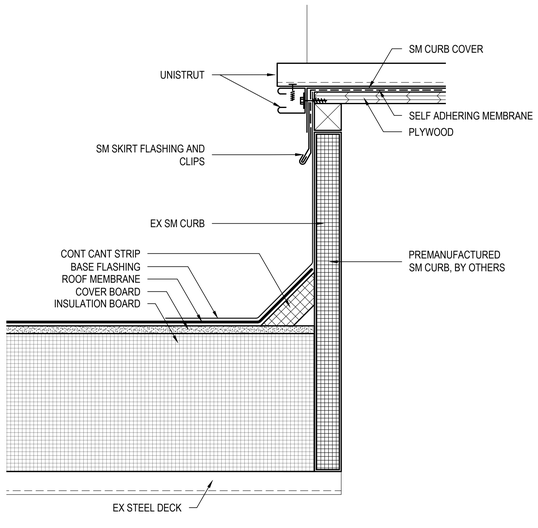
2 AR-506 ROOF DRAIN
SCALE: 3" = 1'



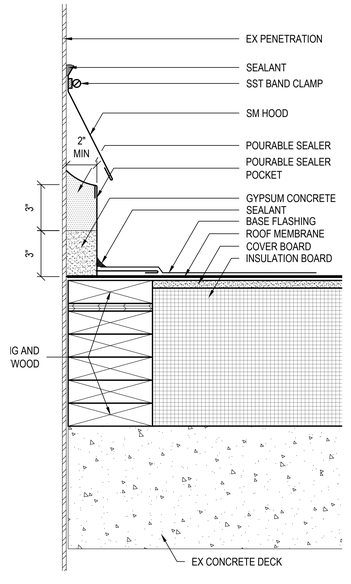
3 AR-506 ROOF DRAIN, INVERTED ASSEMBLY
SCALE: 3" = 1'



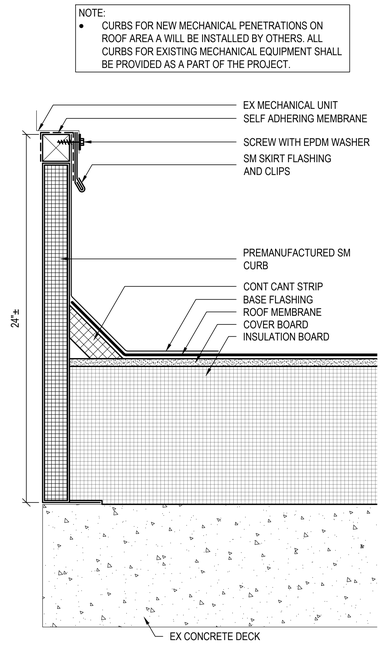
4 AR-506 VENT PIPE
SCALE: 3" = 1'



5 AR-506 CONDENSER UNIT
SCALE: 3" = 1'



6 AR-506 POURABLE SEALER POCKET
SCALE: 3" = 1'



7 AR-506 FAN/VENT CURB
SCALE: 3" = 1'

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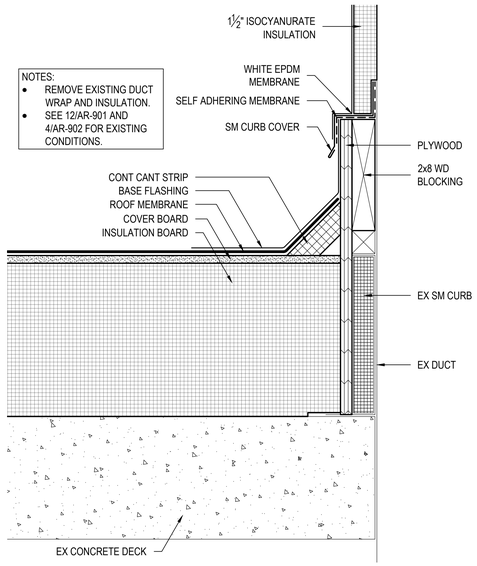
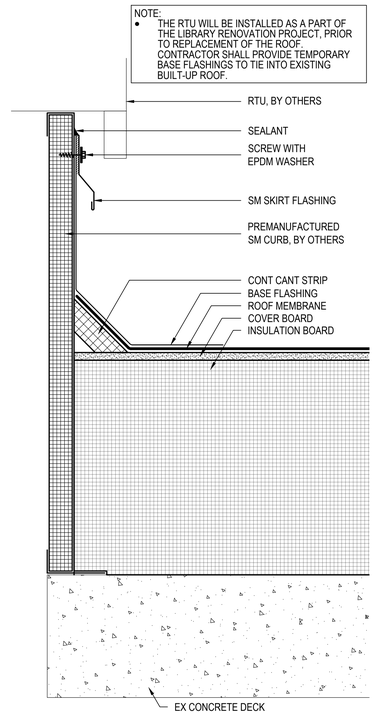
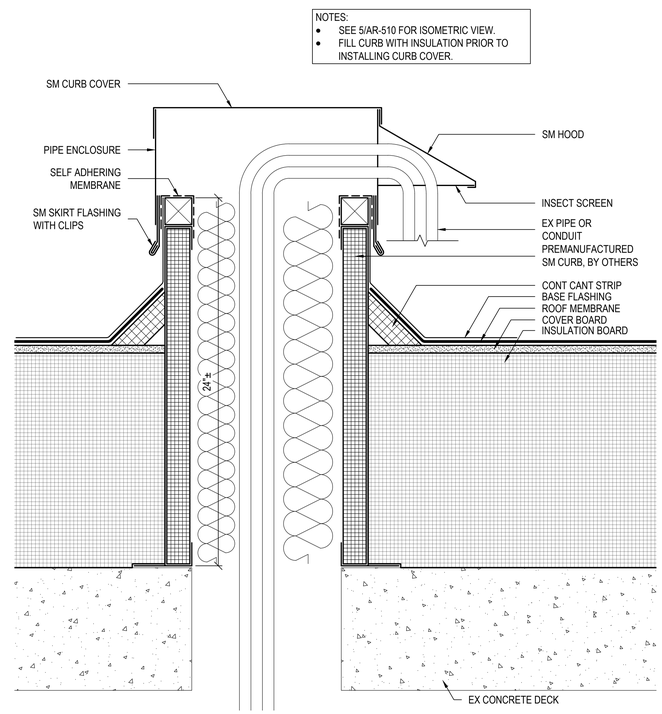


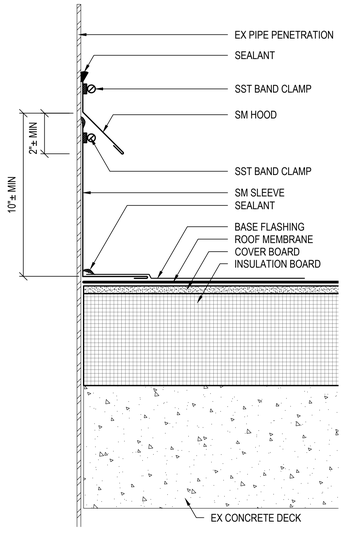
1 AR-507 DUCT PENETRATION
SCALE: 3" = 1'



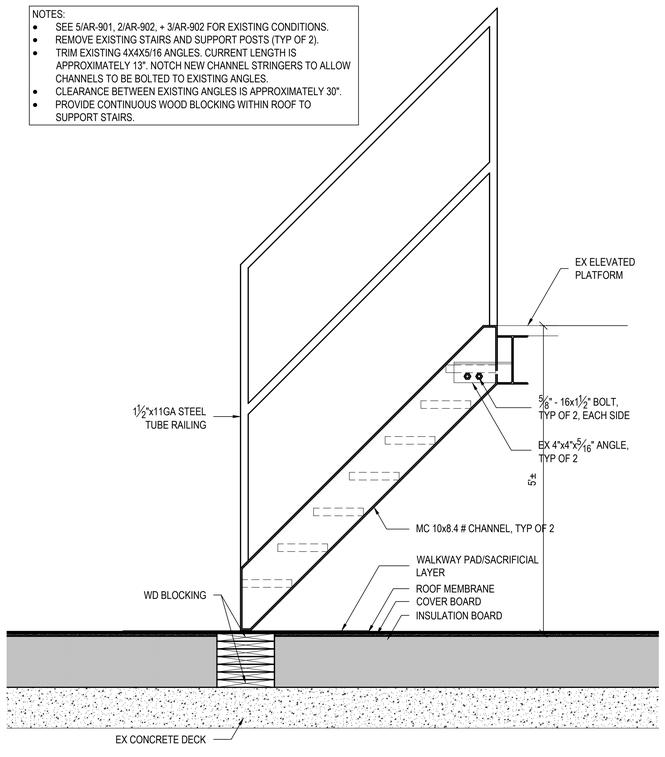
2 AR-507 RTU CURB
SCALE: 3" = 1'



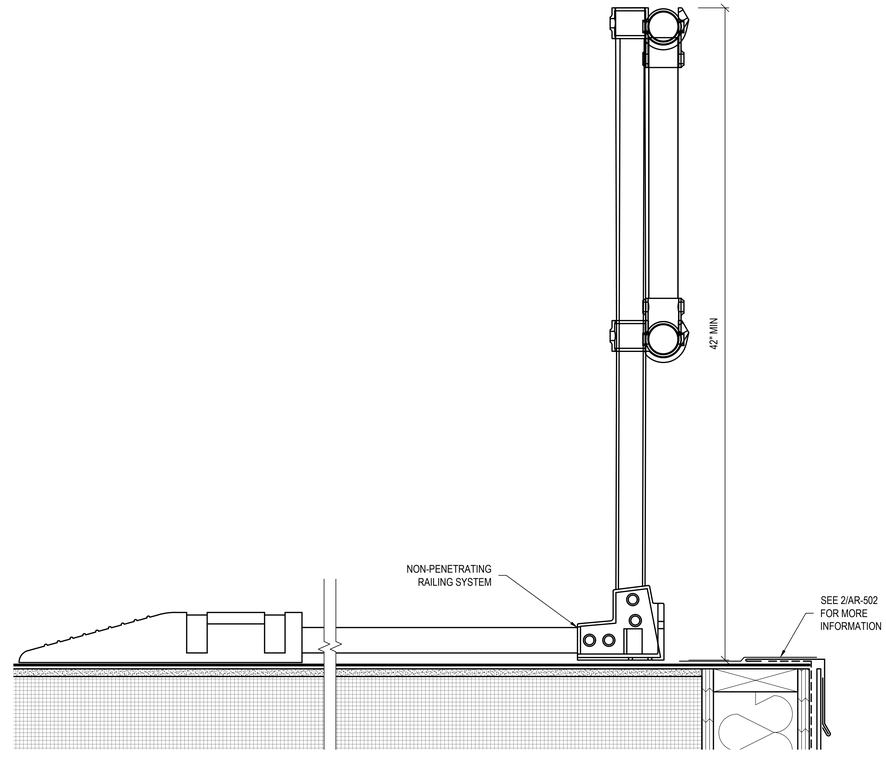
3 AR-507 MULTI-PIPE PENETRATION
SCALE: 3" = 1'



4 AR-507 PIPE PENETRATION
SCALE: 3" = 1'



5 AR-507 STAIRS
SCALE: 1" = 1'



6 AR-507 NON-PENETRATING RAILING
SCALE: 3" = 1'

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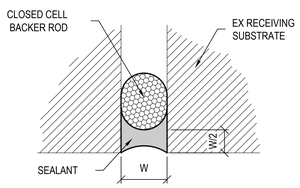
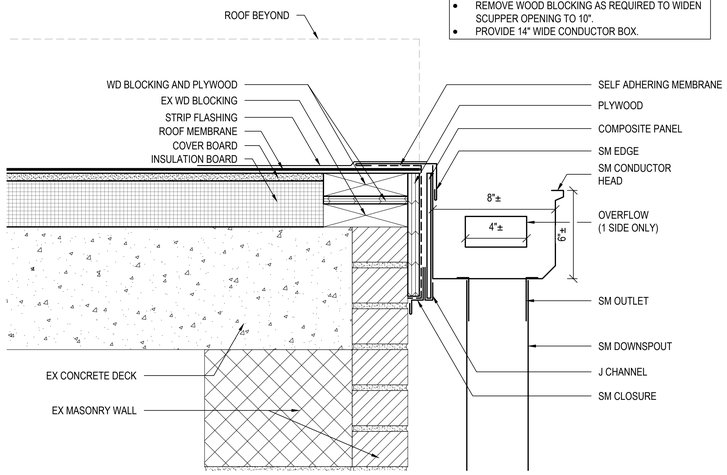
NOTE:
- SAWCUT JOINTS TO ½" WIDTH MINIMUM.



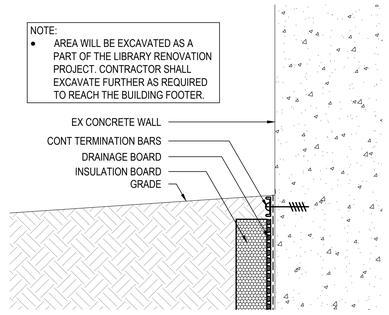
1 AR-508 VERTICAL SEALANT JOINT
SCALE: NOT TO SCALE

NOTES:
- REMOVE WOOD BLOCKING AS REQUIRED TO WIDEN SCUPPER OPENING TO 10".
- PROVIDE 14" WIDE CONDUCTOR BOX.



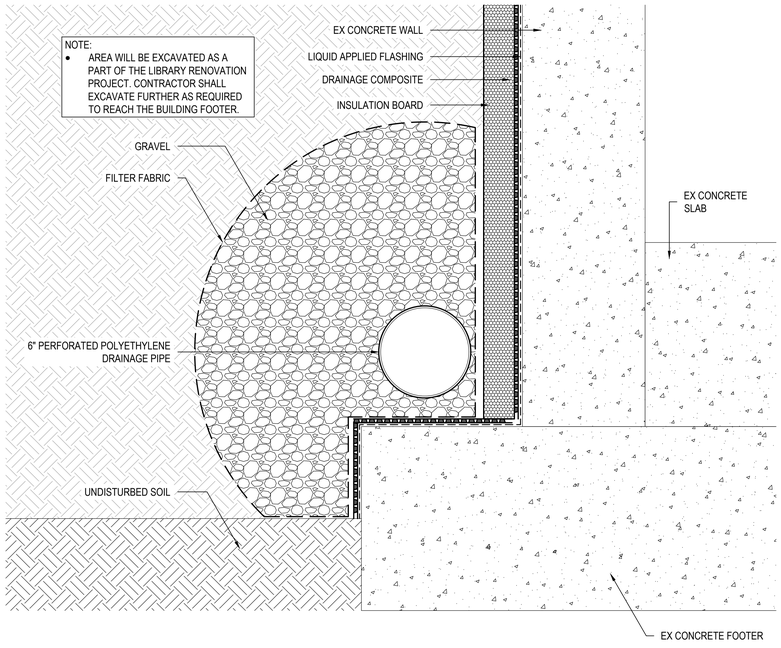
2 AR-508 SCUPPER/CONDUCTOR HEAD - AREA C
SCALE: 3" = 1'

NOTE:
- AREA WILL BE EXCAVATED AS A PART OF THE LIBRARY RENOVATION PROJECT. CONTRACTOR SHALL EXCAVATE FURTHER AS REQUIRED TO REACH THE BUILDING FOOTER.

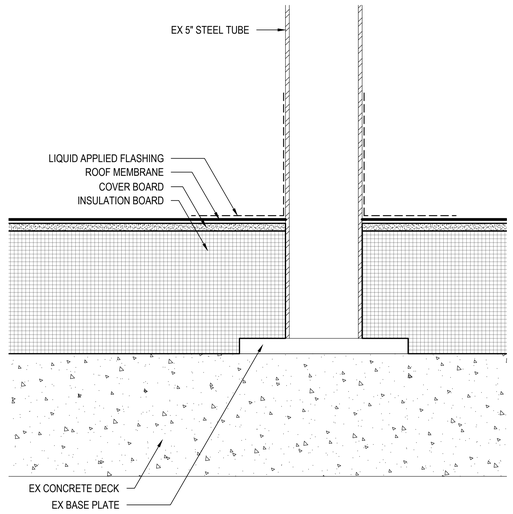


3 AR-508 WATERPROOFING TERMINATION AT GRADE (ADD ALTERNATE)
SCALE: 3" = 1'

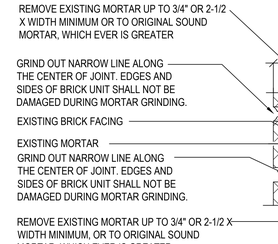
NOTE:
- AREA WILL BE EXCAVATED AS A PART OF THE LIBRARY RENOVATION PROJECT. CONTRACTOR SHALL EXCAVATE FURTHER AS REQUIRED TO REACH THE BUILDING FOOTER.



4 AR-508 WATERPROOFING TERMINATION AT FOOTER (ADD ALTERNATE)
SCALE: 3" = 1'



5 AR-508 SQUARE TUBE PENETRATION
SCALE: 3" = 1'



NOTE:
- SURFACE OF MORTAR CAN BE TOOLED WITH A SOFT BRUSH TO MATCH WEATHERED PROFILE OF ORIGINAL SURROUNDING JOINTS.

6 AR-508 TYPICAL MORTAR JOINT POINTING PROCEDURE
SCALE: NOT TO SCALE

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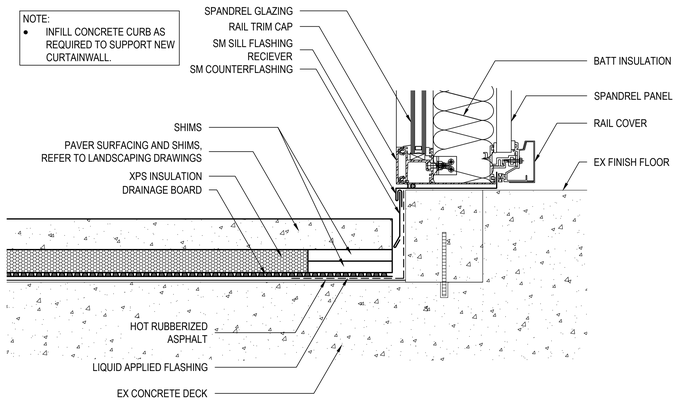
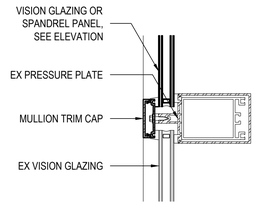


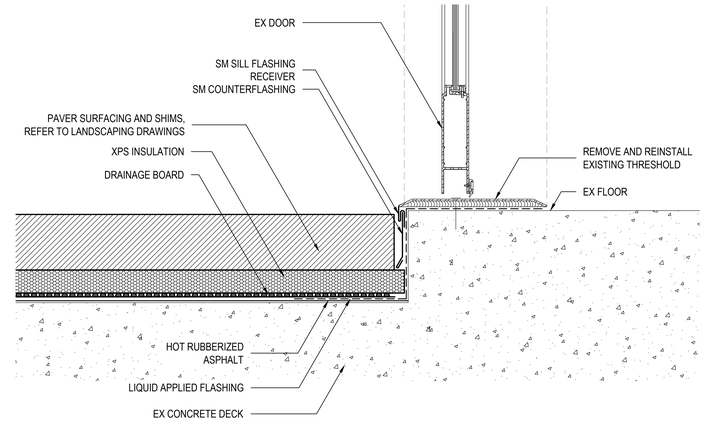
1 AR-509 CURTAIN WALL SILL AT INFILL - TERRACE 3

SCALE: 3" = 1'



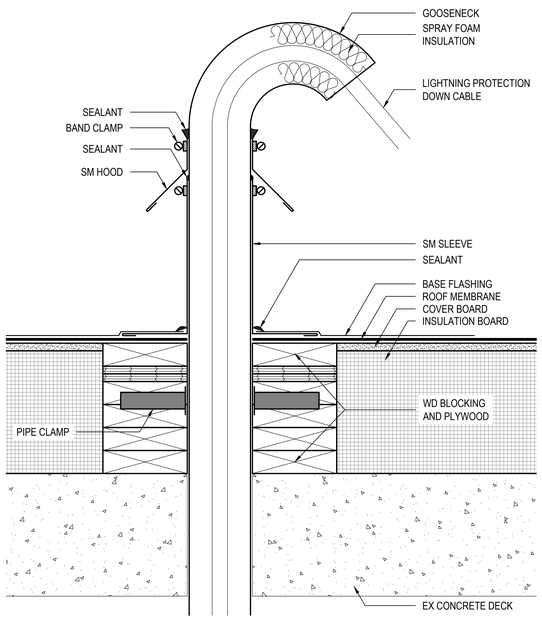
2 AR-509 MULLION AT CURTAINWALL INFILL - TERRACE 3

SCALE: 3" = 1'



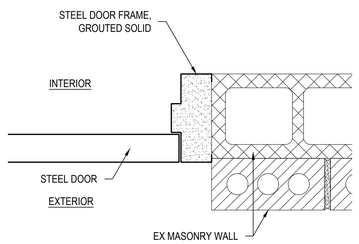
3 AR-509 TERRACE DOOR SILL

SCALE: 3" = 1'



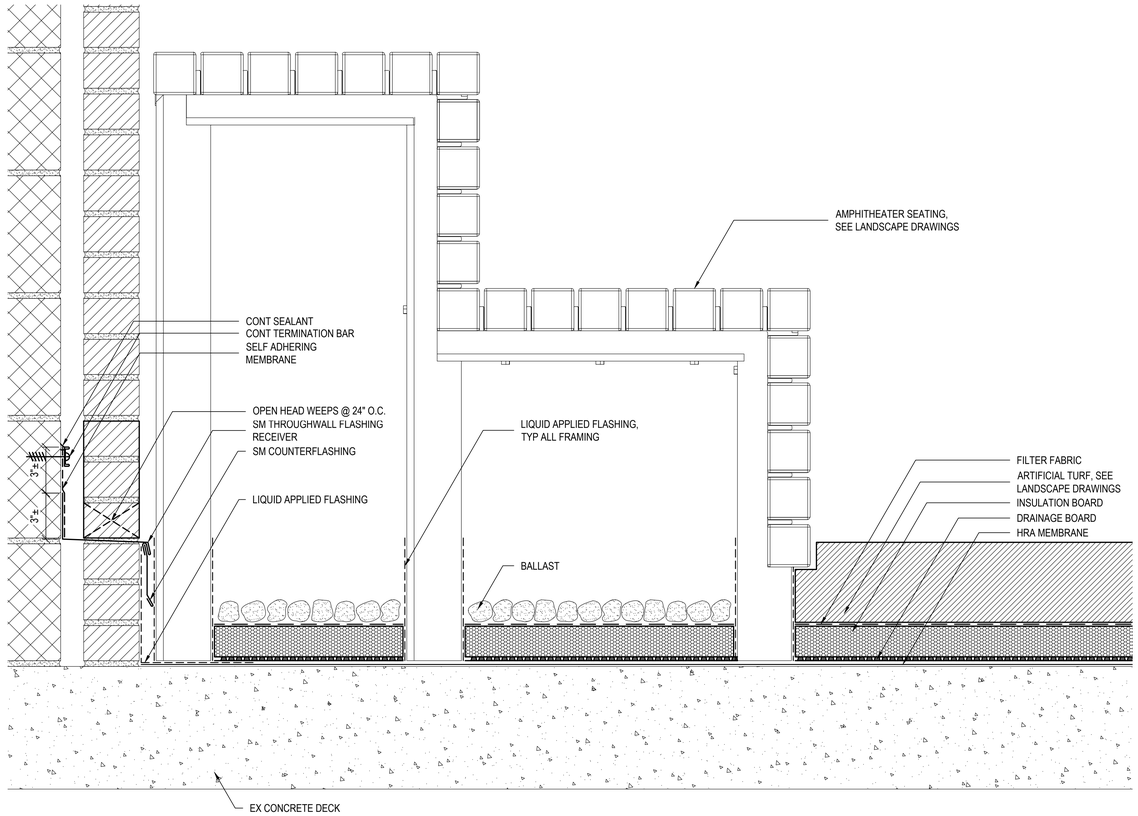
4 AR-509 GOOSENECK

SCALE: 3" = 1'



5 AR-509 DOOR JAMB

SCALE: 3" = 1'



6 AR-509 AMPHITHEATER SEATING

SCALE: 3" = 1'

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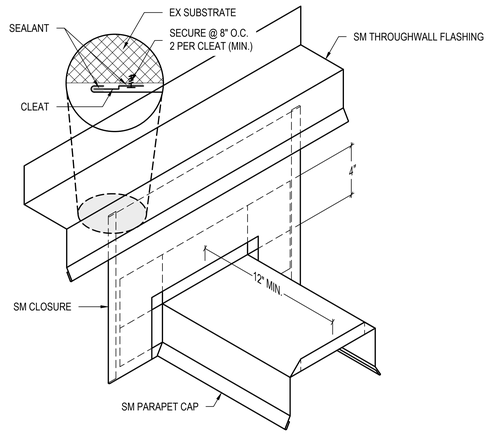
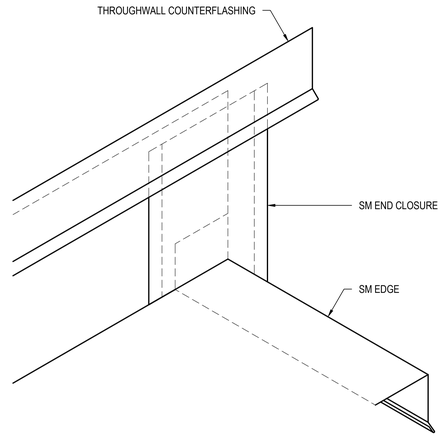


1 AR-510 PARAPET CAP AT WALL
SCALE: NOT TO SCALE



2 AR-510 END CLOSURE
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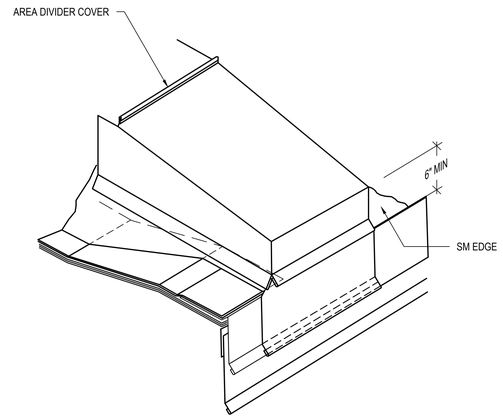
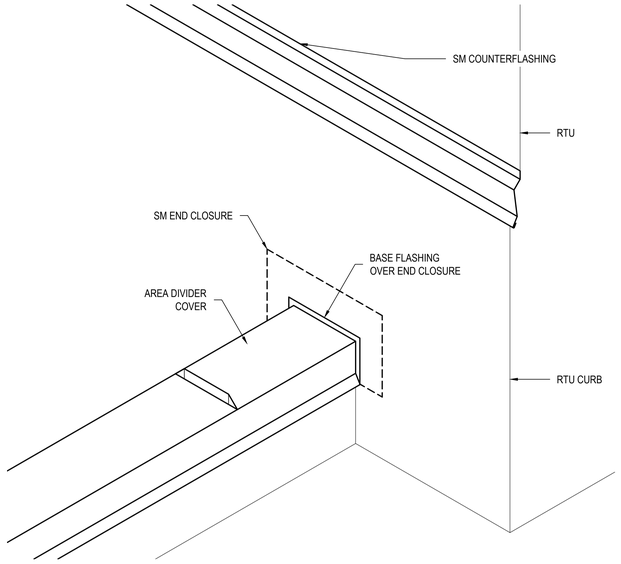
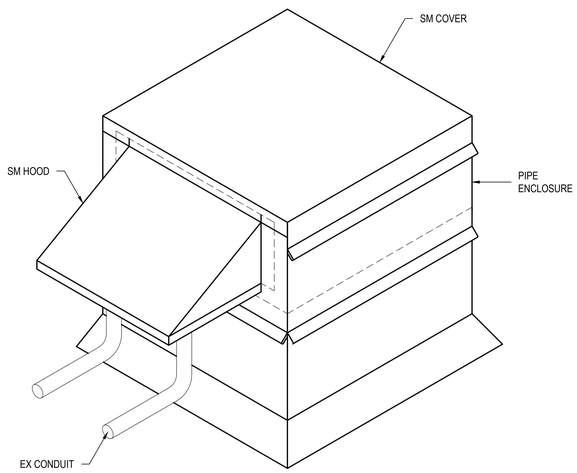


3 AR-510 AREA DIVIDER TO EDGE TRANSITION
SCALE: NOT TO SCALE



4 AR-510 AREA DIVIDER TO CURB
SCALE: NOT TO SCALE



5 AR-510 MULTI-PIPE PENETRATION
SCALE: NOT TO SCALE

NOTES

- ISOMETRIC DETAILS ARE PROVIDED FOR TO CONVEY ADDITIONAL INFORMATION RELATED TO MATERIAL CONNECTIONS OR ASSEMBLY WHERE NEEDED OR REQUIRED AT TRANSITIONS.
- REFER TO DETAIL DRAWINGS SPECIFICATIONS FOR REQUIRED MATERIALS.
- SCALE, REFERENCES AND NOTES ARE FOR CONCEPTUAL PURPOSES ONLY.
- ACTUAL CONFIGURATIONS AND TRANSITIONS MAY DIFFER WITH VARYING SITE CONDITIONS. FIELD VERIFY ALL DIMENSIONS PRIOR TO FABRICATION.

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1 AR-901 WINDOW WASHING ANCHORS
SCALE: NONE

2 AR-901 OBSERVATION PLATFORM
SCALE: NONE

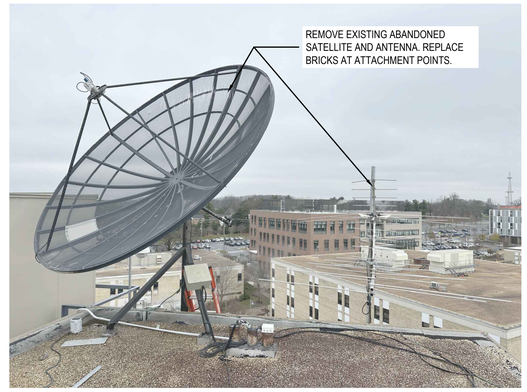
3 AR-901 OBSERVATION PLATFORM
SCALE: NONE

4 AR-901 OBSERVATION PLATFORM
SCALE: NONE

5 AR-901 ELEVATED RTU STAIR
SCALE: NONE

6 AR-901 ABANDONED CURB
SCALE: NONE

7 AR-901 RTU FRAMING AT WALL
SCALE: NONE



8 AR-901 SATELLITE
SCALE: NONE

9 AR-901 CURTAINWALL REPAIRS
SCALE: NONE

10 AR-901 SHELF ANGLE
SCALE: NONE

11 AR-901 TERRACE 3 DOORS
SCALE: NONE

12 AR-901 DUCTWORK - AREA B
SCALE: NONE

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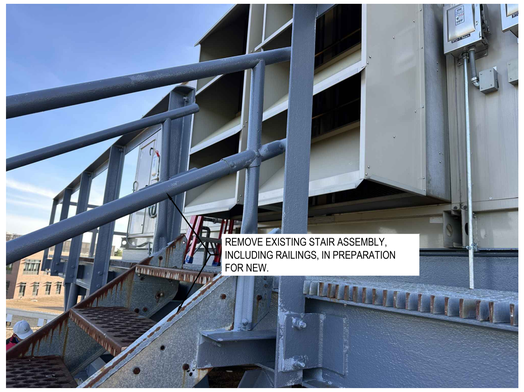
1 AR-902 **LOUVER VENT**
SCALE: NONE

2 AR-902 **STEEL STAIRS**
SCALE: NONE



3 AR-902 **STEEL STAIRS**
SCALE: NONE

4 AR-902 **DUCT WORK**
SCALE: NONE

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MC PROJECT # FP24-021 / BUILDING # 206

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Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.

License No. 36513, Expiration Date: 3/27/2027

Δ	DATE	DESCRIPTION

Project Number:	FP24-021
Drawn By:	MLF
Checked By:	SLB
Sheet Issue Date:	8/29/2025

Drawing
PARTIAL ROOF AREA PLAN
EXISTING CONDITIONS

AR-902

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GENERAL NOTES:

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B. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

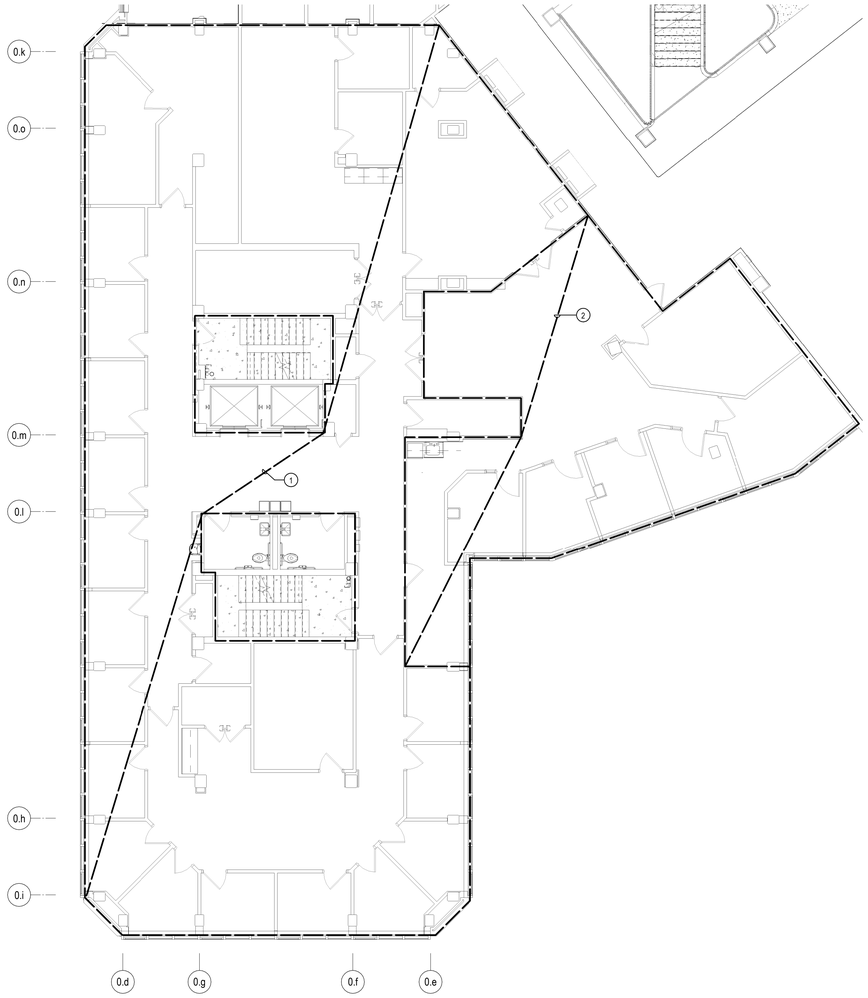
SPECIFIC NOTES:

(1) SALVAGE SPRINKLER HEADS AND MODIFY BRANCH SPRINKLER PIPING AS REQUIRED TO PROVIDE SPRINKLER COVERAGE IN ACCORDANCE WITH NFPA 13 & FM GLOBAL FOR THE INDICATED AREA OF WORK; RE-INSTALL EXISTING SPRINKLER HEADS WITHIN NEW CEILINGS.

(2) MODIFY BRANCH SPRINKLER PIPING AND PROVIDE NEW SPRINKLER HEADS AS REQUIRED TO PROVIDE SPRINKLER COVERAGE IN ACCORDANCE WITH NFPA 13 & FM GLOBAL FOR THE INDICATED AREA OF WORK.

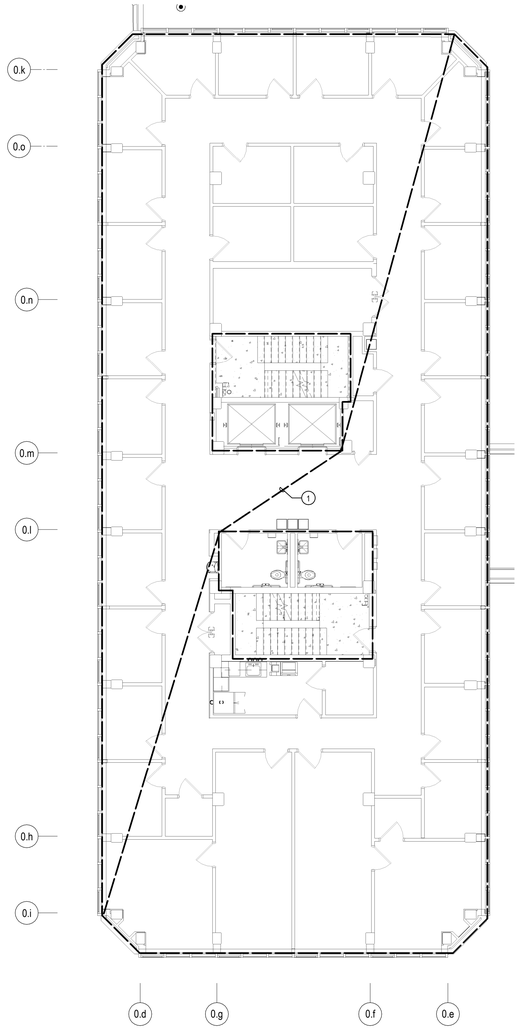
FIRE PROTECTION DESIGN CRITERIA

1. THE EXISTING BUILDING IS PROVIDED WITH AN EXISTING COMPLETE AUTOMATIC FIRE PROTECTION SYSTEM. MODIFICATIONS TO THE EXISTING SPRINKLER SYSTEM SHALL BE IN COMPLIANCE WITH NFPA-13 & FM GLOBAL, MAINTAINING THE EXISTING BUILDING'S FULLY SPRINKLERED CLASSIFICATION.
2. THE PIPING ARRANGEMENT, HEAD LOCATIONS, AND SIZING SHALL BE BY THE CONTRACTOR IN ACCORDANCE WITH NFPA 13, FM GLOBAL, AND AS INDICATED ON THE CONTRACT DRAWINGS AND SPECIFICATIONS.
3. THE CONTRACTOR SHALL COORDINATE THE SPRINKLER SYSTEM WITH ALL ARCHITECTURAL, STRUCTURAL, MECHANICAL, AND ELECTRICAL BUILDING COMPONENTS. DO NOT LOCATE PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.
4. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR CEILING TYPES, CONFIGURATIONS, AND HEIGHTS.
5. THE SYSTEM SHALL BE HYDRAULICALLY CALCULATED. HYDRAULIC CALCULATIONS SHALL BE BASED ON A MINIMUM FLOW FOR THE MOST HYDRAULICALLY DEMANDING AREA IN ACCORDANCE WITH NFPA 13, FM GLOBAL, AND AVAILABLE SITE WATER PRESSURE/FLOW.
6. HAZARD CLASSIFICATIONS FOR ALL AREAS SHALL NOT BE LESS THAN REQUIRED BY THE AUTHORITY HAVING JURISDICTION. AS A MINIMUM REQUIREMENT, ALL AREAS SHALL BE CLASSIFIED AS LIGHT HAZARD, EXCEPT THE FOLLOWING WHICH SHALL BE CLASSIFIED AS ORDINARY HAZARD (UNLESS OTHERWISE DESIGNATED BY AUTHORITIES HAVING JURISDICTION OR AS INDICATED ON PLANS);
   A. STORAGE ROOMS
   B. ELECTRICAL, TELEPHONE AND DATA ROOMS
   C. JANITOR CLOSETS
7. PROVIDE GUARDS ON SPRINKLER HEADS IN STORAGE ROOMS, ELECTRICAL ROOMS, AND JANITORS CLOSETS. GUARDS ARE ALSO REQUIRED ON ANY HEADS WITHIN 7'-6" OF FINISH FLOOR.
8. WHEN DESIGNING THE SPRINKLER SYSTEM, THE CONTRACTOR SHALL PIERCE FIRE RATED WALLS ONLY ONCE WITH PIPING. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.
9. HEADS SHALL BE LOCATED IN THE CENTER OF CEILING TILES.
10. SPRINKLER MAINS SHALL NOT BE LOCATED IN ELECTRICAL ROOMS. SPRINKLER PIPING AND HEADS SHALL NOT BE LOCATED ABOVE ELECTRICAL GEAR.
11. THE CONTRACTOR SHALL PROVIDE THE LAYOUT OF SPRINKLERS FOR THE INDICATED AREA OF WORK AND SUBMIT TO THE ARCHITECT FOR APPROVAL BEFORE PROCEEDING WITH FINAL DESIGN AND CALCULATIONS.
12. ALL EXPOSED PIPE SHALL BE PAINTED.



PART SECOND FLOOR PLAN - FIRE PROTECTION

SCALE: 1/8" = 1'-0"



PART FOURTH FLOOR PLAN - FIRE PROTECTION

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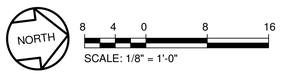

SCALE: 1/8" = 1'-0"

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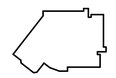
JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:



Drawing
PART SECOND AND FOURTH FLOOR PLANS - FIRE PROTECTION

F101

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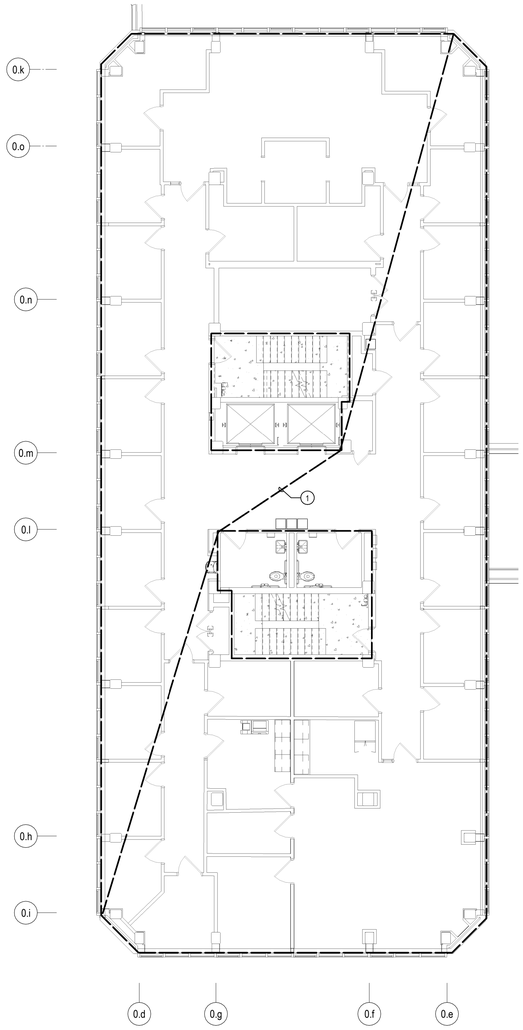
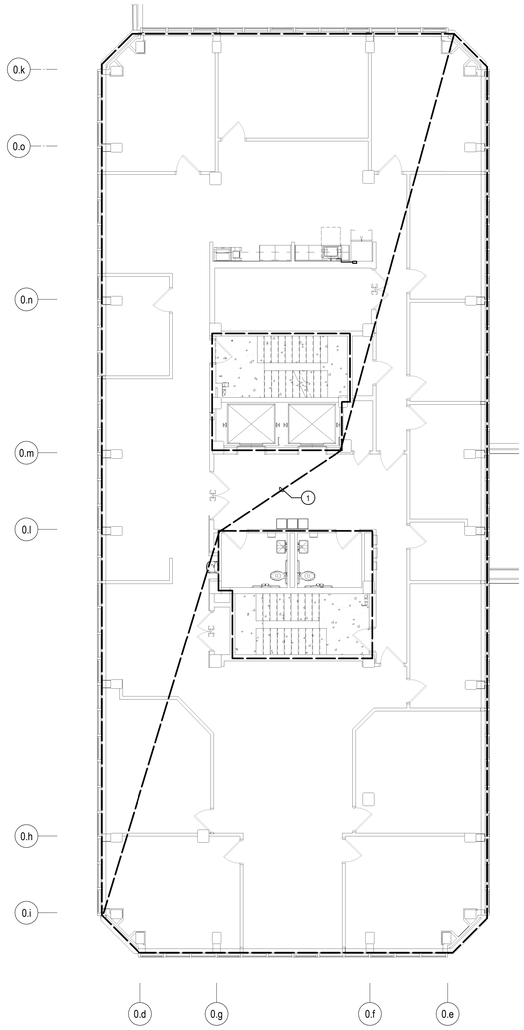


PART FIFTH FLOOR PLAN - FIRE PROTECTION

SCALE: 1/8" = 1'-0"



PART SIXTH FLOOR PLAN - FIRE PROTECTION

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SPECIFIC NOTES:

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LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing
PART FIFTH AND SIXTH FLOOR PLANS - FIRE PROTECTION

F102

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SCALE: 1/8" = 1'-0"

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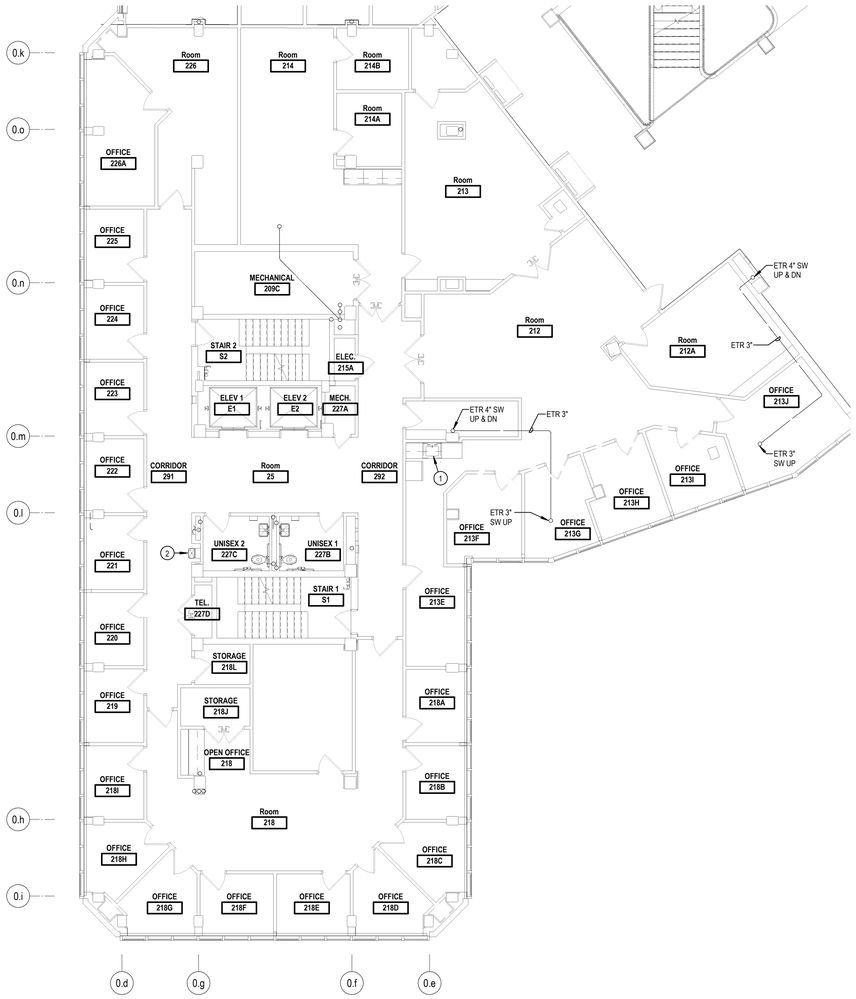
B. DEMOLITION SHALL INCLUDE REMOVAL AND OFF-SITE DISPOSAL OF MATERIALS. DO NOT ABANDON IN PLACE ANY MECHANICAL AND RELATED ELECTRICAL COMPONENTS UNLESS OTHERWISE NOTED ON DRAWINGS.

C. UNLESS OTHERWISE NOTED, MECHANICAL/PLUMBING ITEMS SHOWN HEAVY DASHED (– – –) SHALL BE REMOVED AND MECHANICAL/ PLUMBING ITEMS SHOWN LIGHT SOLID (——) SHALL REMAIN.

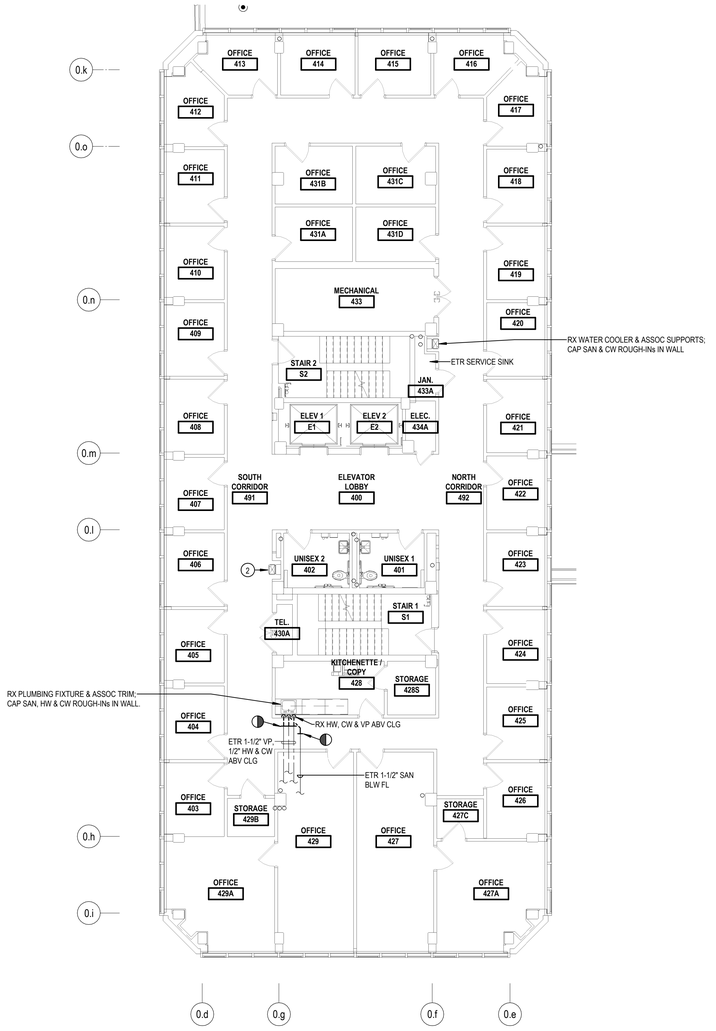
SPECIFIC NOTES:

1. RX COUNTERTOP SINK WITH ASSOC TRIM; EX SAN, HW & CW ROUGH-INs TO REMAIN
2. RX WATER COOLER & ASSOC SUPPORTS; EX SAN & CW ROUGH-INs TO REMAIN



PART SECOND FLOOR PLAN - PLUMBING- DEMOLITION

SCALE: 1/8" = 1'-0"



PART FOURTH FLOOR PLAN - PLUMBING - DEMOLITION

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JPA Project No.: 8091-24

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Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing
PART SECOND AND FOURTH FLOOR PLANS - PLUMBING - DEMOLITION

PD101

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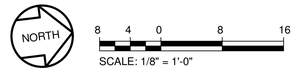

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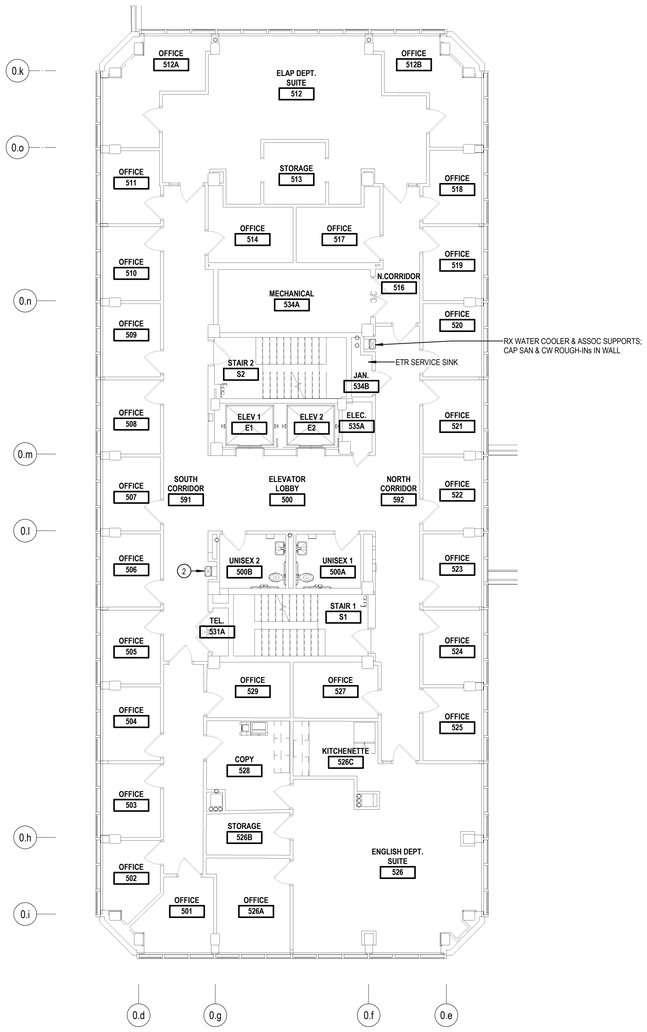

PART FIFTH FLOOR PLAN - PLUMBING - DEMOLITION

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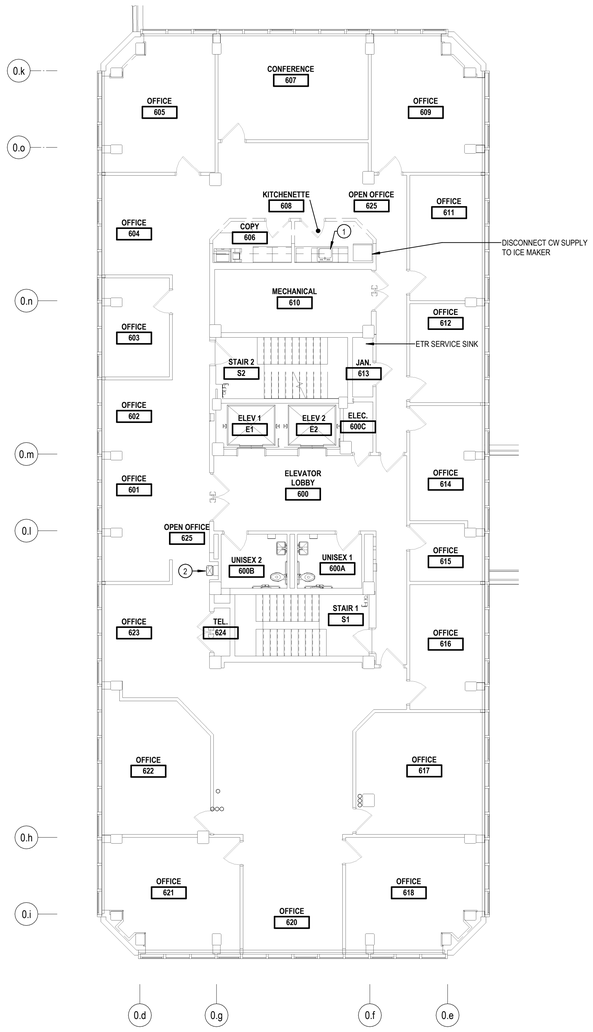

PART SIXTH FLOOR PLAN - PLUMBING - DEMOLITION

SCALE: 1/8" = 1'-0"

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SPECIFIC NOTES:

1. RX COUNTERTOP SINK WITH ASSOC TRIM; EX SAN, HW & CW ROUGH-INs TO REMAIN
2. RX WATER COOLER & ASSOC SUPPORTS; EX SAN & CW ROUGH-INs TO REMAIN

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JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing

PART FIFTH AND SIXTH FLOOR PLANS - PLUMBING - DEMOLITION

PD102

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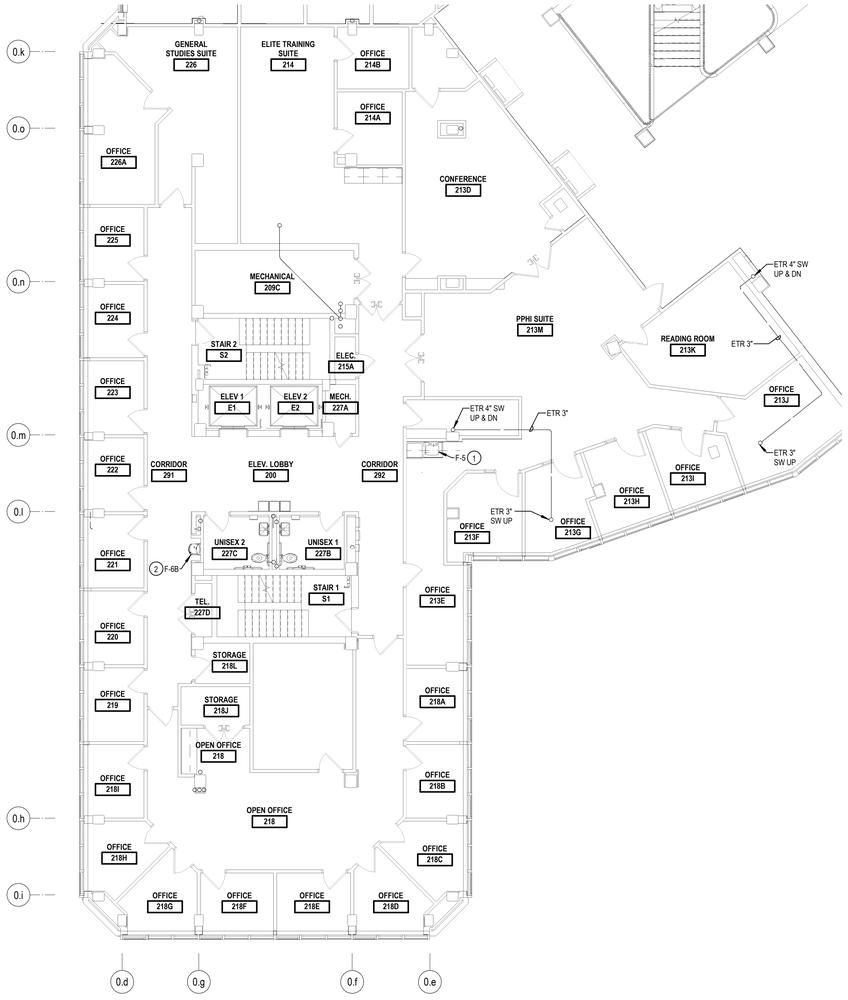
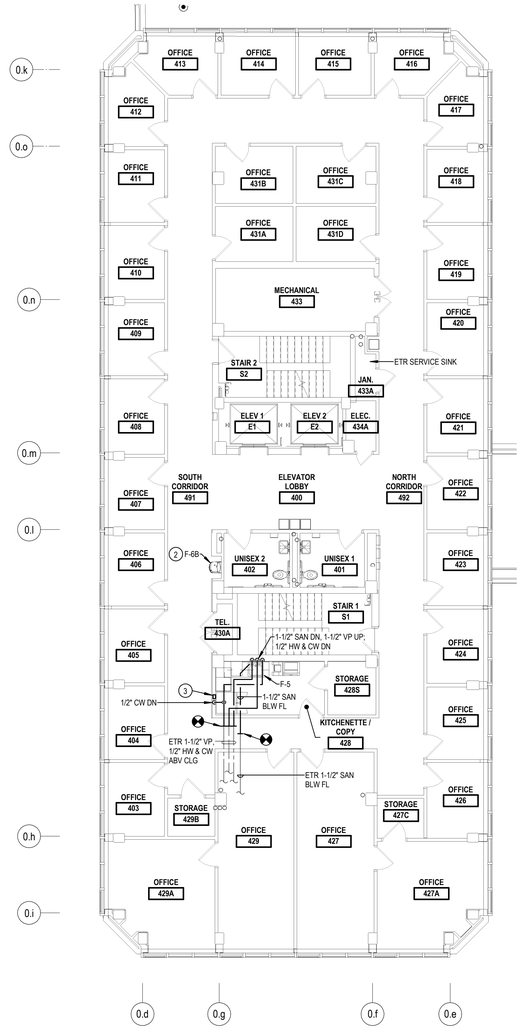


PART SECOND FLOOR PLAN - PLUMBING - NEW WORK

SCALE: 1/8" = 1'-0"



PART FOURTH FLOOR PLAN - PLUMBING - NEW WORK

SCALE: 1/8" = 1'-0"

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B. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

SPECIFIC NOTES:

1. RECONNECT TO ETR SAN, HW & CW ROUGH-INs
2. RECONNECT TO ETR ETR SAN & CW ROUGH-INs
3. COLD WATER SUPPLY BOX; EQUAL TO GUY GRAY

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JPA Project No.: 8091-24

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Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing
PART SECOND AND FOURTH FLOOR PLANS - PLUMBING - NEW WORK

P101

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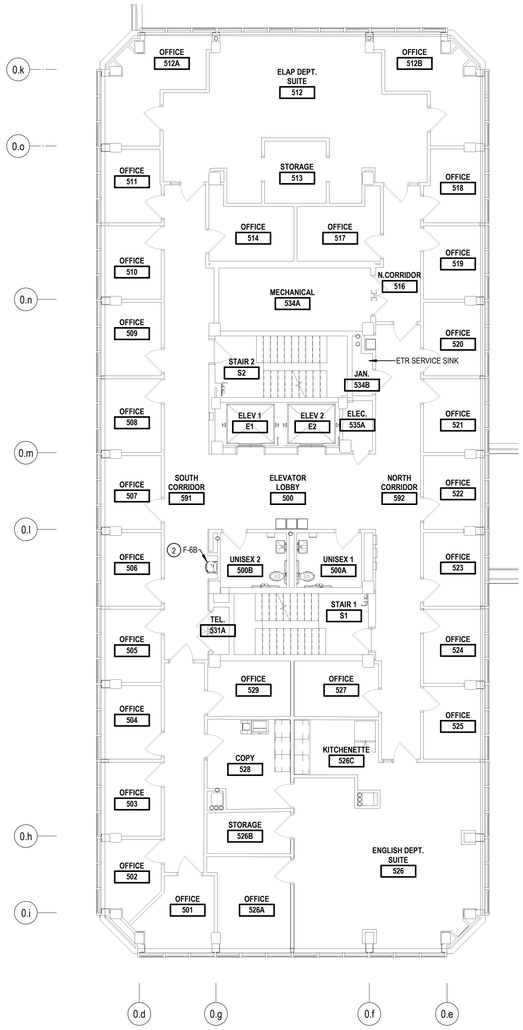
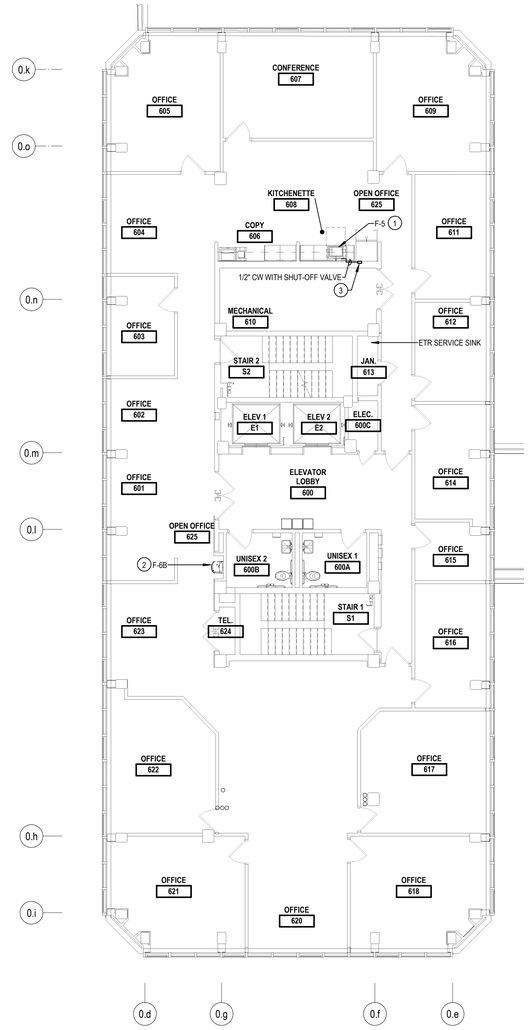


PART FIFTH FLOOR PLAN - PLUMBING - NEW WORK

SCALE: 1/8" = 1'-0"



PART SIXTH FLOOR PLAN - PLUMBING - NEW WORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

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B. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

SPECIFIC NOTES:

1. RECONNECT TO ETR SAN, HW & CW ROUGH-INs
2. RECONNECT TO ETR ETR SAN & CW ROUGH-INs
3. COLD WATER SUPPLY BOX; EQUAL TO GUY GRAY

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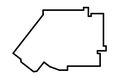
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:



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PART FIFTH AND SIXTH FLOOR PLANS - PLUMBING - NEW WORK

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NORTH

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SCALE: 1/8" = 1'-0"

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PLUMBING FIXTURE ROUGH-IN SCHEDULE

DESIG	TYPE OF FIXTURE	MOUNTING	ADA	FLOW RATES	OPERATION		ROUGH-IN CONNECTIONS				NOTES
					MANUAL	SENSOR	CW	HW	TW	SAN	
F-5	KITCHENETTE SINK	COUNTER	X	0.5 GPM	X		1/2"	1/2"	1/2"	1 1/2"	1,2,4
F-6B	WATER COOLER W/ BOTTLE FILLER	WALL	X	0.5 GPM/1.1 GPM	X		1/2"	-	-	1 1/2"	4

NOTES:

1. ALL TRAPS SHALL BE THREADED CAST BRASS WITH CLEANOUT PLUG.
2. LAVATORY AND/OR SINK SHALL BE SUPPLIED TEMPERED WATER THROUGH A THERMOSTATIC WATER MIXING VALVE (ASSE 1070); SET AT 100°F.
3. WATERSENSE CERTIFIED.
4. SEE SPECIFICATION SECTION 22 4200 INSTITUTIONAL PLUMBING FIXTURES FOR ADDITIONAL INFORMATION.

PLUMBING SYMBOLS AND ABBREVIATIONS

- SOIL, WASTE, OR SANITARY PIPE
- VENT PIPE
- DOMESTIC COLD WATER PIPE
- DOMESTIC HOT WATER PIPE
- DOMESTIC HOT WATER RETURN PIPE
- PIPE CAP OR PLUG
- SHUT-OFF VALVE
- 3/9 DETAIL OR DIAGRAM NO. 3 SHOWN ON DRAWING NO. 9
- (1) SYMBOL FOR SPECIFIC NOTE. NOTE APPLIES TO DRAWING ON WHICH IT OCCURS.
- DEMOLITION WORK TERMINATION POINT
- POINT OF CONNECTION, NEW TO EXISTING

ABV	ABOVE
BLW	BELOW
CLG	CEILING
CW	DOMESTIC COLD WATER PIPE
FL	FLOOR
HW	DOMESTIC HOT WATER PIPE
HWR	DOMESTIC HOT WATER RETURN PIPE
RX	REMOVE EXISTING
SAN	SANITARY
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
VP	VENT PIPE

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SCHEDULES

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MECHANICAL SYMBOLS AND ABBREVIATIONS

GENERAL

SYMBOL	ABBR.	TYPE OF PIPE
	--	INDICATES PIPING DIAGRAM
	--	DETAIL OR DIAGRAM NO. 3 SHOWN ON DRAWING NO. 9
	--	SECTION NO. 3 FROM DRAWING NO. 7 SHOWN ON DRAWING NO. 9 (ARROW DENOTES SECTION)
	--	POINT OF CONNECTION, NEW TO EXISTING
	--	DEMOLITION WORK TERMINATION POINT
	--	SYMBOL FOR SPECIFIC NOTE. NOTE APPLIES TO DRAWING ON WHICH IT OCCURS.

ø	INDICATES DIAMETER
ABV	ABOVE
AFF	ABOVE FINISHED FLOOR
ALUM	ALUMINUM
APD	AIR PRESSURE DROP
ASSOC	ASSOCIATED
AWT	AVERAGE WATER TEMPERATURE
BLDG	BUILDING
BLW	BELOW
BTM	BOTTOM
BTUH	BRITISH THERMAL UNITS PER HOUR
C	CELSIUS
CFM	CUBIC FEET PER MINUTE
CI	CAST IRON
CLG	CEILING
CONC	CONCRETE
CONN	CONNECT, CONNECTION
CONT'N	CONTINUATION
DB	DRY BULB
DESG	DESIGNATION
DIA	DIAMETER
DWG	DRAWING
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB
ELEV	ELEVATION OR ELEVATOR
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EWB	ENTERING WET BULB
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
EXP	EXPANSION
F	FAHRENHEIT
FL	FLOOR
FPS	FEET PER SECOND
FT	FEET
FT HD	FEET OF HEAD
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
IN	INCH, INCHES
LAT	LEAVING AIR TEMPERATURE
LB(S)	POUND(S)
LDB	LEAVING DRY BULB
LF	LINEAR FEET
LSD	LINEAR SLOT DIFFUSER
LWB	LEAVING WET BULB
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU'S PER HOUR
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MTD	MOUNTED
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OC	ON CENTER
PD	PRESSURE DROP
PSIG	POUNDS PER SQUARE INCH GAUGE
PSI	POUNDS PER SQUARE INCH
REQ'D	REQUIRED
RPM	REVOLUTIONS PER MINUTE
RX	REMOVE EXISTING
SF	SQUARE FEET
S/M	SHEET METAL
SPEC	SPECIFICATION
SQ	SQUARE
S/S	STAINLESS STEEL
STL	STEEL
TEMP	TEMPERATURE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER COLUMN

HVAC PIPING

SYMBOL	ABBR.	ITEM
CR	CR	CHILLED WATER RETURN PIPE
CS	CS	CHILLED WATER SUPPLY PIPE
HR	HR	HEATING WATER RETURN PIPE
HS	HS	HEATING WATER SUPPLY PIPE

PIPE FITTINGS AND VALVES

SYMBOL	ABBR.	ITEM
	--	PIPE CAP OR PLUG
	--	UNION
	--	FLANGED PIPE CONNECTION
	--	PIPE ANCHOR
	--	PIPE GUIDE
	--	FLEXIBLE CONNECTION (PIPING)
	EJ	EXPANSION JOINT
	--	CONCENTRIC REDUCER
	--	ECCENTRIC REDUCER
	--	FLOW DIRECTION ARROW
	--	STRAINER
	SOV	SHUT-OFF VALVE
	--	VALVE IN VERTICAL PIPE
	BV	BALANCING VALVE
	--	GLOBE VALVE
	--	2-WAY AUTOMATIC TEMPERATURE CONTROL (ATC) VALVE
	--	3-WAY AUTOMATIC TEMPERATURE CONTROL (ATC) VALVE
	--	PRESSURE REDUCING VALVE
30 PSI	PRV	PRESSURE RELIEF VALVE (NUMERALS INDICATE SETTING)
	--	GAUGE COCK
	--	VACUUM BREAKER
0°-100° F	--	THERMOMETER (NUMERALS INDICATE GRADUATION RANGE)
5-60 PSI	--	PRESSURE GAUGE (NUMERALS INDICATE GRADUATION RANGE)
F 20 GPM	--	FLOW METER FITTING (METER WHERE NOTED) (NUMERALS INDICATE FLOW REQUIRED)
	AAV	AUTOMATIC AIR VENT
FS	--	FLOW SWITCH
	CV	CHECK VALVE; (ARROWHEAD INDICATES DIRECTION OF FLOW)
T	P/T	PRESSURE - TEMPERATURE PORT

DUCTWORK AND ACCESSORIES

SYMBOL	ABBR.	ITEM
	A/L	ACOUSTICALLY LINED DUCT; (DIMENSIONS SHOWN ARE SHEET METAL SIZE)
	DW	DOUBLE WALL DUCT; (DIMENSIONS SHOWN ARE OUTSIDE DUCT DIMENSIONS)
	MVD	MANUAL VOLUME DAMPER
	F/D	FIRE DAMPER
	F/S	FIRE/SMOKE DAMPER
S	S/D	SMOKE DAMPER
	CAR	CONSTANT AIRFLOW REGULATOR
18"x12"	--	DUCT (SIZE IN INCHES, FIRST FIGURE SIDE SHOWN)
	--	SUPPLY OR OUTDOOR AIR DUCT SECTION
	--	RETURN OR EXHAUST AIR DUCT SECTION
	--	AUTOMATIC TEMPERATURE CONTROL (ATC) DAMPER
SD	--	SMOKE DETECTOR
	--	AIR DEVICE WITH 2'x2' LAY-IN PANEL
	--	SQUARE TO ROUND TRANSITION
D	--	INCLINED DROP IN DIRECTION OF ARROW
R	--	INCLINED RISE IN DIRECTION OF ARROW
	--	FLEXIBLE CONNECTION (DUCTWORK)
	--	ROUND FLEXIBLE DUCT
	--	ROUND STRAIGHT DUCT TAP FITTING WITH MANUAL VOLUME DAMPER CONNECTING TO RECTANGULAR DUCT
	--	ROUND CONICAL DUCT TAP FITTING WITH MANUAL VOLUME DAMPER CONNECTING TO RECTANGULAR DUCT
	--	ROUND CONICAL DUCT TAP FITTING CONNECTING TO RECTANGULAR DUCT
	--	RECTANGULAR 45 DEGREE DUCT TAP FITTING
A	--	SOUND ATTENUATOR. LETTER DESIGNATES SPECIFIC UNIT. SEE SCHEDULE.
1 100(3W)	--	DIFFUSER & DUCT RUNOUT DESIGNATION (EXAMPLE). LETTER IN SYMBOL IS DIFFUSER DESIGNATION (REFER TO SCHEDULE); NUMBER BESIDE SYMBOL IS CFM; (3W) = 3 WAY THROW PATTERN (AS SHOWN ON THE DRAWINGS)
12"x12" SR 300 CFM (2-WAY)	--	DIFFUSER DESIGNATION (EXAMPLE). TOP LINE INDICATES FACE SIZE; SECOND LINE INDICATES AIRFLOW, THIRD LINE INDICATES THROW PATTERN (IF OTHER THAN STANDARD 4-WAY). NECK SIZE EQUAL TO DUCT RUNOUT AS NOTED ON PLAN.
12"x12" SD 300 CFM (2-WAY)	--	DIFFUSER DESIGNATION (EXAMPLE). TOP LINE INDICATES NECK SIZE, SECOND LINE INDICATES AIRFLOW, THIRD LINE INDICATES THROW PATTERN (IF OTHER THAN STANDARD 4-WAY).

A/D	ACCESS DOOR
BDD	BACKDRAFT DAMPER
CA	CONDITIONED OUTDOOR AIR
EA	EXHAUST AIR
EG	EXHAUST GRILLE
ER	EXHAUST REGISTER
EXH	EXHAUST
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
GR	GRILLE
LSD	LINEAR SLOT DIFFUSER
OAI	OUTDOOR AIR INTAKE
OA	OUTDOOR AIR
OED	OPEN END DUCT WITH 1/2" FRAMED WIRE MESH SCREEN
PR	PRESSURE RELIEF
PRG	PRESSURE RELIEF GRILLE
RA	RETURN AIR
REG	REGISTER
RG	RETURN GRILLE
RR	RETURN REGISTER
SA	SUPPLY AIR
SD	SUPPLY DIFFUSER
SG	SUPPLY GRILLE
SP	STATIC PRESSURE
SPD	STATIC PRESSURE DROP
SR	SUPPLY REGISTER
TA	TRANSFER AIR
TG	TRANSFER GRILLE

CONTROLS

SYMBOL	ABBR.	ITEM
T	--	THERMOSTAT
	ATC	AUTOMATIC TEMPERATURE CONTROL
	DDC	DIRECT DIGITAL CONTROL

EQUIPMENT

SYMBOL	ABBR.	ITEM
	VAV	VARIABLE AIR VOLUME TERMINAL UNIT

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SYMBOLS AND ABBREVIATIONS

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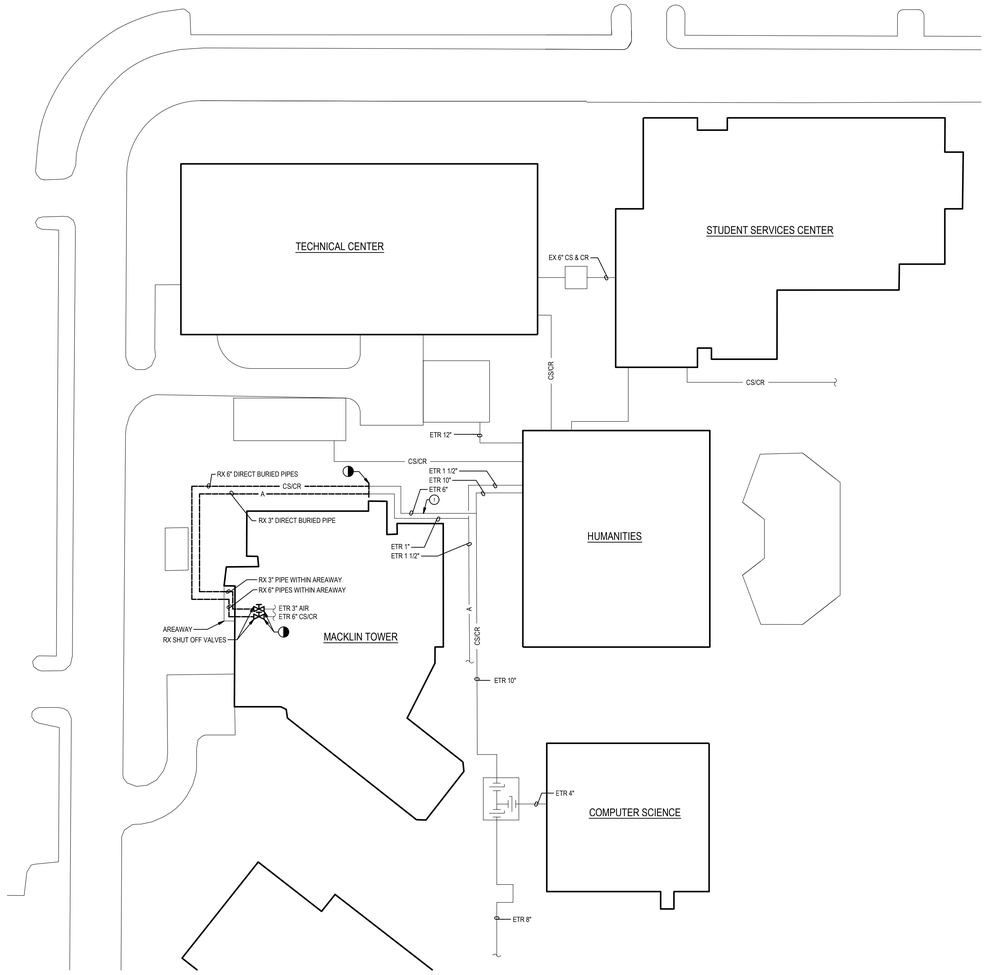
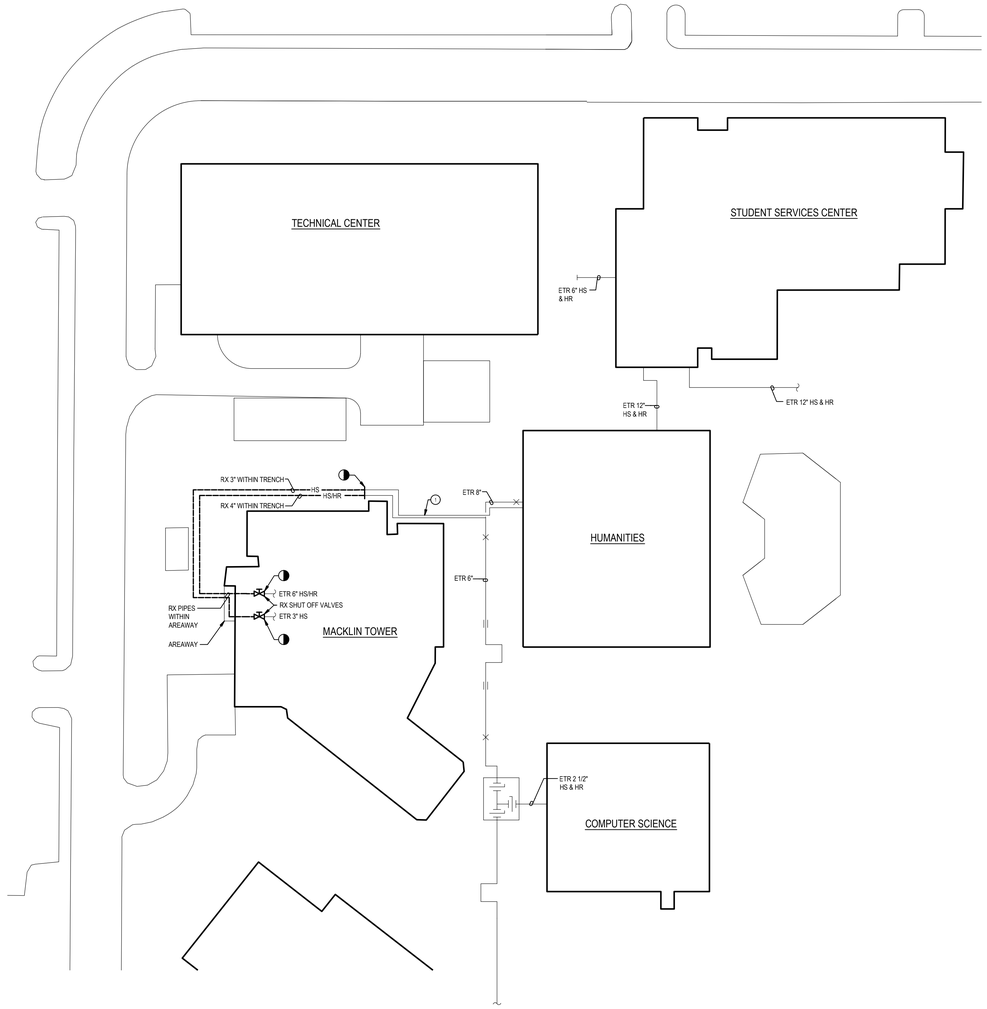
SPECIFIC NOTES:

1 APPROXIMATE EXTENT OF EXISTING CONCRETE TRENCH.



SITE PLAN - CHILLED WATER & AIR PIPING - DEMOLITION

SCALE: 1" = 40'-0"



SITE PLAN - HEATING WATER PIPING - DEMOLITION

SCALE: 1" = 40'-0"

NORTH

40 20 0 40 80

SCALE: 1" = 40'-0"

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SITE PLANS - DEMOLITION

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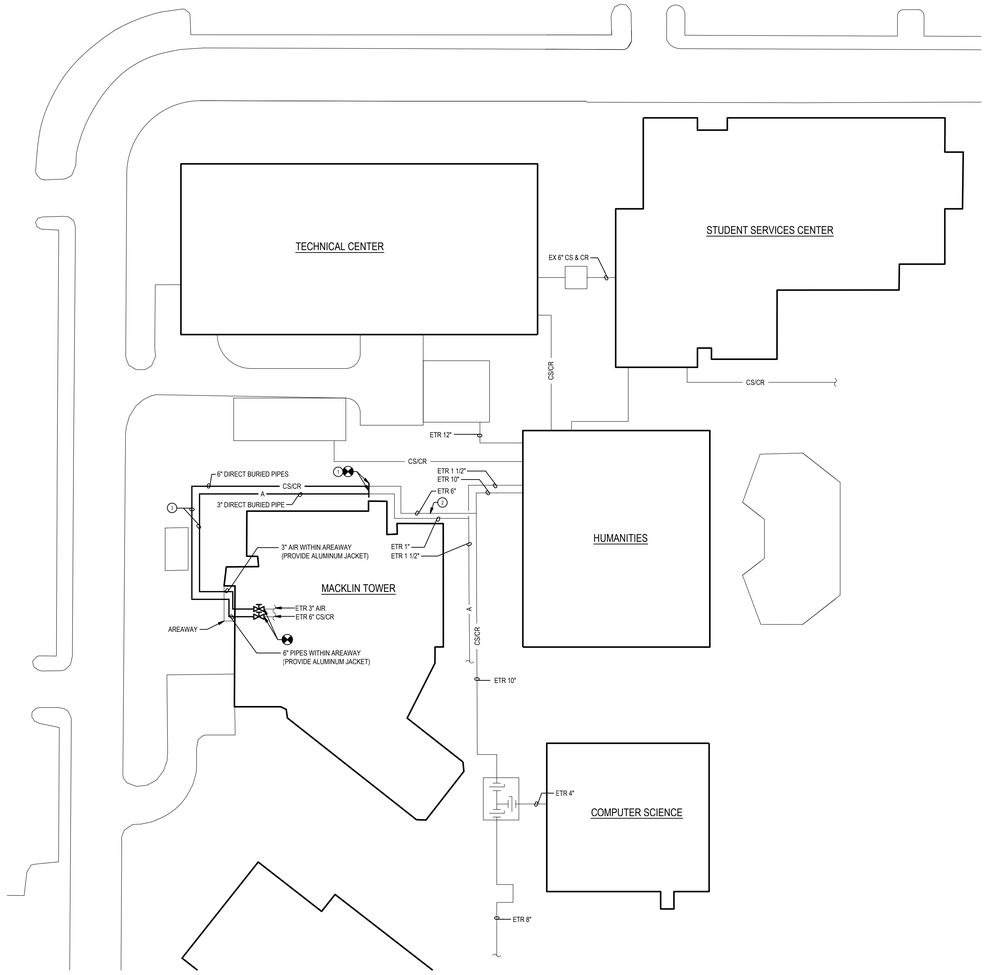
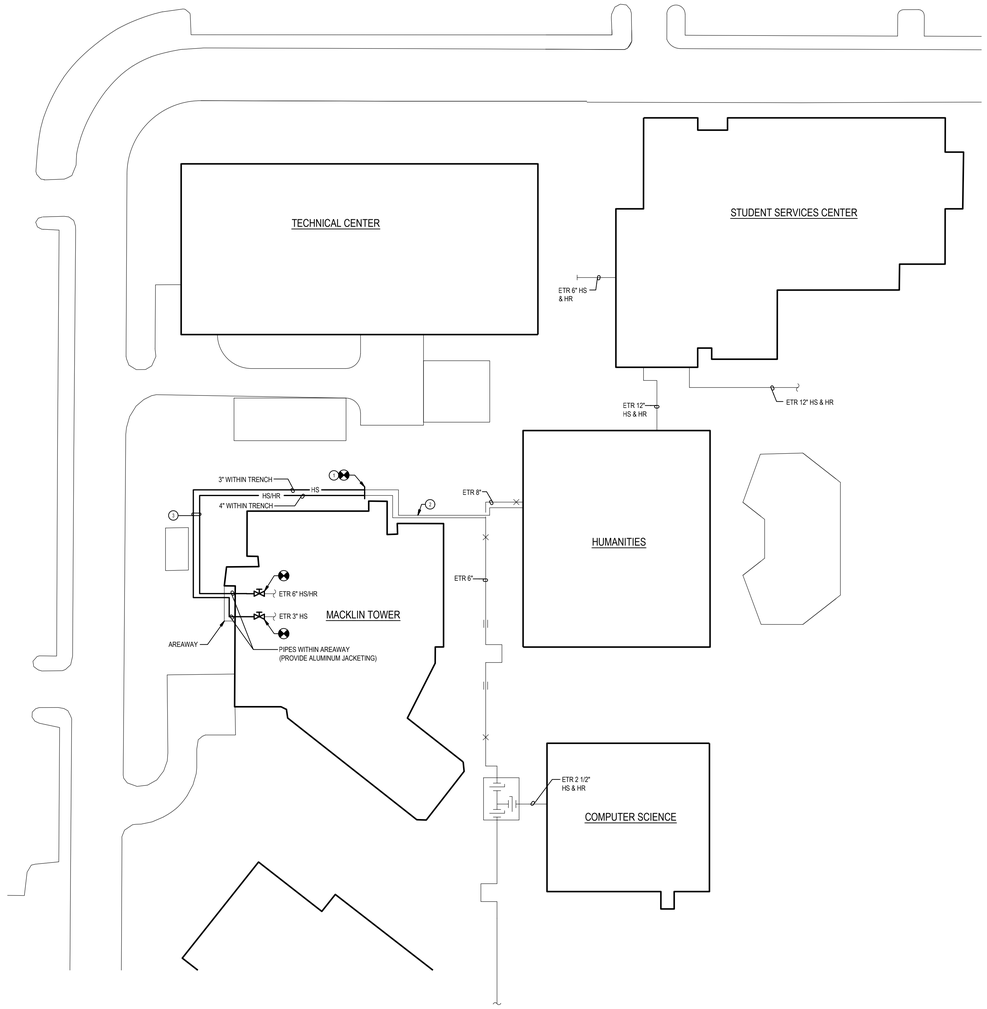
SPECIFIC NOTES:

1. CONNECT NEW DIRECT BURIED PIPING TO EXISTING DIRECT BURIED PIPING. PROVIDE NEW FLANGED CONNECTIONS ON EXISTING PIPING AS WELL AS NEW PIPING. LOCATION AND DEPTH OF EXISTING PIPE SHALL BE DETERMINED IN THE FIELD. SEE CIVIL SITE DRAWINGS FOR MORE INFORMATION.
2. APPROXIMATE EXTENT OF EXISTING CONCRETE TRENCH.
3. NEW PRE INSULATED, PRE FABRICATED DIRECT BURIED PIPE SYSTEM, SEE CIVIL SITE DRAWINGS FOR DEPTH PROFILE OF PIPING. PROVIDE FITTINGS FOR ELEVATION CHANGES REQUIRED. SEE DETAIL 1/M521



SITE PLAN - CHILLED WATER & AIR PIPING - NEW WORK

SCALE: 1" = 40'-0"



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SCALE: 1" = 40'-0"

NORTH

40 20 0 40 80

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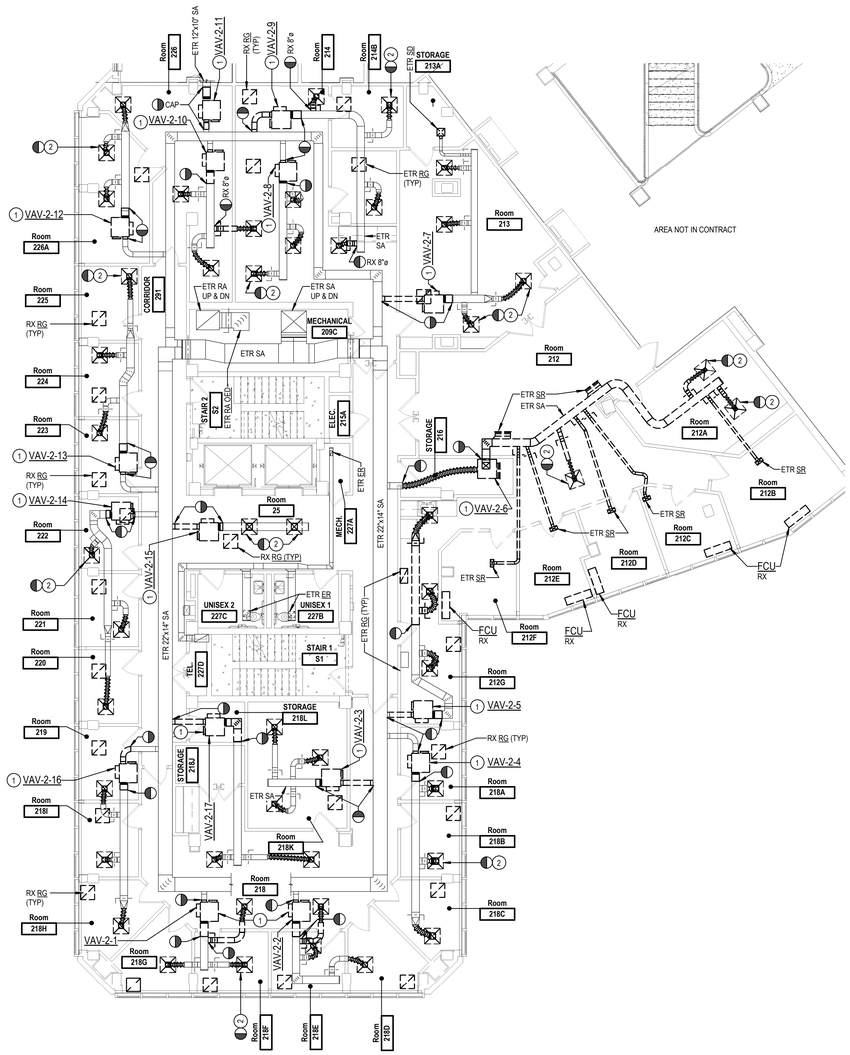
B. DEMOLITION SHALL INCLUDE REMOVAL AND OFF-SITE DISPOSAL OF MATERIALS. DO NOT ABANDON IN PLACE ANY MECHANICAL AND RELATED ELECTRICAL COMPONENTS UNLESS OTHERWISE NOTED ON DRAWINGS.

C. UNLESS OTHERWISE NOTED, MECHANICAL/PLUMBING ITEMS SHOWN HEAVY DASHED (– – – –) SHALL BE REMOVED AND MECHANICAL/ PLUMBING ITEMS SHOWN LIGHT SOLID (——) SHALL REMAIN.

SPECIFIC NOTES:

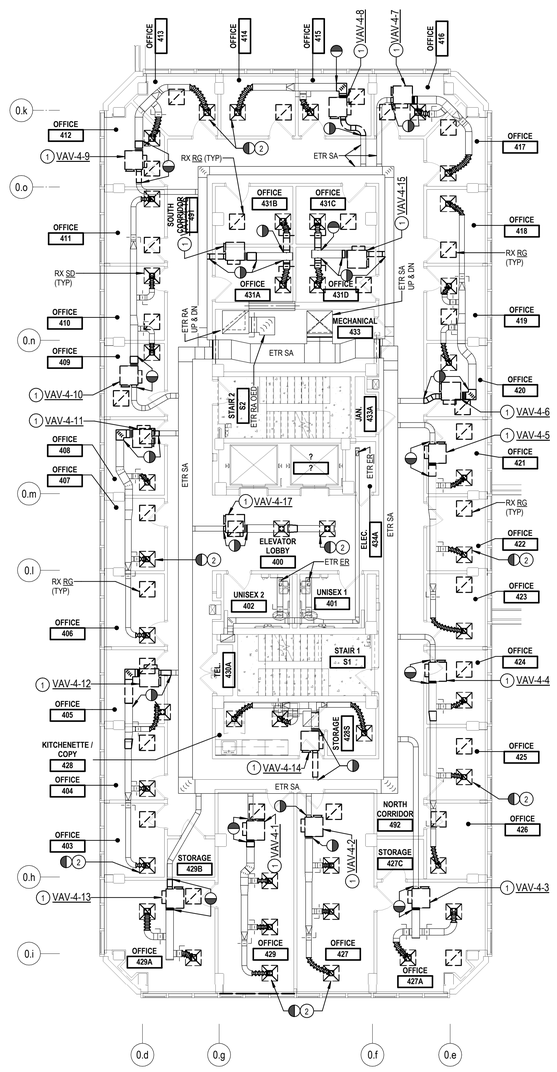
(1) RX VAV TERMINAL UNIT AND ALL ASSOCIATED PIPING, PNEUMATIC CONTROLS, TEMPERATURE SENSOR, AND APPURTENANCES. MEASURE AND RECORD PRIMARY AIRFLOW AT MAXIMUM AND MINIMUM SETPOINTS PRIOR TO DEMOLITION OF EXISTING ROOFTOP UNIT. SUBMIT TO AE FOR REVIEW.

(2) RX SD AND ASSOCIATED FLEX DUCT (TYPICAL THROUGHOUT ENTIRE FLOOR).



PART SECOND FLOOR PLAN - HVAC - DEMOLITION

SCALE: 1/8" = 1'-0"



PART FOURTH FLOOR PLAN - HVAC - DEMOLITION

SCALE: 1/8" = 1'-0"

NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

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MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing
PART SECOND AND FOURTH FLOOR PLANS - HVAC - DEMOLITION

MD104

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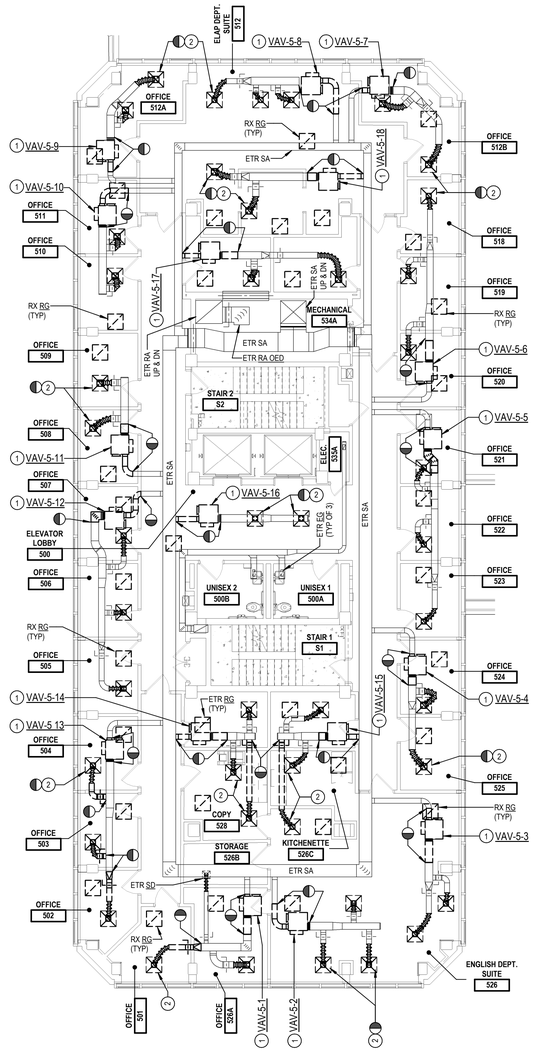
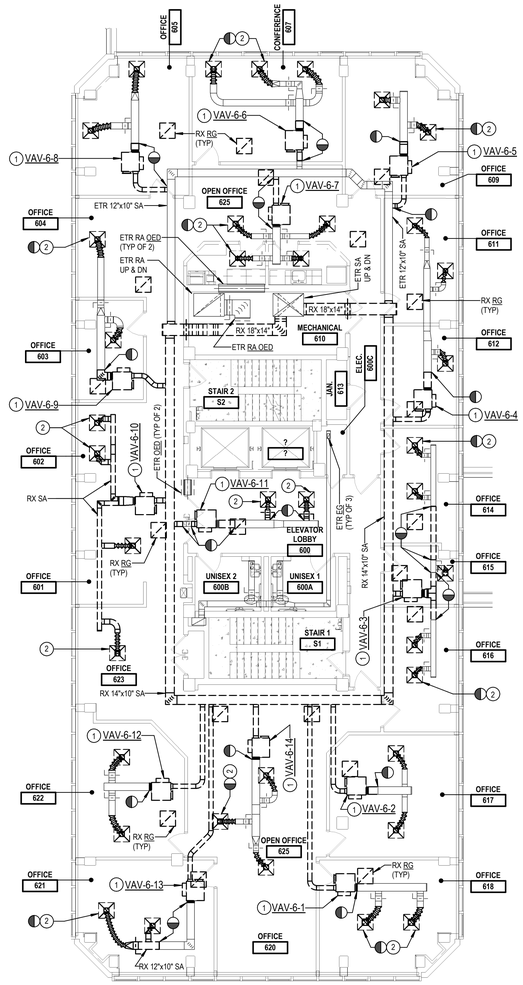


PART FIFTH FLOOR PLAN - HVAC - DEMOLITION

SCALE: 1/8" = 1'-0"



PART SIXTH FLOOR PLAN - HVAC - DEMOLITION

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

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B. DEMOLITION SHALL INCLUDE REMOVAL AND OFF-SITE DISPOSAL OF MATERIALS. DO NOT ABANDON IN PLACE ANY MECHANICAL AND RELATED ELECTRICAL COMPONENTS UNLESS OTHERWISE NOTED ON DRAWINGS.

C. UNLESS OTHERWISE NOTED, MECHANICAL/PLUMBING ITEMS SHOWN HEAVY DASHED (– – – –) SHALL BE REMOVED AND MECHANICAL/ PLUMBING ITEMS SHOWN LIGHT SOLID (——) SHALL REMAIN.

SPECIFIC NOTES:

1. RX VAV TERMINAL UNIT AND ALL ASSOCIATED PIPING, PNEUMATIC CONTROLS, TEMPERATURE SENSOR, AND APPURTENANCES. MEASURE AND RECORD PRIMARY AIRFLOW AT MAXIMUM AND MINIMUM SETPOINTS PRIOR TO DEMOLITION OF EXISTING ROOFTOP UNIT. SUBMIT TO AE FOR REVIEW.

2. RX SD AND ASSOCIATED FLEX DUCT (TYPICAL THROUGHOUT ENTIRE FLOOR).

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MHEC PROJECT #483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing
PART FIFTH AND SIXTH FLOOR PLANS - HVAC - DEMOLITION

MD105

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NORTH

8 4 0 8 16
SCALE: 1/8" = 1'-0"

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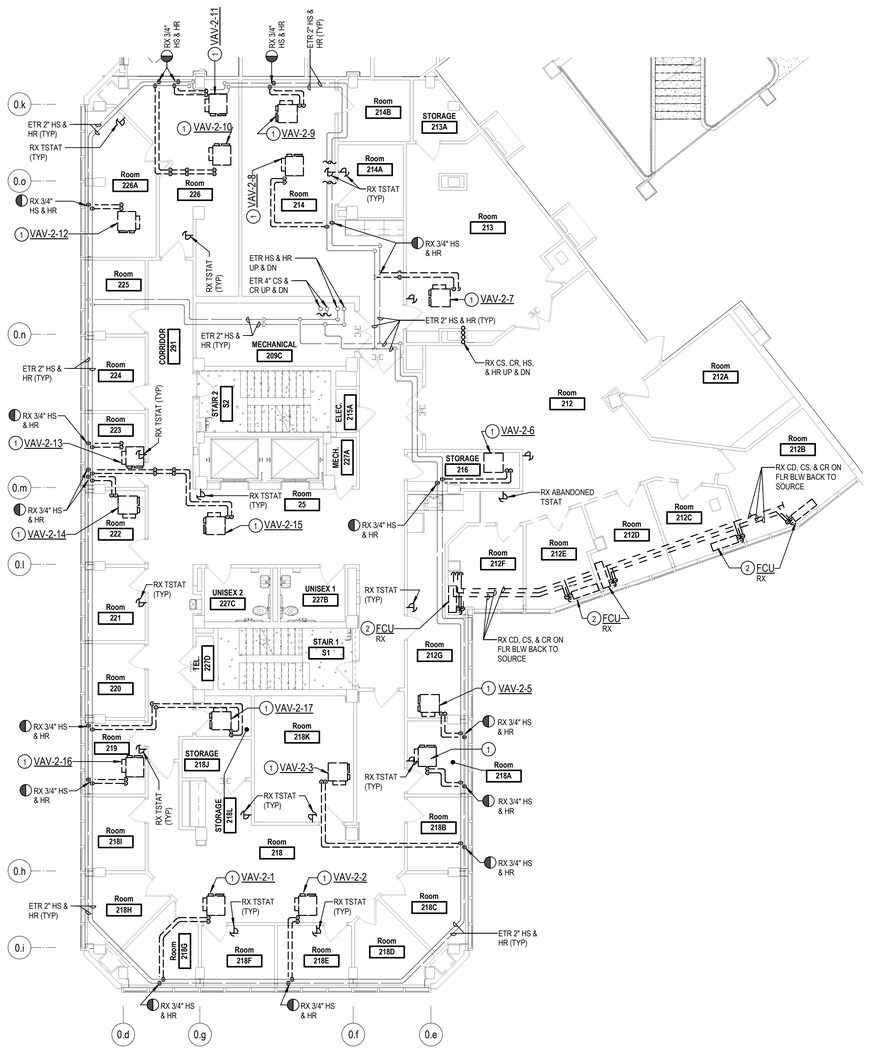
SPECIFIC NOTES:

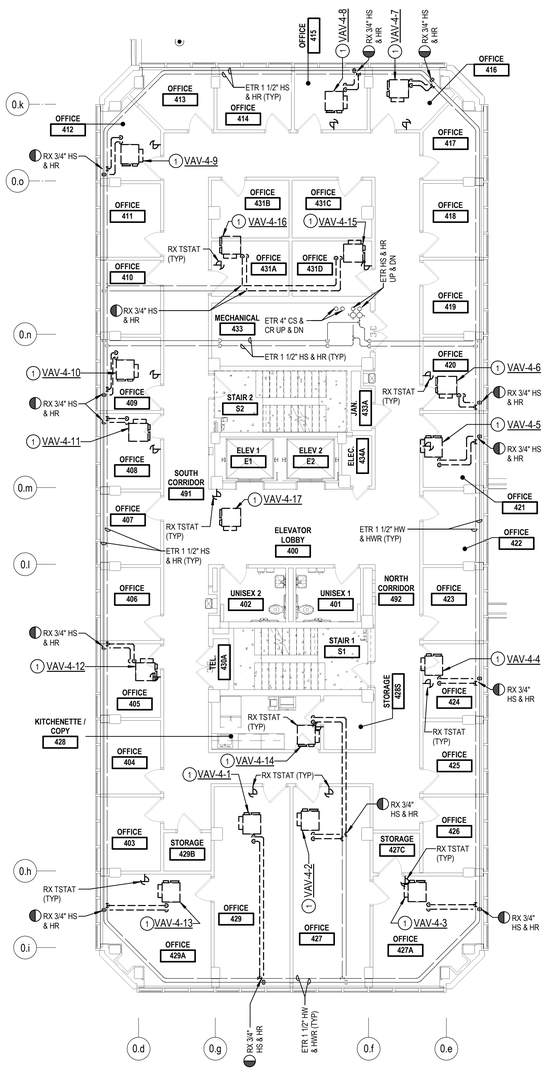
(1) RX VAV TERMINAL UNIT AND ALL ASSOCIATED PIPING, PNEUMATIC CONTROLS, TEMPERATURE SENSOR, AND APPURTENANCES; SEE DIAGRAM: 3/M501

(2) RX FAN COIL UNIT AND ASSOCIATED CD, CS, & CR PIPING BACK TO SOURCE ON FLOORS BELOW.



PART SECOND FLOOR PLAN - PIPING - DEMOLITION

SCALE: 1/8" = 1'-0"



PART FOURTH FLOOR PLAN - MECHANICAL PIPING - DEMOLITION

SCALE: 1/8" = 1'-0"

NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

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MHEC PROJECT #483

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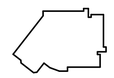
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:



Drawing
PART SECOND AND FOURTH FLOOR PLANS - PIPING - DEMOLITION

MD204

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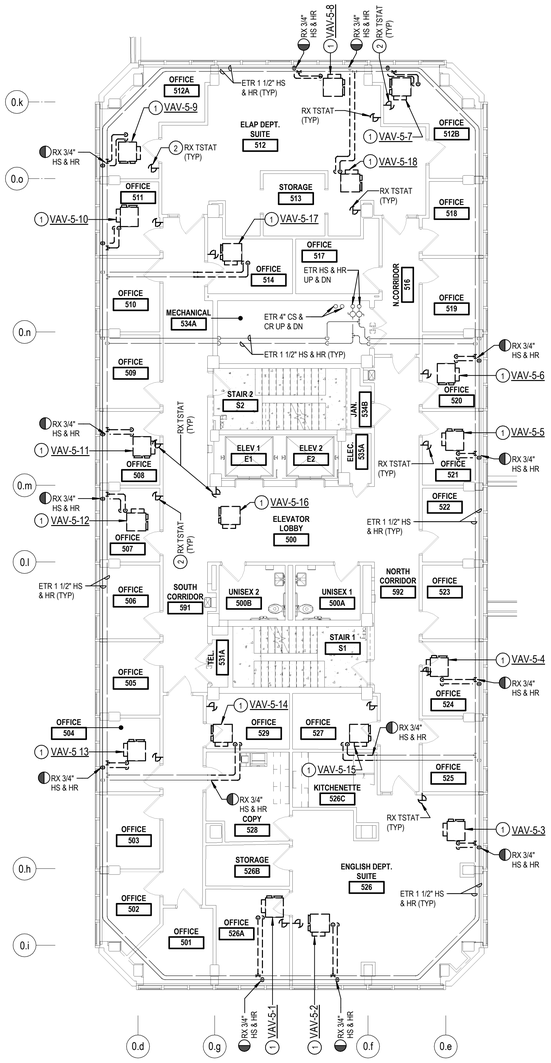
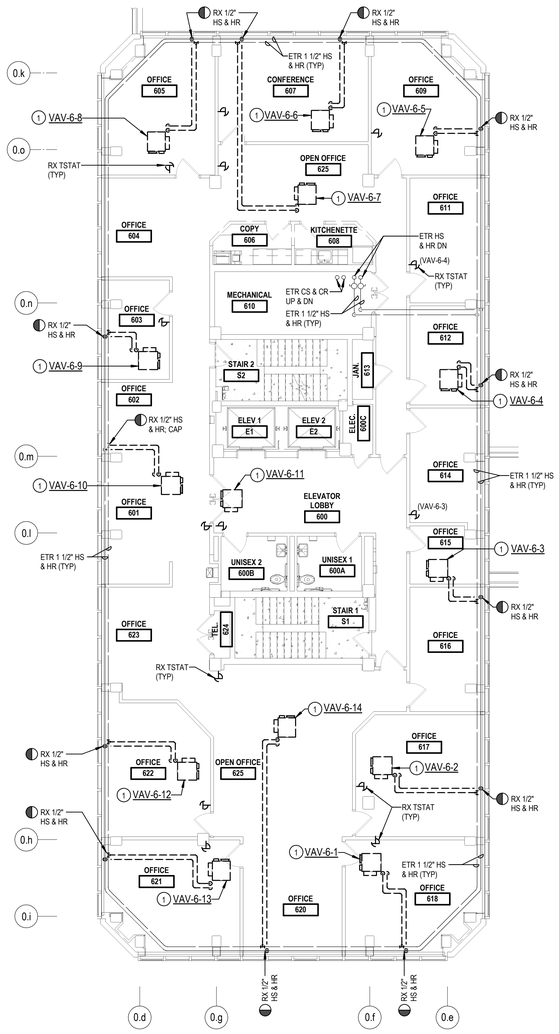


PART FIFTH FLOOR PLAN - PIPING - DEMOLITION

SCALE: 1/8" = 1'-0"



PART SIXTH FLOOR PLAN - PIPING - DEMOLITION

SCALE: 1/8" = 1'-0"

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SPECIFIC NOTES:

1. RX VAV TERMINAL UNIT AND ALL ASSOCIATED PIPING, PNEUMATIC CONTROLS, TEMPERATURE SENSOR, AND APPURTENANCES; SEE DIAGRAM: 3/M501
2. RX THERMOSTAT. PATCH DRYWALL AND REPAINT AS REQUIRED. SEE DWG M205 FOR NEW THERMOSTAT LOCATION.

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MHEC PROJECT #483

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LANDSCAPE ARCHITECTURE
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INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing
PART FIFTH AND SIXTH FLOOR PLANS - PIPING - DEMOLITION

MD205

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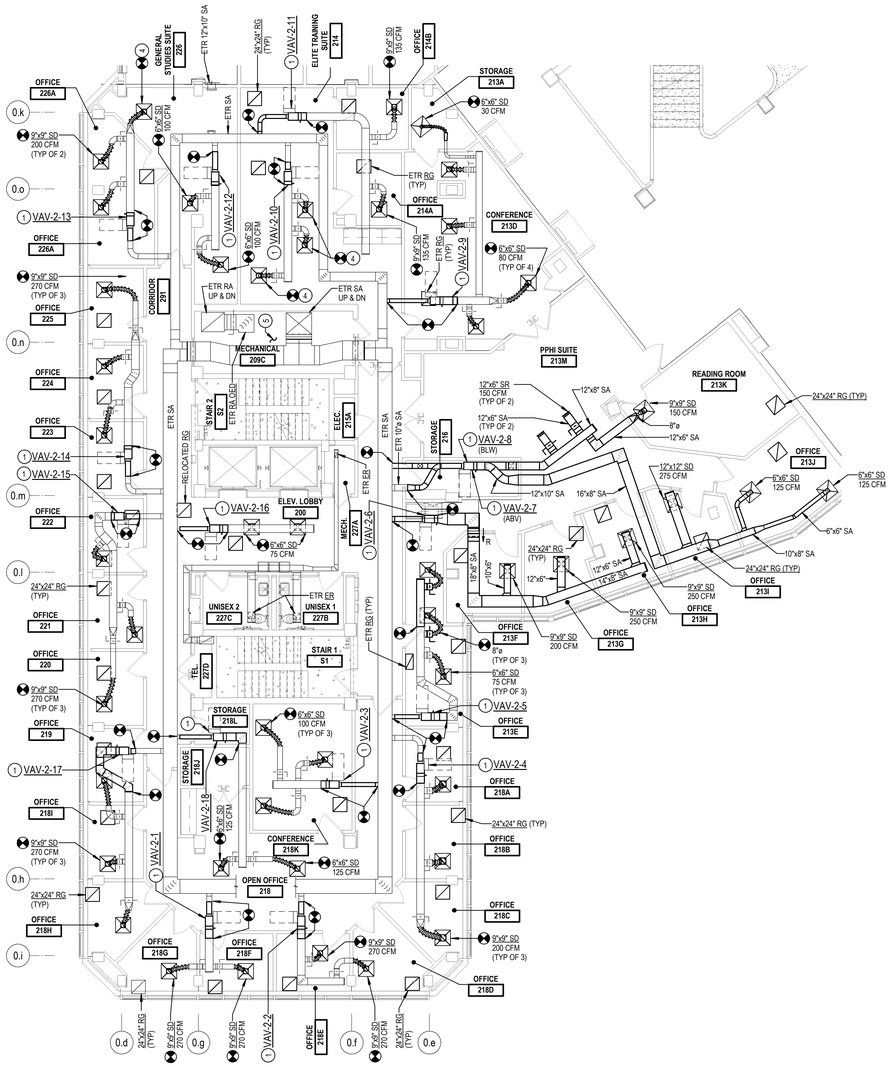
EXISTING DUCTWORK:

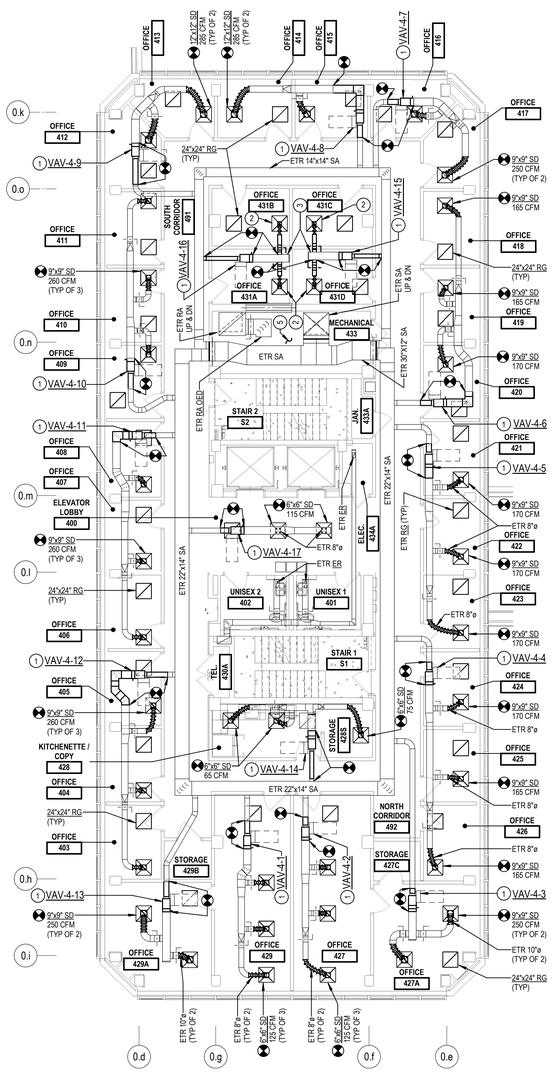
BASE BID: PRESSURE TEST ALL EXISTING TO REMAIN DUCTWORK. PROVIDE AIR BALANCING FOR ENTIRE SYSTEM.

ALTERNATE #2: RESEAL AND REINSULATE ALL EXISTING TO REMAIN DUCTWORK.



PART SECOND FLOOR PLAN - HVAC - NEW WORK

SCALE: 1/8" = 1'-0"



PART FOURTH FLOOR PLAN - HVAC - NEW WORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

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B. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

SPECIFIC NOTES:

1. VARIABLE AIR TERMINAL UNIT. SEE DETAIL: 1/M501
2. 6"x6" SD: 75 CFM; 6"ø BRANCH DUCTWORK.
3. ETR 12"x10" SA
4. 6"x6" SD: 90 CFM; 8"ø BRANCH DUCTWORK.
5. PROVIDE FIREPROOFING SEAL TO EXISTING DUCTWORK AND PIPING PENETRATIONS AS REQUIRED TO ALLOW CONTINOUS FIRE RATING OF MECHANICAL ROOM PARTITIONS.

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MHEC PROJECT #483

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PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing
PART SECOND AND FOURTH FLOOR PLANS - HVAC - NEW WORK

M104

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SCALE: 1/8" = 1'-0"

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EXISTING DUCTWORK:

BASE BID: PRESSURE TEST ALL EXISTING TO REMAIN DUCTWORK. PROVIDE AIR BALANCING FOR ENTIRE SYSTEM.

ALTERNATE #2: RESEAL AND REINSULATE ALL EXISTING TO REMAIN DUCTWORK.

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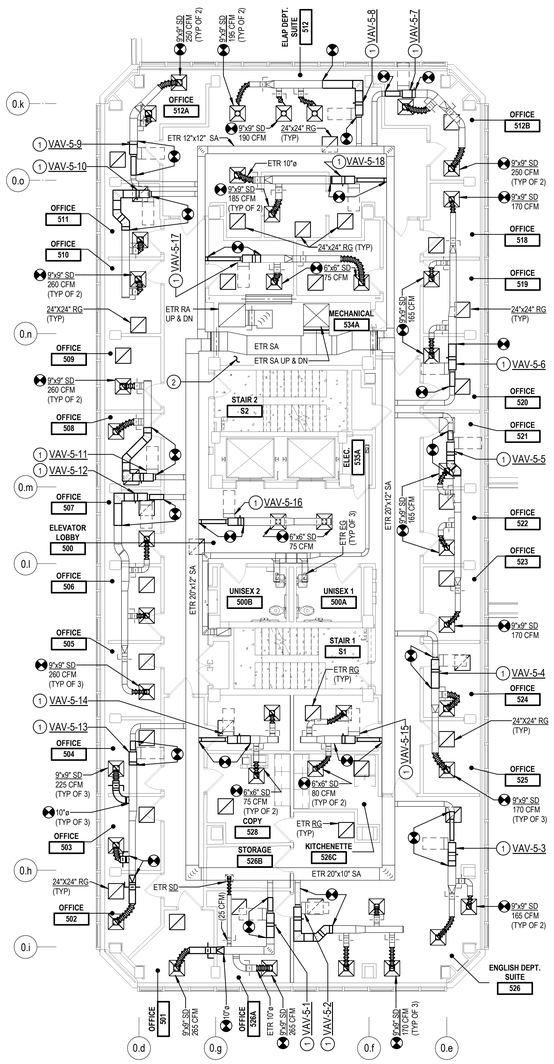
B. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

SPECIFIC NOTES:

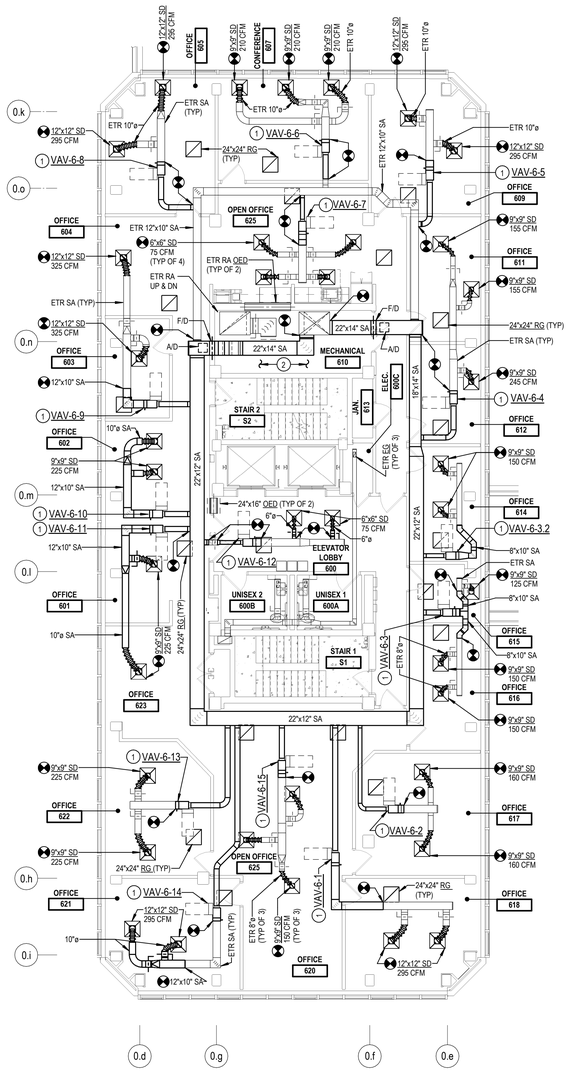
1. VARIABLE AIR TERMINAL UNIT. SEE DETAIL: 1/M501

2. PROVIDE FIREPROOFING SEAL TO EXISTING DUCTWORK AND PIPING PENETRATIONS AS REQUIRED TO ALLOW CONTINOUS FIRE RATING OF MECHANICAL ROOM PARTITIONS.



PART FIFTH FLOOR PLAN - HVAC - NEW WORK

SCALE: 1/8" = 1'-0"



PART SIXTH FLOOR PLAN - HVAC - NEW WORK

SCALE: 1/8" = 1'-0"

NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

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ARCHITECTURE
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PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
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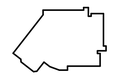
KEY PLAN:



Drawing
PART FIFTH AND SIXTH FLOOR PLANS - HVAC - NEW WORK

M105

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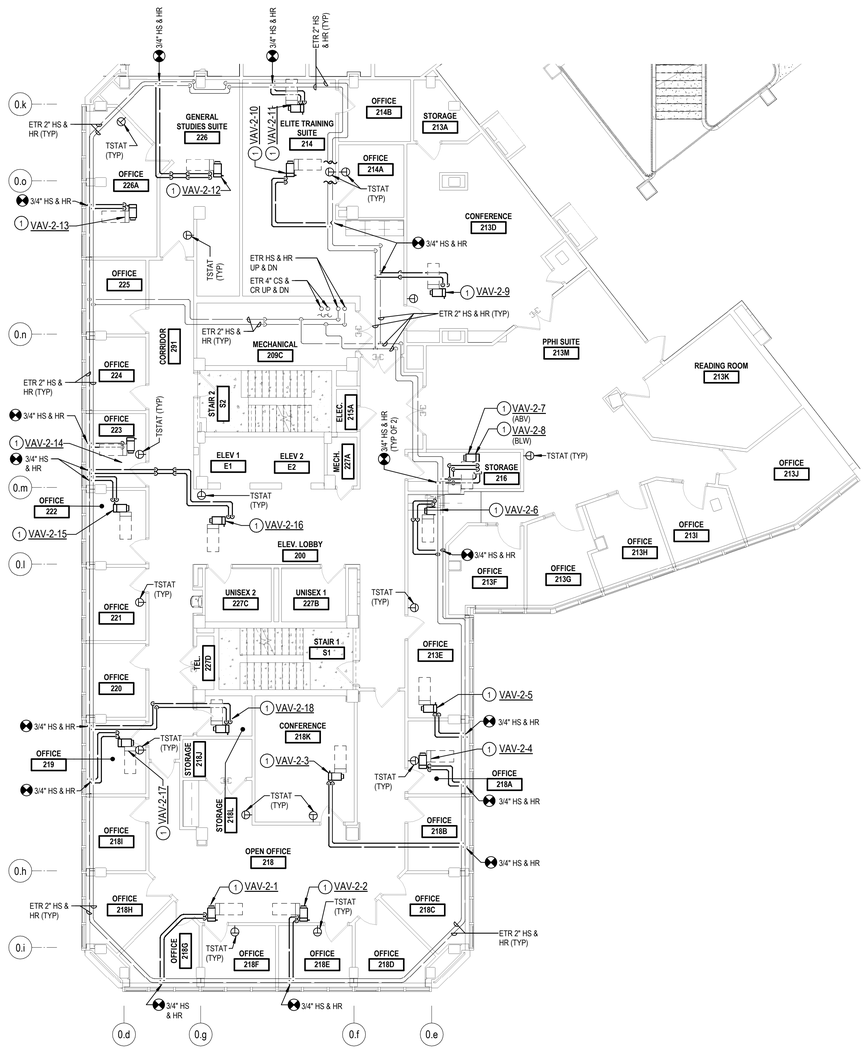
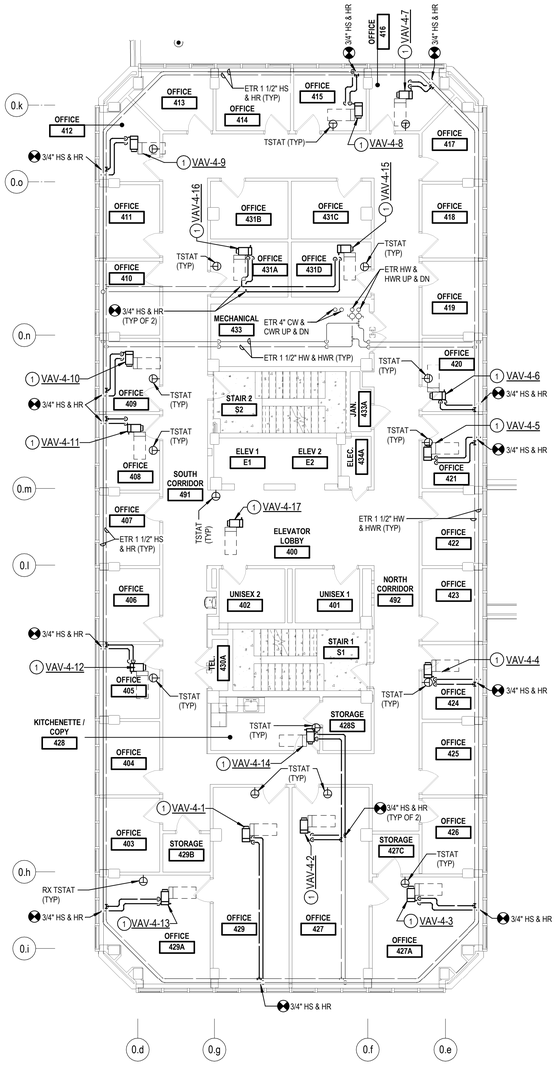


PART SECOND FLOOR PLAN - PIPING - NEW WORK

SCALE: 1/8" = 1'-0"



PART FOURTH FLOOR PLAN - PIPING - NEW WORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE EXISTING CONDITIONS IN DETAIL OR DIMENSION. DETERMINE EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.

B. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

SPECIFIC NOTES:

1 PROVIDE ASSOCIATED BRANCH PIPING, CONTROLS, TEMPERATURE SENSOR, AND APPURTENANCES VIA VAV MANUFACTURER COIL KIT; SEE DIAGRAM 4/M501

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MONTGOMERY COLLEGE

MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES

51 MANNAKEE STREET
ROCKVILLE, MD 20850

MC PROJECT # FP24-0003 / BUILDING # 206
MHEC PROJECT #483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing
PART SECOND AND FOURTH FLOOR PLANS - PIPING - NEW WORK

M204

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NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

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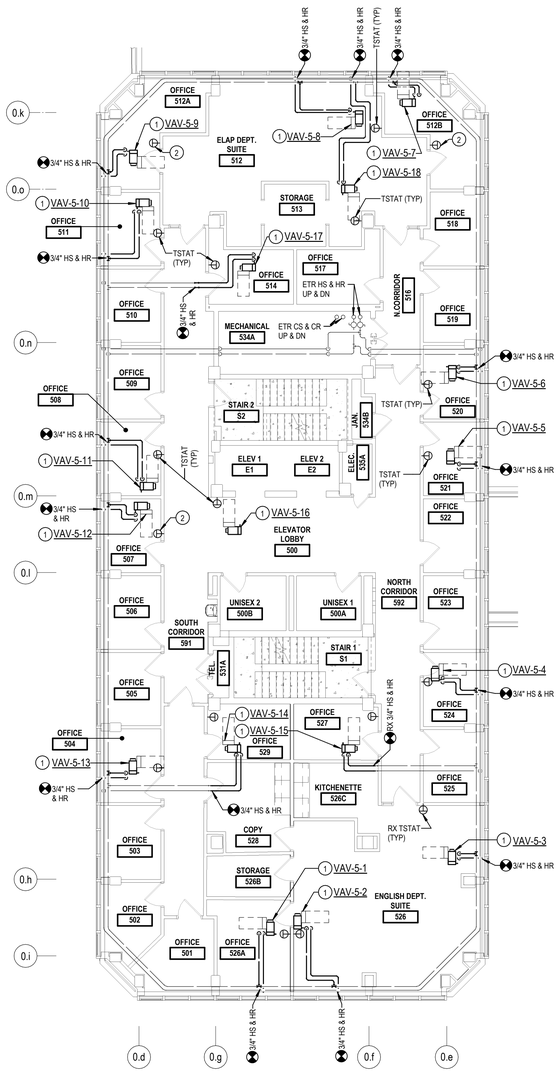
B. DO NOT LOCATE DUCTWORK OR PIPING ABOVE ELECTRICAL PANELS OR EQUIPMENT.

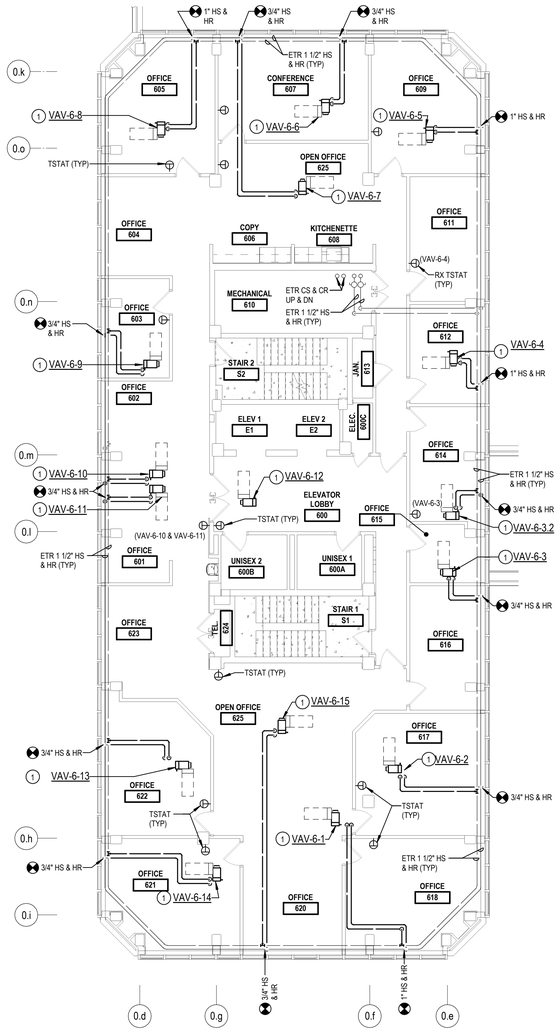
SPECIFIC NOTES:

1. PROVIDE ASSOCIATED BRANCH PIPING, CONTROLS, TEMPERATURE SENSOR, AND APPURTENANCES VIA VAV MANUFACTURER COIL KIT; SEE DIAGRAM 4/M507
2. NEW THERMOSTAT LOCATION. PROVIDE PATRITION PATCHING AND REPAINTING AS REQUIRED.



PART FIFTH FLOOR PLAN - PIPING - NEW WORK

SCALE: 1/8" = 1'-0"



PART SIXTH FLOOR PLAN - PIPING - NEW WORK

SCALE: 1/8" = 1'-0"

NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

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MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

KEY PLAN:

Drawing
PART FIFTH AND SIXTH FLOOR PLANS - PIPING - NEW WORK

M205

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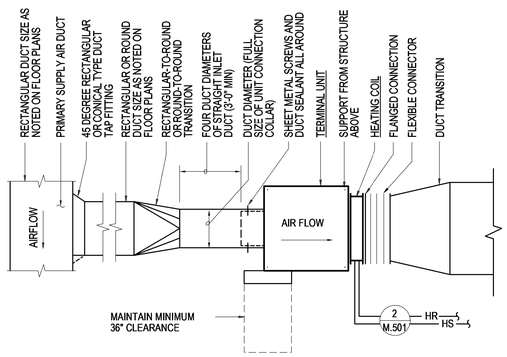
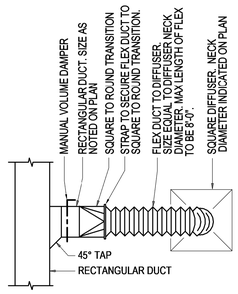
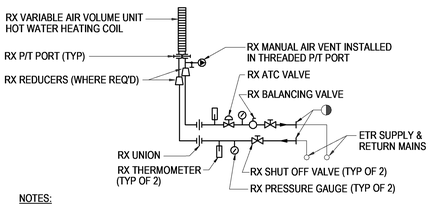


DETAIL 1/M501
DUCT CONNECTIONS TO SINGLE DUCT TERMINAL UNIT
NOT TO SCALE

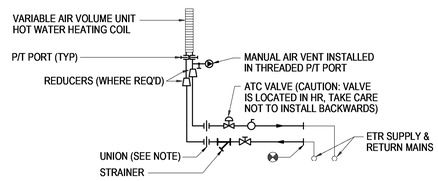


DETAIL 2/M501
DUCT CONNECTION TO SUPPLY DIFFUSER
NOT TO SCALE



NOTES:

DIAGRAM 3/M501
TYPICAL DEMO PIPING CONNECTIONS FOR VARIABLE AIR VOLUME UNIT HOT WATER HEATING COIL
NOT TO SCALE



NOTES:

LOCATE UNIONS OR FLANGES IN PIPING SO THAT COIL MAY BE REMOVED WITHOUT INTERFERENCE WITH PIPING.

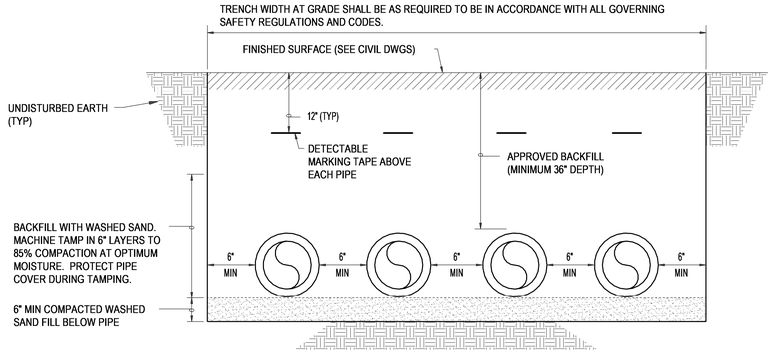
VALVES AND ACCESSORIES SHALL BE LINE SIZE, NOT COIL CONNECTION SIZE.

SIZE PIPING ACCORDING TO EQUIPMENT SCHEDULE OR AS SHOWN ON PLANS.

DIAGRAM 4/M501
TYPICAL NEW WORK PIPING CONNECTIONS FOR VARIABLE AIR VOLUME UNIT HOT WATER HEATING COIL
NOT TO SCALE

GENERAL NOTE:

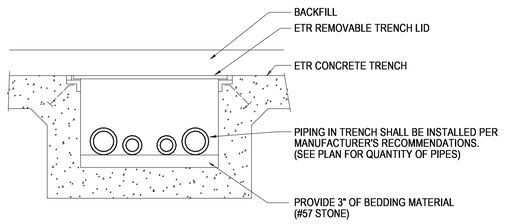
REFER TO CIVIL DRAWINGS FOR ROUTING AND ADDITIONAL DETAILS REGARDING DIRECT BURIED PIPING AND OTHER SITE UTILITIES.



NOTES:

1. TRENCH SHORING SHALL BE PROVIDED AS REQUIRED AND IN ACCORDANCE WITH ALL GOVERNING REGULATIONS AND CODES.
2. REFER TO CIVIL DRAWINGS FOR ALL PIPE ROUTING AND PROFILES, IN ADDITION TO LOCATION OF ROADS, CURBS, WALKS, BACKFILL AND REPLACEMENT SURFACE.
3. ALL NEW AND EXISTING UTILITIES UNCOVERED DURING EXCAVATION SHALL BE SUPPORTED AND PROTECTED AT ALL TIMES. ALL UTILITIES DAMAGED AS A RESULT OF NEW WORK SHALL REPAIRED AT THE CONTRACTOR'S EXPENSE.
4. REMOVE ALL DEMOLISHED MATERIALS AND UNUSED EXCAVATED EARTH FROM THE SITE.
5. REFER TO MECHANICAL SITE PLANS FOR PIPE QUANTITY AND SIZE.

DETAIL 5/M501
DIRECT BURIED PIPING BELOW GRADE
NOT TO SCALE



NOTES:

1. TEMPORARILY REMOVE TRENCH LID AND REMOVE EXISTING HVAC PIPING AND SUPPORTS. REINSTALL TRENCH LID AFTER INSTALLATION OF NEW HVAC PIPING.
2. REFER TO CIVIL DRAWINGS FOR ALL PIPE ROUTING AND PROFILES, IN ADDITION TO LOCATION OF ROADS, CURBS, WALKS, BACKFILL AND REPLACEMENT SURFACE.
3. ALL NEW AND EXISTING UTILITIES UNCOVERED DURING EXCAVATION SHALL BE SUPPORTED AND PROTECTED AT ALL TIMES. ALL UTILITIES DAMAGED AS A RESULT OF NEW WORK SHALL REPAIRED AT THE CONTRACTOR'S EXPENSE.
4. REMOVE ALL DEMOLISHED MATERIALS AND UNUSED EXCAVATED EARTH FROM THE SITE.
5. REFER TO PIPING MANUFACTURER RECOMMENDATIONS FOR ADDITIONAL BEDDING REQUIREMENTS.
6. RESUPPORT EXISTING TO REMAIN UTILITIES WITH UNISTRUT TO MATCH EXISTING.
7. REFER TO MECHANICAL SITE PLANS FOR PIPE QUANTITY AND SIZE.

DETAIL 6/M501
ETR PIPING TRENCH
NOT TO SCALE

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LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

Drawing
DETAILS AND DIAGRAMS

M501

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LEVELS 2, 4, 5, & 6 VARIABLE AIR VOLUME TERMINAL UNIT SCHEDULE

DESIG	AREA SERVED	MAX HEATING AIRFLOW (CFM)	MAX COOLING AIRFLOW (CFM)	MIN PRIMARY AIRFLOW (CFM)	MIN PRIMARY INLET SIZE (IN DIA)	HEATING COIL										NOTES
						CFM	MBH	GPM	ROWS	EWT (°F)	LWT (°F)	EAT (°F)	LAT (°F)	MAX PD (FT HD)	MAX SP (IN WC)	
VAV-2-1	OFFICE 218G & OFFICE 218F	425	540	185	8	425	13.8	2.0	2	130	110	55	85	5	0.25	1,2
VAV-2-2	OFFICE 218E & OFFICE 218D	425	540	185	8	425	13.8	2.0	2	130	110	55	85	5	0.25	1,2
VAV-2-3	CONF 218K	150	300	110	6	150	4.1	1.0	1	130	110	55	80	5	0.25	1,2
VAV-2-4	OFFICE 218A, OFFICE 218B & OFFICE 218C	600	440	200	8	600	19.5	2.5	2	130	110	55	85	5	0.25	1,2,4
VAV-2-5	OFFICE 212G	225	225	80	6	225	7.4	1.0	2	130	110	55	85	5	0.25	1,2
VAV-2-6	OFFICE 212D, OFFICE 212E & OFFICE 212F	460	700	125	8	460	16.4	2.0	2	130	110	55	85	5	0.25	1,2,4
VAV-2-7	OFFICE 212B & OFFICE 212C	490	625	100	8	490	16.0	2.0	2	130	110	55	85	5	0.25	1,2,4
VAV-2-8	CAMPUS COMMONS 212 & READING 212A	265	450	180	8	265	9.7	1.0	2	130	110	55	85	5	0.25	1,2
VAV-2-9	CONF 213	250	350	175	6	250	7.7	1.0	2	130	110	55	80	5	0.25	1,2
VAV-2-10	ELITE 214	200	270	150	8	200	5.4	1.0	1	130	110	55	80	5	0.25	1,2
VAV-2-11	OFFICE 214A, OFFICE 214B	100	270	90	6	100	2.9	0.5	1	130	110	55	80	5	0.25	1,2
VAV-2-12	STORAGE 226	140	200	75	8	140	4.6	1.0	1	130	110	55	85	5	0.25	1,2
VAV-2-13	OFFICE 226A	350	490	165	8	350	11.5	1.5	2	130	110	55	85	5	0.25	1,2
VAV-2-14	OFFICE 223, OFFICE 224 & OFFICE 225	500	810	270	8	500	16.3	2.0	2	130	110	55	85	5	0.25	1,2,4
VAV-2-15	OFFICE 220, OFFICE 221 & OFFICE 222	500	810	270	8	500	14.6	1.5	2	130	110	55	80	5	0.25	1,2,4
VAV-2-16	ELEVATOR LOBBY 200	125	150	90	6	125	3.4	1.0	1	130	110	55	80	5	0.25	1,2
VAV-2-17	OFFICE 218H, OFFICE 218I & OFFICE 219	590	810	280	8	590	19.2	2.5	2	130	110	55	85	5	0.25	1,2,4
VAV-2-18	PSYCHOLOGY DEPT. 218	85	250	85	6	85	2.7	0.5	1	130	110	55	80	5	0.25	1,2
VAV-4-1	OFFICE 429	175	375	125	8	175	6.7	1.0	2	130	110	55	85	5	0.25	1,2
VAV-4-2	OFFICE 427	175	375	125	8	175	6.7	1.0	2	130	110	55	85	5	0.25	1,2
VAV-4-3	OFFICE 427A	500	350	170	8	500	16.3	3.0	2	130	110	55	85	5	0.25	1,2
VAV-4-4	OFFICE 426, OFFICE 425 & OFFICE 424	500	400	180	8	500	16.3	3.0	2	130	110	55	85	5	0.25	1,2
VAV-4-5	OFFICE 423, OFFICE 422 & OFFICE 421	500	400	180	8	500	16.3	3.0	2	130	110	55	85	5	0.25	1,2
VAV-4-6	OFFICE 420, OFFICE 419 & OFFICE 418	500	400	180	8	500	16.3	3.0	2	130	110	55	85	5	0.25	1,2
VAV-4-7	OFFICE 417 & OFFICE 416	500	450	190	8	500	16.3	3.0	2	130	110	55	85	5	0.25	1,2
VAV-4-8	OFFICE 415 & OFFICE 414	340	570	190	8	340	11.0	1.5	2	130	110	55	85	5	0.25	1,2
VAV-4-9	OFFICE 413 & OFFICE 412	500	570	200	8	500	16.2	3.0	2	130	110	55	85	5	0.25	1,2
VAV-4-10	OFFICE 411, OFFICE 410 & OFFICE 409	500	780	270	8	500	16.2	2.0	2	130	110	55	85	5	0.25	1,2,4
VAV-4-11	OFFICE 408, OFFICE 407 & OFFICE 406	500	780	270	8	500	16.2	2.0	2	130	110	55	85	5	0.25	1,2,4
VAV-4-12	OFFICE 405, OFFICE 404 & OFFICE 403	500	780	270	8	500	16.2	2.0	2	130	110	55	85	5	0.25	1,2,4
VAV-4-13	OFFICE 429A	500	400	170	8	500	16.2	3.0	2	130	110	55	85	5	0.25	1,2
VAV-4-14	KITCHEN 428 & STORAGE 428A	100	200	100	6	100	2.7	0.5	1	130	110	55	80	5	0.25	1,2
VAV-4-15	OFFICE 431D & OFFICE 431C	75	150	75	6	75	2.5	0.5	1	130	110	55	80	5	0.25	1,2
VAV-4-16	OFFICE 431 & OFFICE 431A	75	150	75	6	75	2.5	0.5	1	130	110	55	80	5	0.25	1,2
VAV-4-17	ELEVATOR LOBBY 400	200	230	135	8	-	-	-	-	-	-	-	-	-	-	3
VAV-5-1	OFFICE 501, OFFICE 526A & STORAGE 526B	450	550	205	8	450	14.7	2.5	2	130	110	55	85	5	0.25	1,2
VAV-5-2	ENGLISH DEPARTMENT 526	510	465	175	8	510	16.6	3.0	2	130	110	55	85	5	0.25	1,2
VAV-5-3	ENGLISH DEPARTMENT 526	330	305	115	6	330	10.7	2.0	2	130	110	55	85	5	0.25	1,2
VAV-5-4	OFFICE 525 & OFFICE 524	340	260	120	8	340	11.1	1.5	2	130	110	55	85	5	0.25	1,2
VAV-5-5	OFFICE 523, OFFIC 522 & OFFICE 521	500	390	180	8	500	16.3	3.0	2	130	110	55	85	5	0.25	1,2
VAV-5-6	OFFICE 520, OFFIC 519 & OFFICE 518	500	390	180	8	500	16.3	3.0	2	130	110	55	85	5	0.25	1,2
VAV-5-7	OFFICE 512B	500	390	170	8	500	16.3	3.0	2	130	110	55	85	5	0.25	1,2
VAV-5-8	READING DEPARTMENT 512	240	580	195	8	240	8.6	1.0	2	130	110	55	85	5	0.25	1,2
VAV-5-9	OFFICE 512A	500	440	170	8	500	16.3	3.0	2	130	110	55	85	5	0.25	1,2
VAV-5-10	OFFICE 511 & OFFICE 510	340	520	180	8	340	11.1	1.5	2	130	110	55	85	5	0.25	1,2
VAV-5-11	OFFICE 509 & OFFICE 508	340	520	180	8	340	11.1	1.5	2	130	110	55	85	5	0.25	1,2
VAV-5-12	OFFICE 507, OFFICE 506 & OFFICE 505	340	780	180	8	340	12.4	1.5	2	130	110	55	85	5	0.25	1,2,4
VAV-5-13	OFFICE 504, OFFICE 503 & OFFICE 502	595	795	275	8	595	19.4	2.4	2	130	110	55	85	5	0.25	1,2,4
VAV-5-14	OFFICE 529 & COPY/FAX 528	75	150	75	6	75	2.5	0.5	1	130	110	55	80	5	0.25	1,2
VAV-5-15	OFFICE 527, KITCHEN 526, & ENGLISH DEPARTMENT 526	75	160	75	6	75	2.5	0.5	1	130	110	55	80	5	0.25	1,2
VAV-5-16	ELEVATOR LOBBY 500	125	150	90	6	-	-	-	-	-	-	-	-	-	-	3
VAV-5-17	OFFICE 517 & OFFICE 514	75	150	75	6	75	3.2	0.5	1	130	110	55	80	5	0.25	1,2
VAV-5-18	STORAGE 513 & READING DEPARTMENT 512	150	370	130	6	150	4.1	1.0	1	130	110	55	80	5	0.25	1,2
VAV-6-1	OFFICE 618	590	440	200	8	590	19.2	5.5	2	130	110	55	85	5	0.3	1,2
VAV-6-2	OFFICE 617	320	240	110	6	320	10.4	1.5	2	130	110	55	85	5	0.25	1,2
VAV-6-3	OFFICE 616 & STORAGE 615	425	325	175	8	425	13.8	2.0	2	130	110	55	85	5	0.25	1,2
VAV-6-3.2	OFFICE 614	325	225	125	6	325	10.6	2.0	2	130	110	55	85	5	0.25	1,2
VAV-6-4	OFFICE 611 & OFFICE 612	555	390	215	8	555	18.1	4.0	2	130	110	55	85	5	0.25	1,2
VAV-6-5	OFFICE 609	590	440	200	8	590	19.2	5.5	2	130	110	55	85	5	0.3	1,2
VAV-6-6	CONFERENCE 607	380	630	220	8	380	13.0	1.5	2	130	110	55	85	5	0.3	1,2
VAV-6-7	KITCHEN 608, COPY/FAX 606 & COMMON CORRIDOR	120	300	120	6	120	3.2	0.5	1	130	110	55	80	5	0.25	1,2
VAV-6-8	OFFICE 605	570	500	190	8	570	18.6	4.5	2	130	110	55	85	5	0.3	1,2
VAV-6-9	OFFICE 604 & OFFICE 603	490	650	230	8	490	16.0	2.6	2	130	110	55	85	5	0.35	1,2
VAV-6-10	OFFICE 602	380	550	190	8	380	12.4	1.5	2	130	110	55	85	5	0.25	1,2
VAV-6-11	OFFICE 601 & OFFICE 623	380	550	190	8	380	12.4	1.5	2	130	110	55	85	5	0.25	1,2
VAV-6-12	ELVATOR LOBBY 600	75	150	75	6	-	-	-	-	-	-	-	-	-	-	3
VAV-6-13	OFFICE 622	365	450	155	8	365	11.9	1.5	2	130	110	55	85	5	0.25	1,2
VAV-6-14	OFFICE 621	590	465	200	8	590	19.2	5.5	2	130	110	55	85	5	0.3	1,2
VAV-6-15	OFFICE 620 & OFFICE 619	290	450	150	8	290	9.4	1.0	2	130	110	55	85	5	0.25	1,2

NOTES:

1. BASED ON TITUS MODEL "DESV" SINGLE-DUCT TERMINAL UNIT WITH HYDRONIC REHEAT COIL.
2. HEATING COIL PERFORMANCE SELECTED AT MINIMUM PRIMARY AIRFLOW AND A 20 DEGREE HEATING WATER DELTA.
3. BASED ON TITUS MODEL "DESV" SINGLE-DUCT TERMINAL UNIT.
4. PROVIDE TITUS "DESV" EXTENDED CABINET OPTION.

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MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-24

Δ	DATE	DESCRIPTION

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DDC - INPUT/OUTPUT POINT SCHEDULE

SYSTEM APPARATUS OR AREA POINT DESCRIPTION	INPUT TO DDC: ANALOG: TEMPERATURE	PRESSURE	CFM	FLOW	RELATIVE HUMIDITY	POSITION	ENERGY USAGE	SPEED	CURRENT SENSING TRANSDUCER	INPUT TO DDC: BINARY: STATUS	CURRENT SENSING RELAY	SMOKE DETECTORS	FREEZESTAT	EMERGENCY SWITCH	FILTER DP	END SWITCH	LOCAL SWITCH ACTIVATION	ALARM	OUTPUT FROM DDC: ANALOG: SETPOINT ADJUSTMENT	POSITION	HUMIDITY	SPEED	OUTPUT FROM DDC: BINARY: OPTION	OPEN-CLOSE	HEATING-COOLING	SYSTEM FEATURES: ALARMS: FAILURE	HIGH ANALOG	LOW ANALOG	HIGH BINARY	FAULT (GENERAL)	PROGRAMS: TIME SCHEDULING (OCCUNOCC)	LEAD/LAG	MORNING WARM-UP / COOL DOWN	REDUCED OCCUPANCY CYCLE	ECONOMIZER	GENERAL: COLOR GRAPHICS	INTERFACE W/ EQUIPMENT CONTROLS	SUPPLEMENTARY NOTES
GLOBAL POINTS																																								
OA TEMPERATURE AND HUMIDITY	X				X																																			
SINGLE DUCT TERMINAL UNITS																																						X		
ROOM TEMPERATURE SENSOR	X																		X												X		X						
DISCHARGE TEMP SENSOR	X																									X													
HEATING COIL CONTROL VALVE																				X																			
PRIMARY AIR DAMPER						X														X																			
AIRFLOW SENSOR			X																X								X												

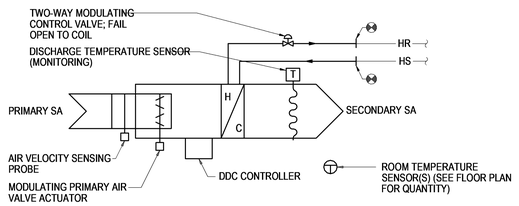
DDC SYSTEM GENERAL NOTES

1. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE DDC SYSTEM.
3. UNLESS OTHERWISE INDICATED, PROVIDE DDC CONTROLS.
4. SMOKE DETECTORS, FREEZE DETECTORS, AND HIGH/LOW LIMIT STATIC PRESSURE SENSORS SHALL BE HARD WIRED AND SHALL NOT REQUIRE OPERATION OF DDC SYSTEM SOFTWARE TO OPERATE OR TO DEENERGIZE SYSTEM FANS.
5. POINT SCHEDULES INCLUDE LINES FOR DEVICE TYPES WHICH MAY HAVE MULTIPLE OCCURRENCES FOR A SINGLE UNIT. SEE PLANS FOR QUANTITIES.
6. THE ATC CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING AND WIRING ALL CONTROL EQUIPMENT SUPPLIED WITH HVAC SYSTEMS AND COMPONENTS AND FOR PROVIDING POWER CIRCUITS AND REQUIRED DATA CONNECTIONS FOR THESE CONTROL SYSTEMS. CONTROLS CONTRACTOR SHALL ALSO PROVIDE ANY ANCILLARY COMPONENTS INCLUDING BUT NOT LIMITED TO SWITCHES, RELAYS, WIRING, CONDUIT, TERMINAL BOXES, JUNCTION BOXES, AND COMMUNICATION INTERFACES AS REQUIRED TO ACCOMPLISH INTENDED CONTROL FUNCTIONS AND/OR CONTROL SEQUENCE NOTED IN THE SPECIFICATIONS.
7. FUNCTION OF CONTROLS SHALL BE AUTOMATICALLY RESTORED TO NORMAL OPERATION WHEN SAFETIES ARE RESET OR WHEN POWER IS RESTORED AFTER AN OUTAGE WITHOUT OPERATOR INTERVENTION. FREEZESTAT AND PRESSURE DIFFERENTIAL SAFETY DEVICES SHALL REQUIRE MANUAL RESET AT THE UNIT. EMERGENCY FAN DISCONNECT TRIPPING SHALL BE RESET WHEN THE DISCONNECT SWITCH IS RESET. SMOKE DETECTOR TRIPPING SHALL BE RESET WHEN THE ALARM IS NO LONGER PRESENT IN THE FIRE ALARM SYSTEM.
9. ALL ANALOG CONTROL OUTPUTS SHALL BE TRUE ANALOG SIGNALS.
10. WHERE VALVE POSITION AND DAMPER POSITION ARE INDICATED, HARDWARE FEEDBACK IS REQUIRED. A CALCULATION OF ANTICIPATED POSITION IS NOT ACCEPTABLE.
11. DDC SYSTEM SHALL BE A STANDALONE CONTROL SYSTEM CONNECTED TO THE CAMPUS FRONT END SYSTEM. COORDINATE REQUIREMENTS FOR CONNECTION TO THE CENTRAL SYSTEM WITH THE OWNER.
12. REFER TO SPECIFICATION SECTIONS 230901 THROUGH 230923 FOR ADDITIONAL SYSTEM REQUIREMENTS.
13. ALL EXISTING PNEUMATIC CONTROL PANELS, DEVICES, VALVES, DAMPERS, ACCESSORIES, AND TUBING ARE TO BE REMOVED AND REPLACED BY DDC COMPONENTS UNDER THE SCOPE OF THIS PROJECT.

ATC SYMBOLS AND ABBREVIATIONS

T	ROOM TEMPERATURE SENSOR
	FAN
	PATH OF AIRFLOW
	DAMPER AND DAMPER OPERATOR; (OA) OUTSIDE AIR, (RA) RETURN AIR, (EA) EXHAUST AIR, (PR) PRESSURE RELIEF
	AIR INSERTION TEMPERATURE OR HUMIDITY SENSOR
F	FREEZESTAT
	2-WAY CONTROL VALVE
	3-WAY CONTROL VALVE
H	HUMIDITY SENSOR
P	PRESSURE SENSOR
	IMMERSION TEMPERATURE SENSOR
	OUTDOOR AIR INSERTION TEMPERATURE SENSOR WITH SUN SHIELD
T	WALL MOUNTED TEMPERATURE SENSOR
	MOTOR
H/C	H/C: HEATING COIL
SD	AIR DUCT SMOKE DETECTOR
CSR	CURRENT SENSING RELAY
CST	CURRENT SENSING TRANSDUCER
CO_2	CARBON DIOXIDE (CO2) SESNOR

AHU	AIR HANDLING UNIT
EA	EXHAUST AIR
EF	EXHAUST FAN
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTDOOR AIR
PR	PRESSURE RELIEF
RA	RETURN AIR
RF	RETURN FAN
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SATU	SUPPLY AIR TERMINAL UNIT
SF	SUPPLY FAN



SINGLE DUCT VAV TERMINAL UNITS

A. FURNISH AIR TERMINAL UNIT MANUFACTURER WITH DDC CONTROLLER(S) FOR FACTORY MOUNTING. PROVIDE ONE DDC CONTROLLER FOR EACH TERMINAL UNIT.

B. PROVIDE CONTROL INTERLOCK BETWEEN SA TERMINAL UNITS, ROOM TEMPERATURE SENSORS AND CONTROL VALVES AS INDICATED ON THE DRAWINGS.

1. DDC SYSTEM SHALL PROVIDE CONTROL INTERFACE WITH TERMINAL UNIT AIRFLOW SENSORS AND CONVERT THEIR VELOCITY PRESSURE DATA DIRECTLY TO CFM BASED ON VELOCITY.

C. TERMINAL UNIT OCCUPIED STATUS SHALL BE DETERMINED BY THE DDC SYSTEM'S BUILDING OCCUPANCY SCHEDULE (TIMECLOCK).

D. IN AREAS SERVED BY MULTIPLE SUPPLY AIR TERMINAL UNITS, DDC SYSTEM SHALL PROVIDE THE ABILITY TO REMOVE OR REDEFINE ANY SUPPLY AIR TERMINAL INTERLOCK ARRANGEMENT. IN ADDITION, DDC SYSTEM SHALL PROVIDE THE ABILITY TO ADD DEDICATED ROOM TEMPERATURE SENSOR CONTROL FOR EACH SUPPLY AIR TERMINAL UNIT.

E. OPERATION - BUILDING OCCUPIED:

1. OCCUPIED ROOM TEMPERATURE SENSOR SETPOINT SHALL BE 75 DEGREES F (ADJUSTABLE) IN COOLING AND 70 DEGREES F (ADJUSTABLE) IN HEATING.
2. THE SUPPLY AIR TERMINAL UNIT PRIMARY AIR DAMPER SHALL MODULATE BETWEEN ITS MINIMUM AND MAXIMUM AIRFLOW SETPOINTS TO MAINTAIN THE OCCUPIED COOLING ROOM TEMPERATURE SENSOR SETPOINT.
3. WHEN THE PRIMARY AIR DAMPER HAS REACHED ITS MINIMUM AIRFLOW SETPOINT AND THE SPACE TEMPERATURE FALLS BELOW THE OCCUPIED HEATING SETPOINT OF THE ROOM TEMPERATURE SENSOR, THE TERMINAL UNIT HEATING COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN THE OCCUPIED HEATING SETPOINT OF THE ROOM TEMPERATURE SENSOR, SUBJECT TO A HIGH LIMIT DISCHARGE AIR TEMPERATURE OF 85 DEGREES F (ADJUSTABLE).
4. WHEN THE DISCHARGE TEMPERATURE RISES ABOVE AN ADJUSTABLE HIGH LIMIT TEMPERATURE (85 DEGREES F; ADJUSTABLE), PRIMARY AIR DAMPER SHALL MODULATE TOWARDS IT'S MAXIMUM AIRFLOW SETPOINT TO MAINTAIN THE HIGH LIMIT SETPOINT. ONCE PRIMARY AIR DAMPER HAS REACHED IT'S MAXIMUM SETPOINT, UNIT DISCHARGE TEMPERATURE SHALL BE PERMITTED TO INCREASE ABOVE THE HIGH LIMIT DISCHARGE TEMPERATURE SETPOINT.
5. WHERE MULTIPLE SENSORS ARE USED, AVERAGE SPACE TEMPERATURE SHALL BE USED TO CONTROL THE TERMINAL UNIT.

G. OPERATION - BUILDING UNOCCUPIED:

1. UNOCCUPIED ROOM TEMPERATURE SENSOR HEATING SETPOINT SHALL BE 65 DEGREES (ADJUSTABLE).
2. UPON A FALL IN SPACE TEMPERATURE BELOW THE UNOCCUPIED HEATING TEMPERATURE SENSOR SETPOINT, A SIGNAL SHALL BE SENT THRU THE DDC SYSTEM TO ENERGIZE THE ASSOCIATED AHU AND THE PRIMARY AIR DAMPER SHALL OPEN TO ITS MAXIMUM POSITION. THE TERMINAL UNIT HEATING COIL CONTROL VALVE SHALL FULLY OPEN TO ACHIEVE THE UNOCCUPIED HEATING SETPOINT OF THE ROOM TEMPERATURE SENSOR.
3. WHEN ROOM TEMPERATURE RISES 5 DEGREES F ABOVE THE UNOCCUPIED TEMPERATURE SENSOR HEATING SETPOINT, THE TERMINAL UNIT HEATING COIL CONTROL VALVE SHALL CLOSE AND THE PRIMARY AIR DAMPER SHALL CLOSE.
4. WHEN THE ROOM TEMPERATURE RISES ABOVE THE UNOCCUPIED COOLING SETPOINT, A SIGNAL SHALL BE SENT THRU THE DDC SYSTEM TO ENERGIZE THE ASSOCIATED AHU. THE TERMINAL UNIT FAN SHALL BE ENERGIZED AND THE PRIMARY AIR DAMPER SHALL FULLY OPEN. WHEN THE ROOM TEMPERATURE FALLS 5 DEGREES F BELOW THE UNOCCUPIED COOLING SET POINT, THE PRIMARY AIR DAMPER SHALL CLOSE.

H. OPERATION - MORNING WARM-UP/COOL-DOWN:

1. THE DDC SYSTEM SHALL PLACE THE TERMINAL UNITS INTO MORNING WARM-UP/COOL-DOWN MODE ONE HOUR (ADJUSTABLE) PRIOR TO THE BUILDING BECOMING OCCUPIED.
2. THE SUPPLY AIR TERMINAL UNITS SHALL OPERATE IN BUILDING-OCCUPIED MODE.
3. WHEN ALL SPACE TEMPERATURE SENSORS REACH WITHIN 2 DEGREES F OF THEIR OCCUPIED SETPOINT, THE TERMINAL UNITS SHALL REMAIN IN BUILDING-OCCUPIED MODE.

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INTERIOR DESIGN

JPA Project No.: 8091-24

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Project Number: 224112.00
Drawn By: TMH
Checked By: KAH

Drawing
AUTOMATIC TEMPERATURE CONTROLS

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LIGHTING CONTROLS LEGEND

LIGHTING CONTROL SYSTEM RELAY (ANY TYPE)

L — B1,a2 / 1AH-3
- LIGHTING CONTROL ZONE. WHERE NO LETTER IS INDICATED, LIGHTING LOAD RELAY SERVES A SINGLE ZONE OF LUMINAIRES WITHIN ROOM OR AREA.
- PANEL AND CIRCUIT DESIGNATION.

LIGHTING CONTROL SYSTEM WALL STATIONS

S^{L1}_{L2}
- LIGHTING CONTROL ZONE. WHERE NO LETTER IS INDICATED, WALL STATION SERVES ALL LIGHTING ZONES WITHIN ROOM OR AREA.
- LIGHTING CONTROL STATION TYPE. (SEE SYMBOLS LIST)

UL924 AUTOMATIC LOAD CONTROL RELAY

LCR — a1 / 4ELS-7
- LIGHTING CONTROL ZONE. WHERE NO LETTER IS INDICATED, WALL STATION SERVES ALL LIGHTING ZONES WITHIN ROOM OR AREA.
- LIFE-SAFETY PANEL AND CIRCUIT DESIGNATION.

UL1008 BRANCH CIRCUIT EMERGENCY TRANSFER SWITCH

ETS — a1 / 4ELS-23
- LIGHTING CONTROL ZONE. WHERE NO LETTER IS INDICATED, WALL STATION SERVES ALL LIGHTING ZONES WITHIN ROOM OR AREA.
- LIFE-SAFETY PANEL AND CIRCUIT DESIGNATION.

LIGHTING CONTROL SYSTEM OCCUPANCY SENSORS

(O) a1
- LIGHTING CONTROL ZONE. WHERE NO LETTER IS INDICATED, OCCUPANCY SENSOR SERVES ALL LIGHTING ZONES WITHIN ROOM OR AREA.

LIGHTING CONTROL SYSTEM DAYLIGHT SENSORS

(D) a1
- LIGHTING CONTROL ZONE. WHERE NO LETTER IS INDICATED, DAYLIGHT SENSOR SERVES ALL LIGHTING ZONES WITHIN ROOM OR AREA.

LINE VOLTAGE STAND-ALONE DEVICES (ANY TYPE)

S^{L1}_{L2} — 4ELS-2
- LIGHTING CONTROL ZONE. WHERE NO LETTER IS INDICATED, SWITCH SERVES ALL LIGHTING WITHIN ROOM OR AREA.
- SWITCH TYPE. (SEE SYMBOLS LIST)
- PANEL AND CIRCUIT DESIGNATION.

LIGHTING FIXTURE (ANY TYPE)

RB1 / a1
- FIXTURE TYPE. (REFER TO LIGHTING FIXTURE SCHEDULE)
- LIGHTING CONTROL ZONE.

ELECTRICAL SYMBOLS AND ABBREVATIONS

EXISTING

- EXISTING TO REMAIN ELECTRTICAL PANELBOARD (120/208V), SURFACE MOUNTED AS INDICATED.
- EXISTING TO REMAIN ELECTRTICAL PANELBOARD (277/480V), SURFACE MOUNTED AS INDICATED.
- EXISTING TO REMAIN POWER TRANSFORMER.
- EXISTING TO REMAIN ENCLOSED CIRCUIT BREAKER.
- EXISTING TO REMAIN DISCONNECT SWITCH.
- EXISITNG TO REMAIN SWITCH.
- EXISTING TO REMAIN 1'X4' LIGHT FIXTURE.
- EXISTING TO REMAIN 2'X4' LIGHT FIXTURE.
- EXISTING TO REMAIN WALL MOUNTED DOWN LIGHT.
- EXISTING TO REMAIN EXIT SIGN, MOUNTING AND FACES AS INDICATED.
- EXISTING TO REMAIN JUNCTION BOX.

DEMOLITION

- DISCONNECT AND REMOVE EXISTING 2'X4' LIGHITNG FIXTURE.
- DISCONNECT AND REMOVE EXISTING 1'X4' LIGHTING FIXTURE.
- DISCONNECT AND REMOVE EXISTING 2'X2' LIGHTING FIXTURE.
- DISCONNECT AND REMOVE EXISITING WALL WASH FIXTURE.
- DISCONNECT AND REMOVE EXISITING EXIT SIGN.
- DISCONNECT AND REMOVE EXISITING DOWNLIGHT LIGHTING FIXTURE.
- DISCONNECT AND REMOVE EXISITING PENDANT LIGHTING FIXTURE.
- DISCONNECT AND REMOVE EXISITING SWITCH.
- DISCONNECT AND REMOVE EXISITING BLANK PLATE
- DISCONNECT AND REMOVE EXISITING AIR TERMINAL
- DISCONNECT AND REMOVE GROUNDING CONDUCTOR.
- DISCONNECT AND REMOVE DOWN CONDUCTOR INSTALLED IN EXISTING RACEWAY. RACEWAYS TO REMAIN FOR NEW CABLE.
- LOCATE AND HAND DIG EXISTING DOWN CONDUCTOR AND GROUND ROD FOR REPLACEMENT BELOW GRADE. EXISTING RACEWAY TO REMAIN FOR REUSE.

REMOVE AND REINSTALL EXISITING

- REMOVE EXISITING HARDWIRED-CONNECTION TO EQUIPMENT. REINSTALL UNDER NEW WORK.
- REMOVE EXISTING WIRELESS ACCESS POINT. REINSTALL UNDER NEW WORK
- REMOVE EXISITING SPEAKER. REINSTALL UNDER NEW WORK.
- REMOVE EXISITING SMOKE DETECTOR. REINSTALL UNDER NEW WORK.
- REMOVE EXISITING FIRE ALARM SPEAKER. REINSTALL UNDER NEW WORK.

WIRING AND RACEWAYS

- HOMERUN TO PANELBOARD. NUMBER OF ARROWS INDICATES NUMBER OF CIRCUITS UNLESS OTHERWISE NOTED. NUMBER OF HASH MARKS INDICATES NUMBER OF PHASE AND NEUTRAL CONDUCTORS UNLESS OTHERWISE NOTED. WHERE NO HASH MARKS APPEAR, PROVIDE TWO CONDUCTORS PLUS GROUND. PROVIDE GROUND CONDUCTOR WITH ALL FEEDERS AND BRANCH CIRCUITS. REFER TO PANEL SCHEDULES FOR CONDUCTOR SIZE, AND CONDUIT SIZE UNLESS OTHERWISE NOTED.
- CONDUIT AND WIRING. CONDUIT SHALL BE RUN CONCEALED IN WALL CONSTRUCTION OR CEILING SPACE. CONDUIT MAY BE RUN EXPOSED IN SUPPORT SPACES SUCH AS MECHANICAL AND ELECTRICAL ROOMS THAT HAVE EXPOSED CEILINGS OR WHERE CONCEALMENT IS NOT FEASIBLE.
- CONDUIT AND WIRING IN OR BELOW FLOOR CONSTRUCTION (FOR INTERIOR APPLICATIONS). PROVIDE PULLCORD FOR EMPTY.
- CONDUIT UP.
- CONDUIT DOWN.
- PULLBOX WITH REMOVABLE COVER, SIZED AT NOMINAL DIMENSIONS OR AT NEC MINIMUM REQUIREMENTS.
- GROUNDING REQUIREMENT - TERMINATION OF EQUIPMENT GROUNDING CONDUCTORS AND GROUNDING ELECTRODE CONDUCTORS IN COMPLIANCE WITH NEC REQUIREMENTS.
- CONDUIT SLEEVE, SIZE AS INDICATED, ABOVE CEILING WITH INSULATED BUSHINGS.
- 2" X 24" TELECOMMUNICATIONS GROUNDING BUSBAR.

LIGHTING FIXTURES

- 2-FT BY 4-FT LIGHT FIXTURE, TYPE AS DESIGNATED.
- 1-FT BY 4-FT LIGHT FIXTURE, TYPE AS DESIGNATED.
- 2-FT BY 2-FT LIGHT FIXTURE, TYPE AS DESIGNATED.
- WALL MOUNTED LINEAR LIGHT FIXTURE, VARIOUS WIDTHS AND LENGTHS, TYPE AS DESIGNATED.
- EXIT SIGN, CEILING OR WALL MOUNTED WITH DIRECTIONAL ARROWS AND FACES AS INDICATED ON PLAN, TYPE AS DESIGNATED.
- 2-FT DIAMETER RECESSED OR SURFACE MOUNTED CEILING FIXTURE, TYPE AS DESIGNATED.
- INDUSTRIAL STRIP LIGHTING FIXTURE, TYPE AS DESIGNATED.
- ROUND PENDANT LIGHTING FIXTURE, TYPE AS DESIGNATED.
- FOR ANY OF THE ABOVE, SHADED AREA INDICATES LIGHTING FIXTURE IS FED FROM LIFE SAFETY GENERATOR CIRCUIT.

LIGHTING CONTROLS

- S — LINE VOLTAGE SINGLE-POLE TOGGLE SWITCH, WALL MOUNTED 48" ABOVE FLOOR TO TOP OF BOX, UNLESS OTHERWISE NOTED.
- LINE VOLTAGE WALL SWITCH WITH INTEGRAL DUAL-TECHNOLOGY OCCUPANCY SENSOR, WALL MOUNTED 48" ABOVE FLOOR TO TOP OF BOX, UNLESS OTHERWISE NOTED.
- ETS — BRANCH CIRCUIT EMERGENCY LIGHTING TRANSFER SWITCH WITH 0-10V DIMMING INTERFACE, UL1008 LISTED, WALL MOUNTED TO JUNCTION BOX IN ACCESSIBLE CEILING SPACE, UNLESS OTHERWISE NOTED.
- LCR — AUTOMATIC LOAD CONTROL RELAY, UL924 LISTED, WALL MOUNTED TO JUNCTION BOX IN ACCESSIBLE CEILING SPACE, UNLESS OTHERWISE NOTED.
- L — LIGHTING CONTROL SYSTEM LOAD RELAY WITH LOW VOLTAGE INPUTS AND 0-10V DIMMING OUTPUTS, MOUNTED TO JUNCTION BOX IN ACCESSIBLE CEILNG SPACE, UNLESS OTHERWISE NOTED.
- S_{L1} — LIGHTING CONTROL SYSTEM LOW VOLTAGE BUTTON STATION WITH ON/OFF FUNCTIONALITY, WALL MOUNTED 48" ABOVE FLOOR TO TOP OF BOX, UNLESS OTHERWISE NOTED.
- S_{L2} — LIGHTING CONTROL SYSTEM LOW VOLTAGE BUTTON STATION WITH SINGLE ZONE ON/OFF AND DIMMING FUNCTIONALITY, WALL MOUNTED 48" ABOVE FLOOR TO TOP OF BOX, UNLESS OTHERWISE NOTED.
- (O) — LIGHTING CONTROL SYSTEM OCCUPANCY SENSOR, WITH 360-DEGREE, 2000-SQUARE FOOT MINIMUM COVERAGE, CEILING MOUNTED UNLESS OTHERWISE NOTED.

POWER

- 2P-3W-20A-125V DUPLEX GROUNDING TYPE CONVENIENCE RECEPTACLE, NEMA 5-20R, RECESSED CEILING MOUNTED. SEE DETAIL 3/EP-101 FOR MORE INFORMATION ON NEW INSTALLATION.

SYSTEMS

- TELECOMMUNICATION DATA OUTLET, RECESSED CEILING MOUNTED. PROVIDE (1) CATEGORY 6 DATA CABLE TERMINATED IN (1) RJ-45 DATA JACK AND FACEPLATE.

LIGHTNING PROTECTION - NEW WORK

- LIGHTNING PROTECTION AIR TERMINAL, MINIMUM 12" HEIGHT. SEE DETAILS, THIS DRAWING FOR ADDITIONAL INFORMATION.
- COPPER DOWN CONDUCTOR AND GROUND ROD IN PVC CONDUIT.
- GROUNDING CONDUCTOR.
- GROUND CONDUCTOR SPLICE POINT.
- (D) — DOWN CONDUCTOR INSTALLED IN EXISTING RACEWAY.
- (T) — TEST WELL AND GROUND ROD.

GENERAL

- ELEC RM / 101 — ROOM NAME; ROOM NUMBER
- 1 / E-001 — DETAIL NAME; DRAWING NUMBER WHERE DETAIL EXISTS
- (1) — SPECIFIC NOTE ON DRAWING SHEET.
- ELECTRICAL CLEARANCE AROUND DISTRIBUTION EQUIPMENT.
- DISTRIBUTION EQUIPMENT SHOWING REQUIRED CLEARANCES AROUND EQUIPMENT AND PLACEMENT ON EQUIPMENT PAD.

ABBREVIATIONS

A	AMPS, AMPERES
AC	ALTERNATING CURRENT
AF	ABOVE FLOOR, AMPERES FRAME
AG	ABOVE GRADE
AHU	AIR HANDLING UNIT
AIC	AMPERES INTERRUPTING CAPACITY
AS	AMPERES SENSOR
AT	AMPERES TRIP
ATC	AUTOMATIC TEMPERATURE CONTROL
ATS	AUTOMATIC TRANSFER SWITCH
BAS	BUILDING AUTOMATION SYSTEM
BIL	BASIC INSULATION LEVEL
C	CONDUIT
CKT	CIRCUIT
CT	CURRENT TRANSFORMERS
CUH	CABINET UNIT HEATER
DC	DIRECT CURRENT
DDC	DIGITAL DIRECT CONTROL
DIST	DISTRIBUTION
DSS	DUCTLESS SPLIT SYSEM
DTU	DIGITAL TRIP UNIT
DWG	DRAWING
DX	DISCONNECT EXISTING
EC	EMPTY CONDUIT
ECB	ENCLOSED CIRCUIT BREAKER
EF	EXHAUST FAN
ELEV	ELEVATOR
EGB	ELECTRICAL GROUNDING BUSBAR
EMGB	ELECTRICAL MAIN GROUNDING BUSBAR
EMT	ELECTRICAL METALLIC TUBING
EPO	EMERGENCY POWER OFF
ERMS	ENERGY REDUCTION MAINTENANCE SWITCH
EQP	EQUIPMENT
ETR	EXISTING TO REMAIN
EWC	ELECTRIC WATER COOLER
EX	EXISTING
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FLA	FULL LOAD AMPS
FVAV	FAN POWERED VARIABLE AIR VOLUME
GRD, G	GROUND, GFCI
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
HOA	HAND-OFF-AUTOMATIC
HP	HORSEPOWER
IMC	INTERMIDIATE METALLIC CONDUIT
JB	JUNCTION BOX
KCMIL	THOUSANDS OF CIRCULAR MILS
KV	KILO-VOLT
KVA	KILO-VOLT-AMPERES
KW	KILO-WATT
LED	LIGHT-EMITTING DIODE
LM	LUMEN
LM/W	LUMENS PER WATT (EFFICACY)
LSI	LONG, SHORT, AND INSTANTANEOUS (SETTINGS)
LTG	LIGHTING
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MLO	MAIN LUGS ONLY
MIN	MINIMUM
MOA	MULTI-OUTLET RACEWAY ASSEMBLY
MOP	MAXIMUM OVERCURRENT PROTECTION
MV	MEDIUM VOLTAGE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OPT	OPTIONAL
P	POLE
PDU	POWER DISTRIBUTION UNIT
PF	POWER FACTOR
PNL	PANEL
PUH	PROPELLER UNIT HEATER
PVC	POLY-VINYL CHLORIDE
REC	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
RX	UNINSTALL AND REMOVE
RM	ROOM
SBJ	SYSTEM BONDING JUMPER
SPD	SURGE PROTECTIVE DEVICE
STDBY	STANDBY
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TGB	TELECOMMUNICATION GROUNDING BUSBAR
TMGB	TELECOMMUNICATION MAIN GROUNDING BUSBAR
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UPS	UNINTERRUPTABLE POWER SUPPLY
V	VOLTS
VA	VOLTS-AMPERES
VFD	VARIABLE FREQUENCY DRIVE
W	WIRE, WATTS
W/C	WITHSTAND AND CLOSE
WP	WEATHER-PROTECTIVE, WEATHER-PROOF
XFMR	TRANSFORMER
Y	WYE
Z	IMPEDANCE
&	AND
Δ	DELTA
Ø	PHASE

NOTES

A. MOUNTING HEIGHTS ARE TO TOP OF WIRING DEVICES UNLESS OTHERWISE INDICATED. COMPLY WITH ADA (AMERICANS WITH DISABILITIES ACT) GUIDELINES FOR MAXIMUM MOUNTING HEIGHTS.

B. MOUNTING HEIGHTS ARE TO BOTTOM OF LIGHTING FIXTURES UNLESS OTHERWISE INDICATED.

C. VERIFY EXACT LOCATION OF SPECIALTY WIRING DEVICES WITH EQUIPMENT SPECIFIED UNDER OTHER DIVISIONS OR SUPPLIED BY OWNER AND PRIOR TO ROUGH-IN

D. WIRING DEVICES AND DEVICE OUTLET BOXES SHALL BE RECESSED IN NEW WALL CONSTRUCTION AND SURFACE MOUNTED WHERE NOTED OR OTHERWISE APPROVED BY ARCHITECT.

WHERE SURFACE MOUNTED, THE FOLLOWING APPLIES:
- -FINISHED SPACES - SURFACE METAL RACEWAY TIGHT TO WALL, MOUNTED VERTICALLY AND HORIZONTALLY, PAINTED TO MATCH ROOM FINISH. WHERE DEVICE IS WITHIN 10' OF CORNER OF ROOM, RUN HORIZONTALLY AND RISE VERTICALLY IN CORNER.
- -UNFINISHED SPACES (INCLUDING MECHANICAL AND STORAGE ROOMS) - CONDUIT TIGHT TO WALL.

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MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES

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MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
ELECTRICAL SYMBOLS AND ABBREVIATIONS

E001

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SHEET'S ORIGINAL SCALE, ADD E

THE SQUARES BELOW ARE COLOR: WITH BLACK
AND WHITE LETTERS IF PRINTED CORRECTLY

E

D

C

B

A

COMcheck Software Version COMcheckWeb
Interior Lighting Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	Macklin Tower - Roof Replacement Project
Project Type:	Alteration

Construction Site:
51 Mannakee Street
Rockville, Maryland 20850

Owner/Agent:
Montgomery College - Office of Facilities & Public Safety
9221 Corporate Blvd
Rockville, Maryland 20850

Designer/Contractor:
James Posey Associates
11155 Red Run Blvd, Suite 310
Baltimore, Maryland 21117
(410) 265-6100

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-Office	25110	0.64	16070
		Total Allowed Watts =	16070

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
Office (25110 sq.ft.)				
PA1: PA1: Other:	1	13	32	416
PB1: PB1: Other:	1	3	70	210
RA1: RA1: Other:	1	209	30	6270
RA2: RA2: Other:	1	4	40	160
RB1: RB1: Other:	1	77	28	2156
RK1: RK1: Other:	1	14	25	350
RL1: RL1: Other:	1	18	19	342
SB1: SB1: Other:	1	12	45	540
SC1: SC1: Other:	1	24	48	1152
WA1: WA1: Other:	1	11	48	528
			Total Proposed Watts =	12124

Interior Lighting PASSES

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting alteration project represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2021 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Thomas M. Clippinger, PE (Vice President) — Name - Title
Signature
08/29/2025 — Date

COMcheck Software Version COMcheckWeb
Inspection Checklist

Energy Code: 2021 IECC

Requirements: 100.0% were addressed directly in the COMcheck software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** E601

Additional Comments/Assumptions:

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.3.1 [EL22][1]	Spaces required to have light-reduction controls have a manual control that allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern >= 50 percent.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** EL101, EL102, E501
C405.2.1, C405.2.1.1 [EL18][1]	Occupancy sensors installed in classrooms/lecture/training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges/breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, corridors, warehouse storage areas, and other spaces <= 300 sqft that are enclosed by floor-to-ceiling height partitions. Reference section language C405.2.1.2 for control function in warehouses and section C405.2.1.3 for open plan office spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** EL101, EL102, E501
C405.2.1.2 [EL19][1]	Occupancy sensors control function in warehouses: In warehouses, the lighting in aisleways and open areas is controlled with occupant sensors that automatically reduce lighting power by 50% or more within 20 minutes of when the areas are unoccupied. The occupant sensors control lighting in each aisleway independently and do not control lighting beyond the aisleway being controlled by the sensor. Lights not turned off by occupant sensors is done so by time-switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** N/A
C405.2.1.3 [EL20][1]	Occupant sensor control function in open plan office areas: Occupant sensor controls in open office spaces >= 300 sq.ft. have controls 1) configured so that general lighting can be controlled separately in control zones with floor areas <= 600 sq.ft. within the space, 2) general lighting in each zone permitted to turn on upon occupancy in control zone, 3) automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the space, 4) are configured so that general lighting power in each control zone is reduced by >= 80% of the full zone general lighting power within 20 minutes of all occupants leaving that control zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** EL101, EL102, E501
C405.2.2, C405.2.2.1 [EL21][2]	Each area not served by occupancy sensors (per C405.2.1.1) have time-switch controls and functions detailed in sections C405.2.2.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.4.1, C405.2.4.2 [EL23][2]	Daylight zones provided with individual controls that control the lights independent of general area lighting. See code section C405.2.3 Daylight-responsive controls for applicable spaces, C405.2.3.1 Daylight responsive control function and section C405.2.3.2 Sidelit zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** N/A
C405.2.5 [EL27][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** EL101, EL102, E501
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** N/A
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** N/A
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** N/A
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** N/A
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** N/A
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** N/A
C405.12 [EL32][2]	Buildings with gross conditioned floor area > 25,000 ft2 will be equipped with a energy monitoring system in compliance with C405.12.1 through C405.12.5.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** N/A

Additional Comments/Assumptions:

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17][1]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5 [FI16][1]	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Specification Section 26 0936

Additional Comments/Assumptions:

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

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MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
INTERIOR LIGHTING COMPLIANCE FORM

E002

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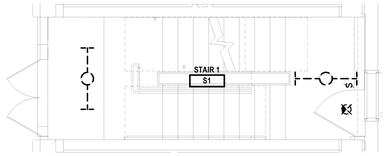
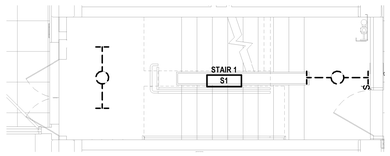
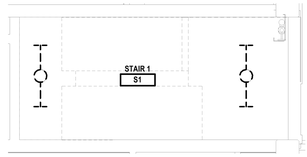


3 ED101 PART GROUND FLOOR PLAN - LIGHTING - DEMOLITION - STAIR 1
SCALE: 1/4" = 1'-0"

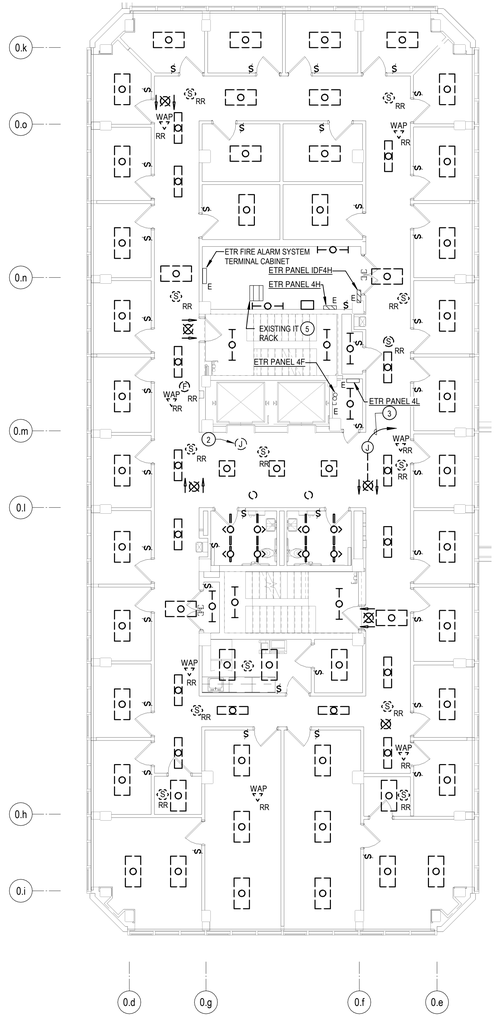


4 ED101 PART FIRST FLOOR PLAN - LIGHTING - DEMOLITION - STAIR 1
SCALE: 1/4" = 1'-0"



5 ED101 PART THIRD FLOOR PLAN - LIGHTING - DEMOLITION - STAIR 1
SCALE: 1/4" = 1'-0"

1 ED101 PART SECOND FLOOR PLAN - ELECTRICAL - DEMOLITION
SCALE: 1/8" = 1'-0"



2 ED101 PART FOURTH FLOOR PLAN - ELECTRICAL - DEMOLITION
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE EXISTING CONDITIONS IN DETAIL OR DIMENSION. DETERMINE EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.

B. COORDINATE WITH MECHANICAL WORK SHOWN ON MECHANICAL DRAWINGS AND DISCONNECT MECHANICAL EQUIPMENT AS INDICATED AND REQUIRED.

C. WHERE EQUIPMENT IS NOTED "DISCONNECT" OR "REMOVE", REMOVE ASSOCIATED WIRE AND CONDUIT BACK TO SOURCE, UNLESS OTHERWISE NOTED.

D. REMOVE EXISTING EQUIPMENT AND DEVICES INDICATED, INCLUDING ASSOCIATED WIRE AND CONDUIT BACK TO SOURCE UNLESS OTHERWISE NOTED.

E. EXISTING CIRCUITS INTERRUPTED BY DEMOLITION, BUT ARE TO REMAIN, SHALL BE MADE CONTINUOUS.

F. WHERE DEVICES ARE TO BE REMOVED AND REINSTALLED, PROVIDE WIRE AND CONDUIT TO NEW LOCATION AS REQUIRED.

G. IN BLOCK OR CONCRETE WALLS TO REMAIN, PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR DEVICES REMOVED.

H. WHERE CIRCUITS ARE REMOVED BACK TO PANELS, ASSOCIATED BREAKERS MAY BE UTILIZED FOR NEW CIRCUITING.

I. DEMOLITION SHALL INCLUDE REMOVAL AND OFF-SITE DISPOSAL OF MATERIALS. DO NOT ABANDON IN PLACE ANY ELECTRICAL COMPONENTS UNLESS OTHERWISE NOTED ON DRAWINGS.

J. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY DASHED (— — —) SHALL BE REMOVED AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (————) SHALL REMAIN.

K. THE EXISTING FACILITY SHALL REMAIN IN OPERATION DURING RENOVATION. INTERRUPTION TO THE EXISTING BUILDING ELECTRIC SERVICE SHALL BE COORDINATED WITH THE OWNER TO MINIMIZE DISRUPTION. INTERRUPTION OF UTILITIES SHALL NOT OCCUR DURING WORKING HOURS.

L. EXISTING CONDUITS MAY BE FOUND TO BE RUNNING IN SLAB WHERE SLAB CUTS OCCUR. SCAN FOR CONDUIT LOCATIONS IN AREAS PRIOR TO CUTTING. SEE STRUCTURAL DRAWINGS FOR OPENING LOCATIONS. WHERE CIRCUITS SERVE DEVICES TO REMAIN, REFEED EXISTING DEVICES. MATCH EXISTING CONDUIT AND WIRE SIZE.

M. ALL EMERGENCY AND EGRESS LIGHTING SERVED BY PANEL 4ELS LOCATED IN BASEMENT. REMOVE CIRCUIT BACK TO COMMON JUNCTION BOX LOCATION. CIRCUIT(S) TO BE REUSED FOR NEW WORK.

N. REMOVE AND REPLACE ALL EXISTING SWITCH PLATES AND OUTLET COVERS FROM EXISTING WALLS AND REPLACE WITH NEW PLATES PER SECTION 260534 OF SPECIFICATIONS.

O ALL DEVICES LABELED "RR" ARE TO BE REMOVED, AND RETAINED FOR REINSTALLATION IN NEW CEILING.

SPECIFIC NOTES:

1. PROJECTOR SHALL BE DISCONNECTED, REMOVED, AND CAREFULLY SALVAGED FOR REINSTALLATION DURING NEW WORK. ASSOCIATED POWER AND DATA OUTLET LOCATED ABOVE CEILING SHALL BE DISCONNECTED, AND REMOVED BACK TO NEAREST JUNCTION BOX. CONDUIT AND WIRING SHALL REMAIN FOR RECONNECTION DURING NEW WORK.
2. REMOVE EXISTING FIRE ALARM JUNCTION BOX IN DEMOLISHED CEILING, AND TEMPORARILY SUSPEND FROM STRUCTURE FOR REINSTALLATION IN NEW CEILING.
3. IDENTIFY IN FIELD THE EXISTING CIRCUIT IN EXISTING PANEL '4ELS', LOCATED IN THE BASEMENT, SERVING FLOOR EMERGENCY AND EXIT LIGHTS. RETAIN CIRCUIT FOR REUSE WITH NEW EMERGENCY FIXTURES. SEE NEW WORK PLANS FOR MORE INFORMATION.
4. AS A PART OF BASE BID: DISCONNECT AND REMOVE MECHANICAL EQUIPMENT CIRCUIT. REMOVED EXISTING BRANCH CIRCUIT BACK TO PANELBOARD, AND LABEL BREAKER AS SPARE.
5. DISCONNECT AND REMOVE EXISTING GROUND WIRES CONNECTED TO TELECOMMUNICATIONS EQUIPMENT AND RACEWAYS. NEW GROUNDING TO BE PROVIDED UNDER NEW WORK.

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
SECOND AND FOURTH FLOOR PLAN - ELECTRICAL - DEMOLITION

ED101

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NORTH
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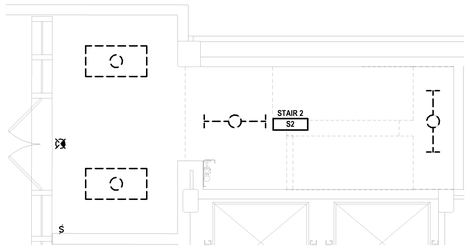
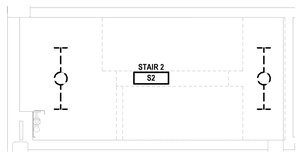
IF LINE SHOWN ABOVE IS NOT EXACTLY ONE INCH LONG AT THIS SHEET'S ORIGINAL PAPER SIZE

THE SQUARES ABOVE ARE COLOR, WITH BLACK AND WHITE LETTERS, IF PRINTED CORRECTLY

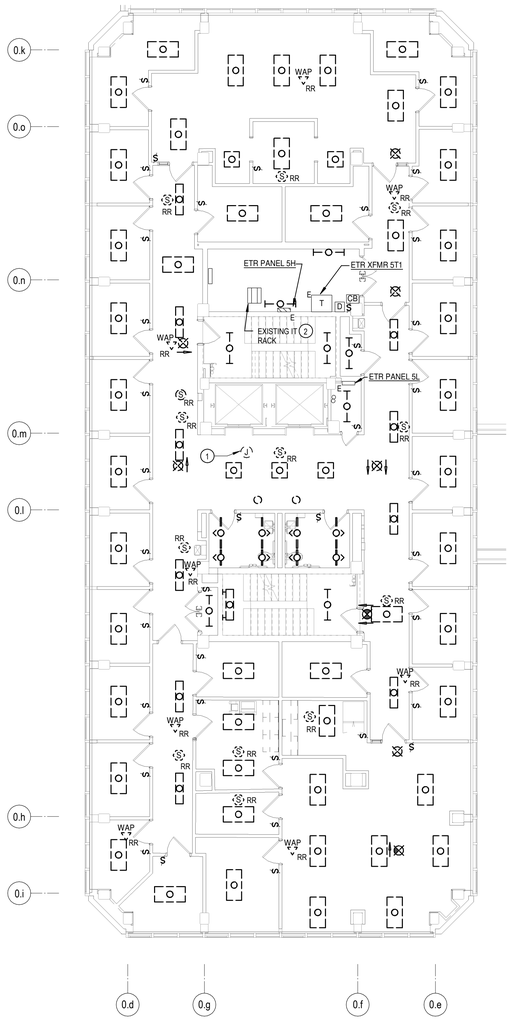




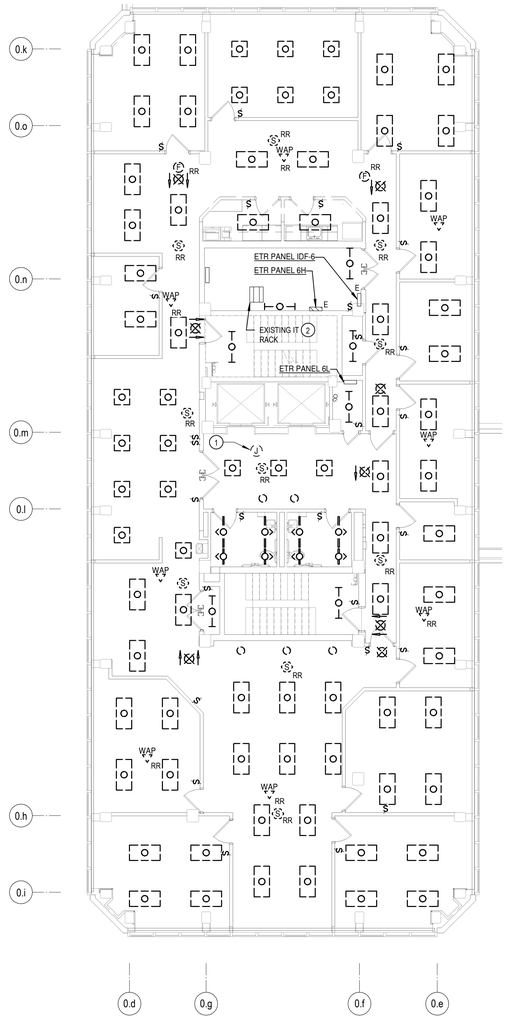
3 ED102 PART FIRST FLOOR PLAN - LIGHTING - DEMOLITION - STAIR 2
SCALE: 1/4" = 1'-0"

4 ED102 PART THIRD FLOOR PLAN - LIGHTING - DEMOLITION - STAIR 2
SCALE: 1/4" = 1'-0"

5 ED102 PART ROOF FLOOR PLAN - LIGHTING - DEMOLITION - STAIR 2
SCALE: 1/4" = 1'-0"



1 ED102 PART FIFTH FLOOR PLAN - ELECTRICAL - DEMOLITION
SCALE: 1/8" = 1'-0"



2 ED102 PART SIXTH FLOOR PLAN - ELECTRICAL - DEMOLITION
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE EXISTING CONDITIONS IN DETAIL OR DIMENSION. DETERMINE EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.

B. COORDINATE WITH MECHANICAL WORK SHOWN ON MECHANICAL DRAWINGS AND DISCONNECT MECHANICAL EQUIPMENT AS INDICATED AND REQUIRED.

C. WHERE EQUIPMENT IS NOTED "DISCONNECT" OR "REMOVE", REMOVE ASSOCIATED WIRE AND CONDUIT BACK TO SOURCE, UNLESS OTHERWISE NOTED.

D. REMOVE EXISTING EQUIPMENT AND DEVICES INDICATED, INCLUDING ASSOCIATED WIRE AND CONDUIT BACK TO SOURCE UNLESS OTHERWISE NOTED.

E. EXISTING CIRCUITS INTERRUPTED BY DEMOLITION, BUT ARE TO REMAIN, SHALL BE MADE CONTINUOUS.

F. WHERE DEVICES ARE TO BE REMOVED AND REINSTALLED, PROVIDE WIRE AND CONDUIT TO NEW LOCATION AS REQUIRED.

G. IN BLOCK OR CONCRETE WALLS TO REMAIN, PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR DEVICES REMOVED.

H. WHERE CIRCUITS ARE REMOVED BACK TO PANELS, ASSOCIATED BREAKERS MAY BE UTILIZED FOR NEW CIRCUITING.

I. DEMOLITION SHALL INCLUDE REMOVAL AND OFF-SITE DISPOSAL OF MATERIALS. DO NOT ABANDON IN PLACE ANY ELECTRICAL COMPONENTS UNLESS OTHERWISE NOTED ON DRAWINGS.

J. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY DASHED (— — —) SHALL BE REMOVED AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (———) SHALL REMAIN.

K. THE EXISTING FACILITY SHALL REMAIN IN OPERATION DURING RENOVATION. INTERRUPTION TO THE EXISTING BUILDING ELECTRIC SERVICE SHALL BE COORDINATED WITH THE OWNER TO MINIMIZE DISRUPTION. INTERRUPTION OF UTILITIES SHALL NOT OCCUR DURING WORKING HOURS.

L. EXISTING CONDUITS MAY BE FOUND TO BE RUNNING IN SLAB WHERE SLAB CUTS OCCUR. SCAN FOR CONDUIT LOCATIONS IN AREAS PRIOR TO CUTTING. SEE STRUCTURAL DRAWINGS FOR OPENING LOCATIONS. WHERE CIRCUITS SERVE DEVICES TO REMAIN, REFEED EXISTING DEVICES. MATCH EXISTING CONDUIT AND WIRE SIZE.

M. ALL EMERGENCY AND EGRESS LIGHTING SERVED BY PANEL 4ELS LOCATED IN BASEMENT. REMOVE CIRCUIT BACK TO COMMON JUNCTION BOX LOCATION. CIRCUIT(S) TO BE REUSED FOR NEW WORK.

N. REMOVE AND REPLACE ALL EXISTING SWITCH PLATES AND OUTLET COVERS FROM EXISTING WALLS AND REPLACE WITH NEW PLATES PER SECTION 260534 OF SPECIFICATIONS.

O. ALL DEVICES LABELED "RR" ARE TO BE REMOVED, AND RETAINED FOR REINSTALLATION IN NEW CEILING.

SPECIFIC NOTES:

1. REMOVE EXISTING FIRE ALARM JUNCTION BOX IN DEMOLISHED CEILING, AND TEMPORARILY SUSPEND FROM STRUCTURE FOR REINSTALLATION IN NEW CEILING.
2. DISCONNECT AND REMOVE EXISTING GROUND WIRES CONNECTED TO TELECOMMUNICATIONS EQUIPMENT AND RACEWAYS. NEW GROUNDING TO BE PROVIDED UNDER NEW WORK.

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MHEC PROJECT #483

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LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
FIFTH AND SIXTH FLOOR PLAN - ELECTRICAL - DEMOLITION

ED102

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NORTH
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SCALE: 1/8" = 1'-0"

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Y
M
C

GENERAL NOTES:

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B. COORDINATE WITH WORK SHOWN ON LIBRARY RENOVATION DRAWINGS.

C. DEMOLITION SHALL INCLUDE REMOVAL AND OFF-SITE DISPOSAL OF MATERIALS. DO NOT ABANDON IN PLACE ANY ELECTRICAL COMPONENTS UNLESS OTHERWISE NOTED ON DRAWINGS.

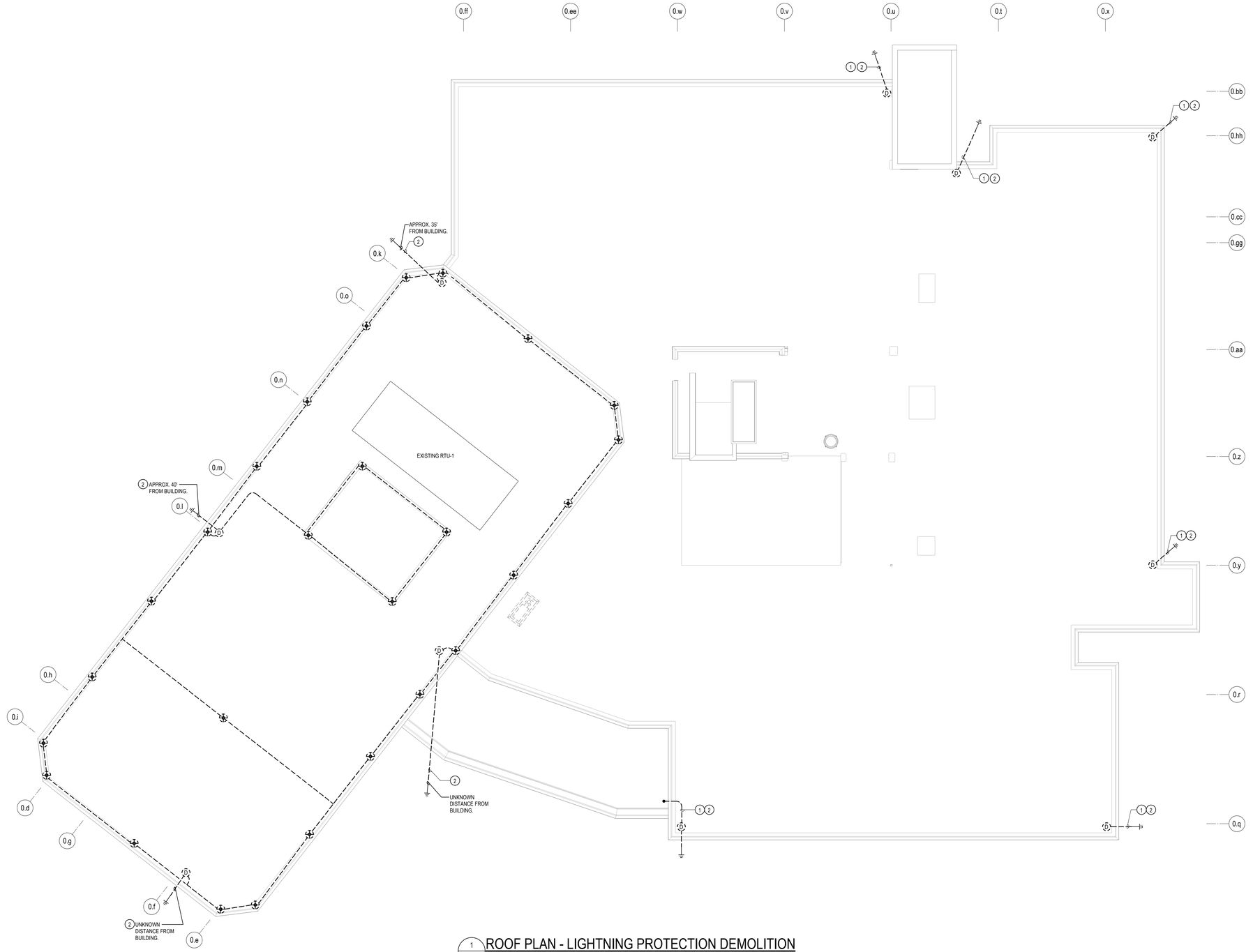
D. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY DASHED (— — —) SHALL BE REMOVED AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (————) SHALL REMAIN.

E. THE EXISTING FACILITY SHALL REMAIN IN OPERATION DURING RENOVATION. INTERRUPTION TO THE EXISTING BUILDING ELECTRIC SERVICE SHALL BE COORDINATED WITH THE OWNER TO MINIMIZE DISRUPTION. INTERRUPTION OF UTILITIES SHALL NOT OCCUR DURING WORKING HOURS.

SPECIFIC NOTES:

1. BASED ON EXISTING DRAWINGS, EXISTING DOWN CONDUCTOR IS NOTED TO EXIST. FIELD SURVEY DURING LIBRARY DEMOLITION TO DETERMINE IF EXISTING PATH GROUND EXISTS. NOTIFY OWNER AND ARCHITECT PRIOR TO ANY FURTHER WORK.

2. TRACE EXISTING CONDUCTOR UNDERGROUND. DETERMINE IF CONDUCTOR AND GROUND ROD CAN BE ACCESSED AND REPLACED. IF GROUND ROD AND CONDUCTOR CANNOT BE REMOVED AND REPLACED, MAINTAIN AND REUSE EXISTING.



1 ED103 ROOF PLAN - LIGHTNING PROTECTION DEMOLITION
SCALE: 1/8" = 1'-0"

NORTH

8 4 0 8 16
SCALE: 1/8" = 1'-0"

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LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
ROOF FLOOR PLAN - LIGHTNING PROTECTION - DEMOLITION

ED103

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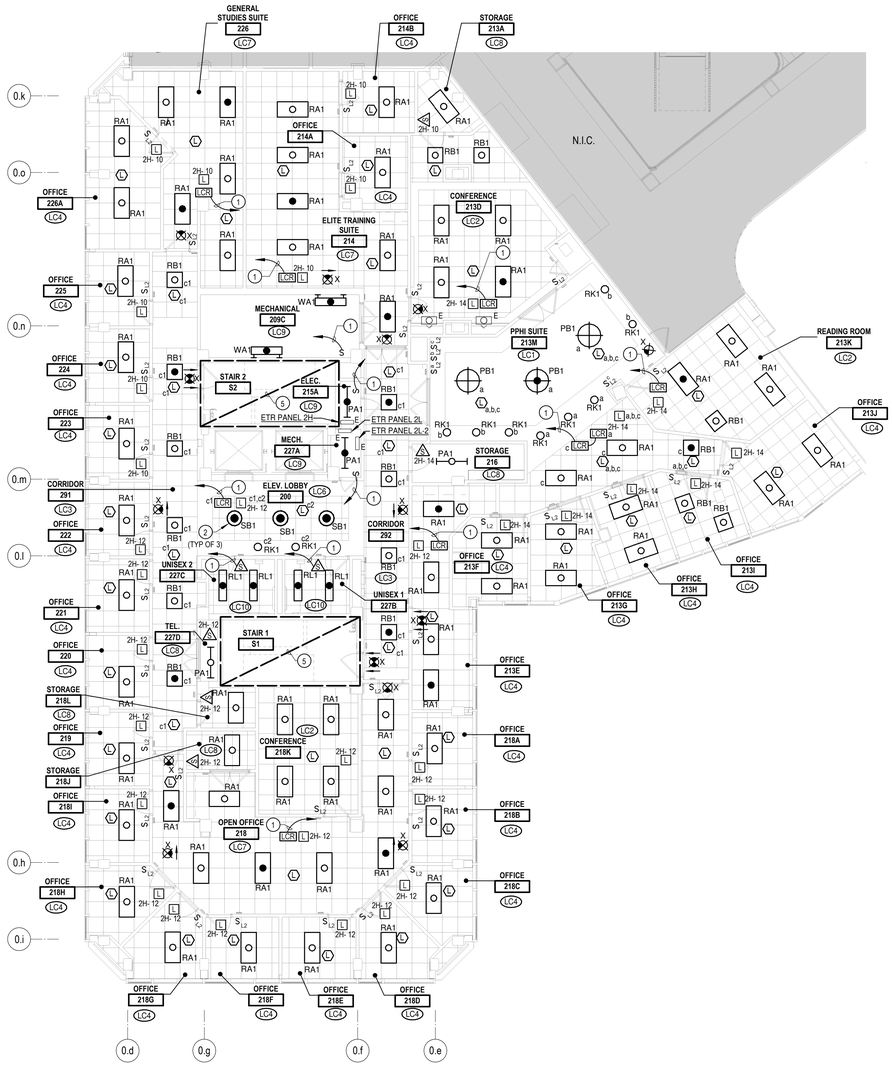
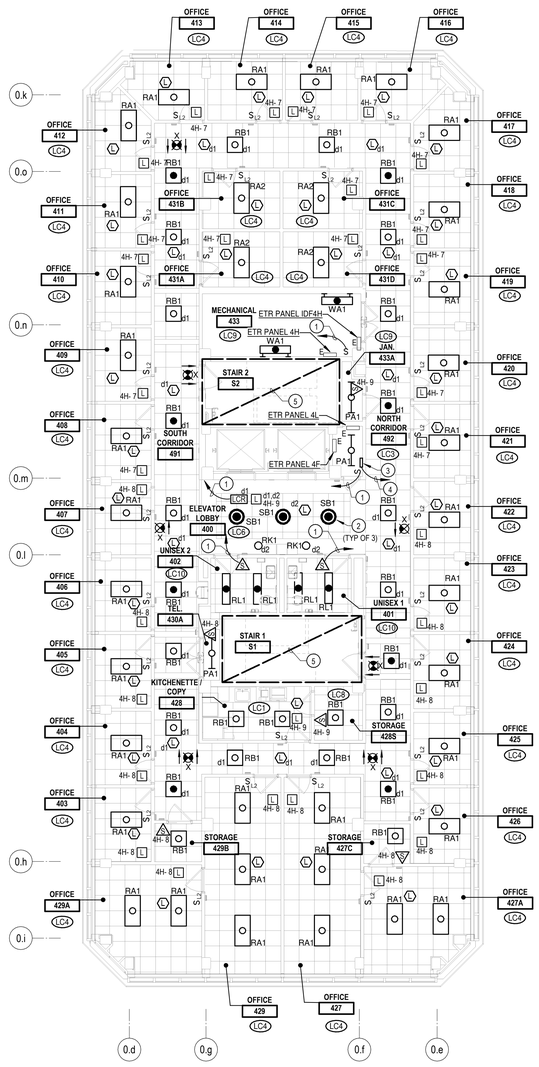


1 EL101 PART SECOND FLOOR PLAN - LIGHTING - NEW WORK

SCALE: 1/8" = 1'-0"



2 EL101 PART FOURTH FLOOR PLAN - LIGHTING - NEW WORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

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B. REFER TO LIGHTING CONTROL DETAILS, DIAGRAMS, AND SEQUENCE OF OPERATIONS ON DRAWING E-501 FOR ADDITIONAL INFORMATION.

C. REFER TO E-600 SERIES DRAWINGS FOR LIGHTING FIXTURE AND PANELBOARD SCHEDULES.

D. REFER TO EP-100 SERIES DRAWINGS FOR PLUG LOAD RELAY CONTROLS.

E. LIGHTING RELAYS, SENSORS, BUTTON STATIONS, AND SWITCHES CONTROL LUMINAIRES IN ROOM OR AREA THEY ARE LOCATED, UNLESS OTHERWISE NOTED.

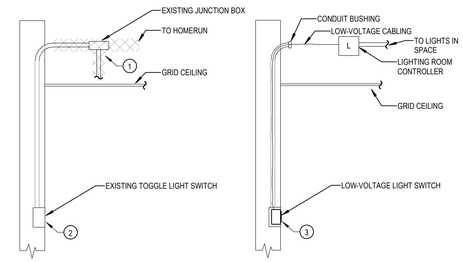
F. CONNECT EXIT SIGNS TO NEAREST UNSWITCHED EMERGENCY CIRCUIT WITH 2#10+#10G IN 3/4" CONDUIT.

G. SWITCHES SHOWN DIRECTLY ADJACENT TO EACH OTHER ON PLAN SHALL BE GANGED IN A COMMON ELECTRICAL BACKBOX.

H. PROVIDE 1P-20A-120V CIRCUIT FOR LIGHTING CONTROL SYSTEM PERIPHERAL DEVICES NOT SHOWN ON PLANS (MINIMUM ONE CIRCUIT PER FLOOR), AS REQUIRED BY CONTROL SYSTEM MANUFACTURER. PERIPHERAL DEVICES INCLUDE, BUT ARE NOT LIMITED TO, SYSTEM CONTROLLERS, NETWORK BRIDGES, AND POWER SUPPLIES. CONNECT TO EXISTING SPARE CIRCUIT BREAKER OR PROVIDE NEW CIRCUIT BREAKER IN AVAILABLE EXISTING BUSSED PANEL SPACE WITH 2#12+#12G IN 3/4" CONDUIT. UPDATE PANEL DIRECTORY TO INDICATE "LIGHTING NETWORK DEVICES".

SPECIFIC NOTES:

1. CONNECT NEW EMERGENCY/EGRESS LIGHTS TO EXISTING CIRCUIT IDENTIFIED DURING DEMOLITION SERVING FLOOR. CONNECT TO EXISTING CIRCUIT WITH 2#10+#10G IN 3/4" CONDUIT.
2. CONNECT LIGHTING FIXTURE TO UNSWITCHED EMERGENCY LIGHTING CIRCUIT INDICATED TO MAINTAIN LIGHTING LEVELS AT ELEVATOR THRESHOLD.
3. LIGHTING SYSTEM CONTROLLER. REFER TO DIAGRAM S/ES01 FOR ADDITIONAL INFORMATION.
4. PROVIDE NEW 20A-1P CIRCUIT BREAKER IN EXISTING PANEL '4L' TO SERVE NEW LOAD. PANEL '4L' IS AN EATON PRL1a 120/208V. MATCH EXISTING PANELBOARD A.I.C. RATING FOR NEW BREAKER.
5. REFER TO PART PLANS ON DRAWING E401 FOR STAIRWELL LIGHTING AND CONTROLS.



DEMOLITION WORK

NEW WORK

SPECIFIC NOTES:

1. DISCONNECT AND REMOVE EXISTING RACEWAY, JUNCTION BOXES, AND BRANCH CIRCUITING AS SHOWN IN THE HATCHED REGION. RETAIN RACEWAY CONNECTED TO RECESSED LIGHT SWITCH BOX FOR REUSE.
2. DISCONNECT AND REMOVE EXISTING LIGHT SWITCH. RETAIN EXISTING RECESSED JUNCTION BOX AND RACEWAY FOR REUSE WITH NEW WORK.
3. MOUNT NEW LOW-VOLTAGE LIGHT SWITCH IN EXISTING RECESSED JUNCTION BOX.

DETAIL 3 EL101

LIGHT SWITCH REPLACEMENT DETAIL

NOT TO SCALE

NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

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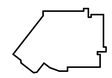
JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:



Drawing

SECOND AND FOURTH FLOOR PLAN - LIGHTING - NEW WORK

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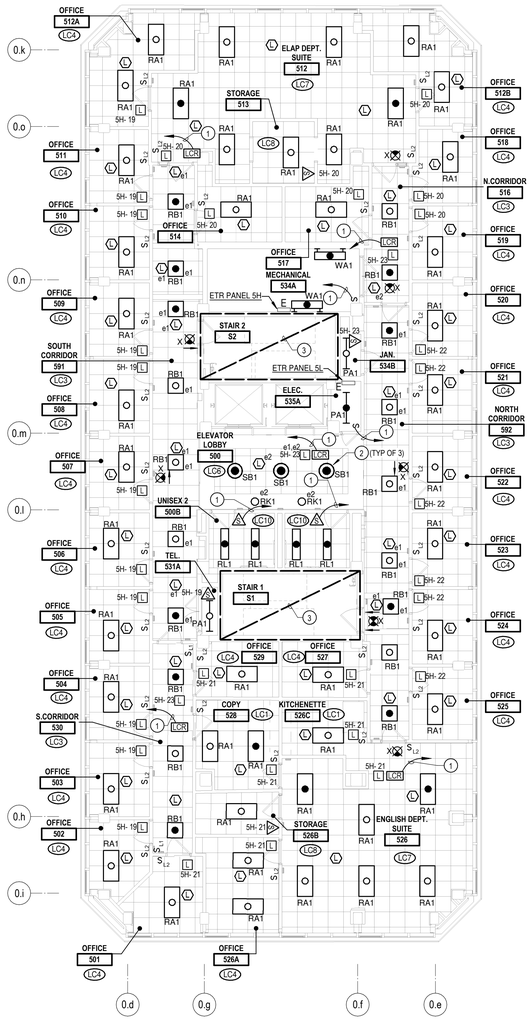
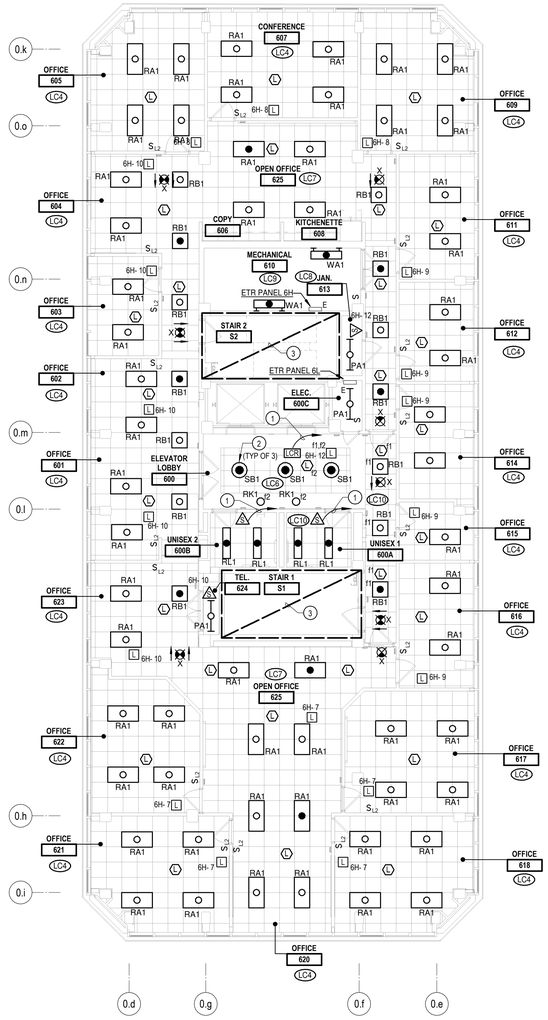


1 PART FIFTH FLOOR PLAN - LIGHTING - NEW WORK
EL102 SCALE: 1/8" = 1'-0"



2 PART SIXTH FLOOR PLAN - LIGHTING - NEW WORK
EL102 SCALE: 1/8" = 1'-0"

NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE EXISTING CONDITIONS IN DETAIL OR DIMENSION. DETERMINE EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.

B. REFER TO LIGHTING CONTROL DETAILS, DIAGRAMS, AND SEQUENCE OF OPERATIONS ON DRAWING E-501 FOR ADDITIONAL INFORMATION.

C. REFER TO E-600 SERIES DRAWINGS FOR LIGHTING FIXTURE AND PANELBOARD SCHEDULES.

D. REFER TO EP-100 SERIES DRAWINGS FOR PLUG LOAD RELAY CONTROLS.

E. LIGHTING RELAYS, SENSORS, BUTTON STATIONS, AND SWITCHES CONTROL LUMINAIRES IN ROOM OR AREA THEY ARE LOCATED, UNLESS OTHERWISE NOTED.

F. CONNECT EXIT SIGNS TO NEAREST UNSWITCHED EMERGENCY CIRCUIT WITH 2#10+#10G IN 3/4" CONDUIT.

G. SWITCHES SHOWN DIRECTLY ADJACENT TO EACH OTHER ON PLAN SHALL BE GANGED IN A COMMON ELECTRICAL BACKBOX.

H. PROVIDE 1P-20A-120V CIRCUIT FOR LIGHTING CONTROL SYSTEM PERIPHERAL DEVICES NOT SHOWN ON PLANS (MINIMUM ONE CIRCUIT PER FLOOR), AS REQUIRED BY CONTROL SYSTEM MANUFACTURER. PERIPHERAL DEVICES INCLUDE, BUT ARE NOT LIMITED TO, SYSTEM CONTROLLERS, NETWORK BRIDGES, AND POWER SUPPLIES. CONNECT TO EXISTING SPARE CIRCUIT BREAKER OR PROVIDE NEW CIRCUIT BREAKER IN AVAILABLE EXISTING BUSSED PANEL SPACE WITH 2#12+#12G IN 3/4" CONDUIT. UPDATE PANEL DIRECTORY TO INDICATE "LIGHTING NETWORK DEVICES".

SPECIFIC NOTES:

1. CONNECT NEW EMERGENCY/EGRESS LIGHTS TO EXISTING CIRCUIT IDENTIFIED DURING DEMOLITION SERVING FLOOR. CONNECT TO EXISTING CIRCUIT WITH 2#10+#10G IN 3/4" CONDUIT.
2. CONNECT LIGHTING FIXTURE TO UNSWITCHED EMERGENCY LIGHTING CIRCUIT INDICATED TO MAINTAIN LIGHTING LEVELS AT ELEVATOR THRESHOLD.
3. REFER TO PART PLANS ON DRAWING E401 FOR STAIRWELL LIGHTING AND CONTROLS.

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LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
FIFTH AND SIXTH FLOOR PLAN - LIGHTING - NEW WORK

EL102

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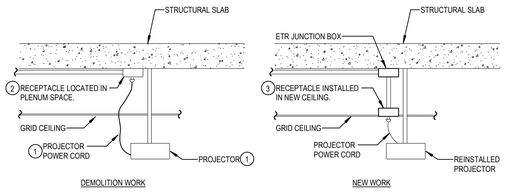

SPECIFIC NOTES:

1. PROJECTOR SHALL BE DISCONNECTED, REMOVED, AND CAREFULLY SALVAGED FOR REINSTALLATION DURING NEW WORK.
2. RECEPTACLE LOCATED ABOVE CEILING SHALL BE DISCONNECTED, AND CONDUIT AND WIRING SHALL REMAIN FOR RECONNECTION DURING NEW WORK.
3. PROVIDE NEW RECEPTACLE MOUNTED IN NEW CEILING TO SERVE REINSTALLED PROJECTOR. CONNECT NEW RECEPTACLE TO EXISTING CIRCUIT THAT SERVED DEVICE PRIOR TO DEMOLITION.

DETAIL 3/EP101

CEILING MOUNTED RECEPTACLE DETAIL

NOT TO SCALE

GENERAL REMOVE AND REINSTALLATION NOTES:

A. REMOVE ALL DEVICES WITHIN AREA OF WORK SHOWN TO FACILITATE REPLACEMENT OF THE CEILING. DEVICES TO BE RECONNECTED AND REINSTALLED IN NEW CEILING IN SAME LOCATION. DEVICES ARE TO BE INSTALLED IN CENTER OF CEILING TILE.

B. SEVERAL JUNCTION BOXES, AND RACEWAYS ABOVE GRID CEILINGS ARE NOT PROPERLY SECURED TO STRUCTURE. CONTRACTOR IS TO INSPECT EXISTING JUNCTION BOXES , AND RACEWAYS ABOVE DEMOLISHED CEILINGS, AND CORRECT ANY IMPROPERLY SUPPORTED BOXES AND RACEWAYS. PROVIDE AN ALLOWANCE PER FLOOR FOR RACEWAY SUPPORT CORRECTIONS.

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B. COORDINATE WITH MECHANICAL WORK SHOWN ON MECHANICAL DRAWINGS AND DISCONNECT MECHANICAL EQUIPMENT AS INDICATED AND REQUIRED.

C. WHERE EQUIPMENT IS NOTED "DISCONNECT" OR "REMOVE", REMOVE ASSOCIATED WIRE AND CONDUIT BACK TO SOURCE, UNLESS OTHERWISE NOTED.

D. REMOVE EXISTING EQUIPMENT AND DEVICES INDICATED, INCLUDING ASSOCIATED WIRE AND CONDUIT BACK TO SOURCE UNLESS OTHERWISE NOTED.

E. EXISTING CIRCUITS INTERRUPTED BY DEMOLITION, BUT ARE TO REMAIN, SHALL BE MADE CONTINUOUS.

F. WHERE DEVICES ARE TO BE REMOVED AND REINSTALLED, PROVIDE WIRE AND CONDUIT TO NEW LOCATION AS REQUIRED.

G. IN BLOCK OR CONCRETE WALLS TO REMAIN, PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR DEVICES REMOVED.

H. WHERE CIRCUITS ARE REMOVED BACK TO PANELS, ASSOCIATED BREAKERS MAY BE UTILIZED FOR NEW CIRCUITING.

I. DEMOLITION SHALL INCLUDE REMOVAL AND OFF-SITE DISPOSAL OF MATERIALS. DO NOT ABANDON IN PLACE ANY ELECTRICAL COMPONENTS UNLESS OTHERWISE NOTED ON DRAWINGS.

J. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY DASHED (— — —) SHALL BE REMOVED AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (————) SHALL REMAIN.

K. THE EXISTING FACILITY SHALL REMAIN IN OPERATION DURING RENOVATION. INTERRUPTION TO THE EXISTING BUILDING ELECTRIC SERVICE SHALL BE COORDINATED WITH THE OWNER TO MINIMIZE DISRUPTION. INTERRUPTION OF UTILITIES SHALL NOT OCCUR DURING WORKING HOURS.

L. EXISTING CONDUITS MAY BE FOUND TO BE RUNNING IN SLAB WHERE SLAB CUTS OCCUR. SCAN FOR CONDUIT LOCATIONS IN AREAS PRIOR TO CUTTING, SEE STRUCTURAL DRAWINGS FOR OPENING LOCATIONS. WHERE CIRCUITS SERVE DEVICES TO REMAIN, REFEED EXISTING DEVICES. MATCH EXISTING CONDUIT AND WIRE SIZE.

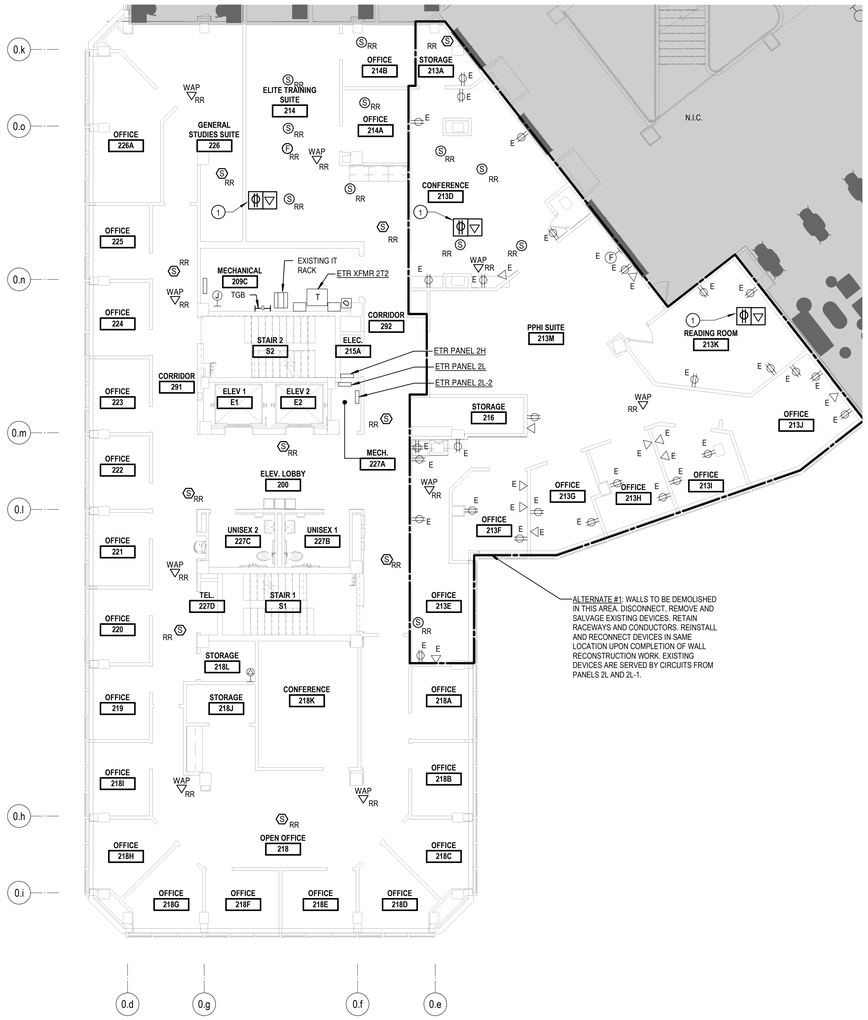
M. ALL EMERGENCY AND EGRESS LIGHTING SERVED BY PANEL 4ELS LOCATED IN BASEMENT. REMOVE CIRCUIT BACK TO COMMON JUNCTION BOX LOCATION. CIRCUIT(S) TO BE REUSED FOR NEW WORK.

N. REMOVE AND REPLACE ALL EXISTING SWITCH PLATES AND OUTLET COVERS FROM EXISTING WALLS AND REPLACE WITH NEW PLATES PER SECTION 260534 OF SPECIFICATIONS.

O ALL DEVICES LABELED "RR" ARE TO BE REMOVED, AND RETAINED FOR REINSTALLATION IN NEW CEILING.

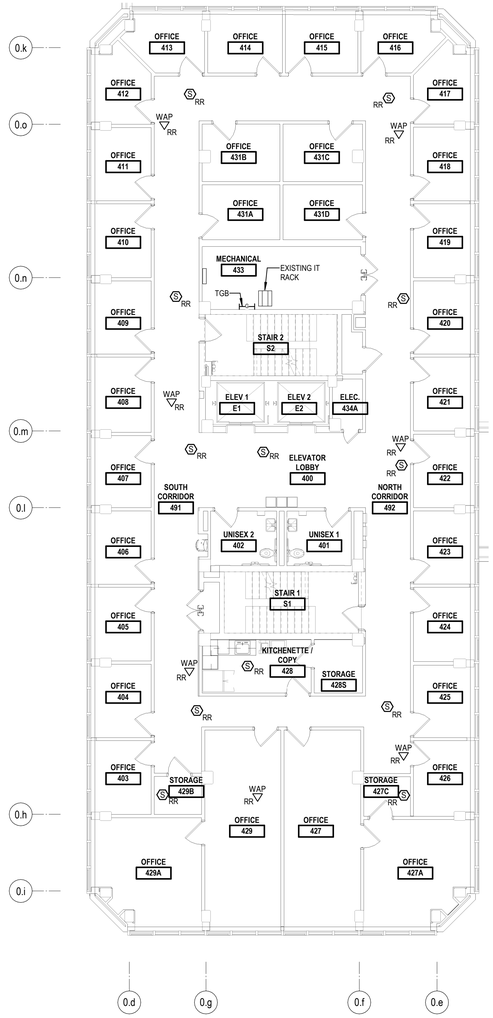
SPECIFIC NOTES:

1. PROVIDE CEILING MOUNTED RECEPTACLE AND DATA CONNECTION FOR REINSTALLED PROJECTOR. CONNECT RECEPTACLE TO EXISTING CIRCUIT THAT SERVED DEVICE PRIOR TO DEMOLITION. PROVIDE 2#12+#12G IN 3/4" CONDUIT TO EXTEND CIRCUIT AS NECESSARY TO NEW CEILING HEIGHT. SEE DETAIL 3/EP101 FOR MORE INFORMATION.



1 EP101 PART SECOND FLOOR PLAN - ELECTRICAL - NEW WORK

SCALE: 1/8" = 1'-0"



2 EP101 PART FOURTH FLOOR PLAN - ELECTRICAL - NEW WORK

SCALE: 1/8" = 1'-0"

NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

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MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing

SECOND AND FOURTH FLOOR PLAN - ELECTRICAL - NEW WORK

EP101

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W
C

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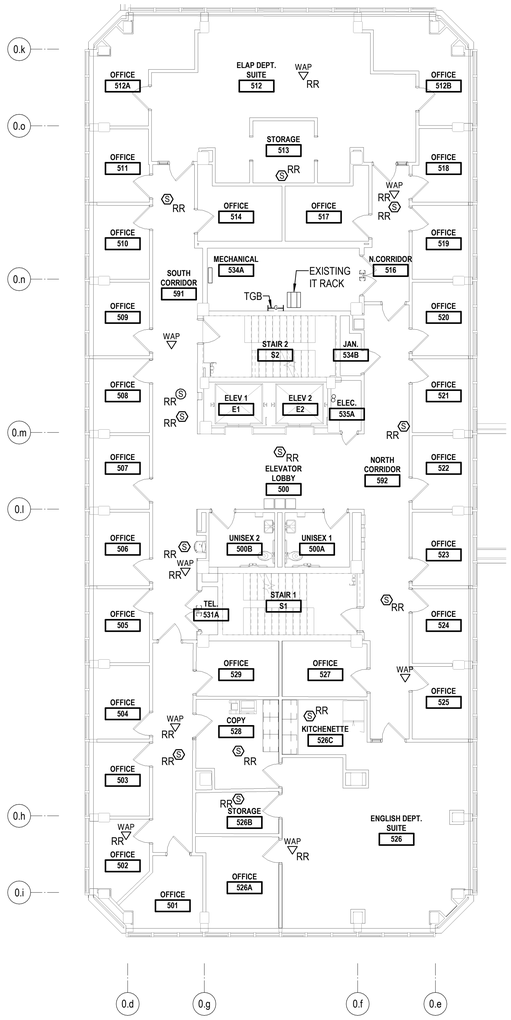
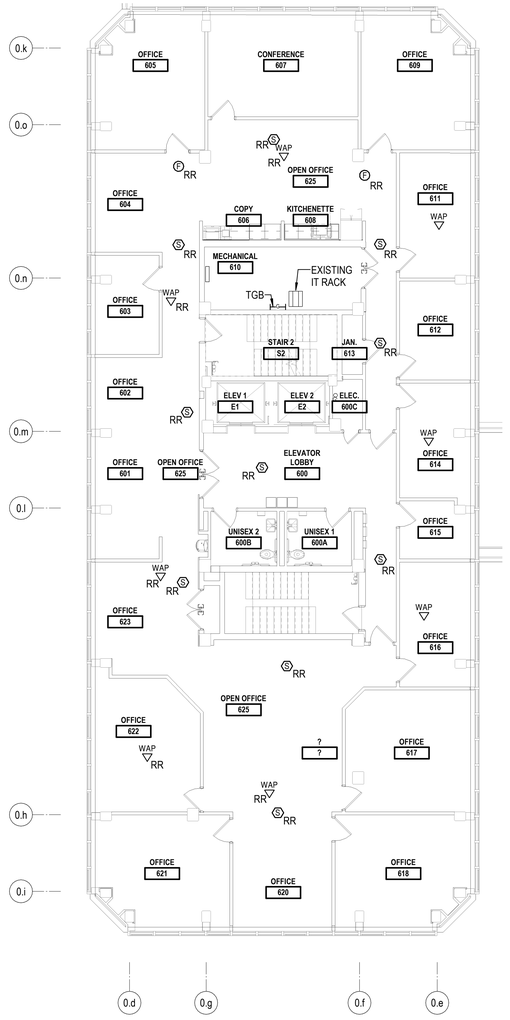


1 EP102 PART FIFTH FLOOR PLAN - ELECTRICAL - NEW WORK

SCALE: 1/8" = 1'-0"



2 EP102 PART SIXTH FLOOR PLAN - ELECTRICAL - NEW WORK

SCALE: 1/8" = 1'-0"

GENERAL REMOVE AND REINSTALLATION NOTES:

A. REMOVE ALL DEVICES WITHIN AREA OF WORK SHOWN TO FACILITATE REPLACEMENT OF THE CEILING. DEVICES TO BE RECONNECTED AND REINSTALLED IN NEW CEILING IN SAME LOCATION. DEVICES ARE TO BE INSTALLED IN CENTER OF CEILING TILE.
B. SEVERAL JUNCTION BOXES, AND RACEWAYS ABOVE GRID CEILINGS ARE NOT PROPERLY SECURED TO STRUCTURE. CONTRACTOR IS TO INSPECT EXISTING JUNCTION BOXES , AND RACEWAYS ABOVE DEMOLISHED CEILINGS, AND CORRECT ANY IMPROPERLY SUPPORTED BOXES AND RACEWAYS. PROVIDE AN ALLOWANCE PER FLOOR FOR RACEWAY SUPPORT CORRECTIONS.

GENERAL NOTES:

A. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE EXISTING CONDITIONS IN DETAIL OR DIMENSION. DETERMINE EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.
B. COORDINATE WITH MECHANICAL WORK SHOWN ON MECHANICAL DRAWINGS AND DISCONNECT MECHANICAL EQUIPMENT AS INDICATED AND REQUIRED.
C. WHERE EQUIPMENT IS NOTED "DISCONNECT" OR "REMOVE", REMOVE ASSOCIATED WIRE AND CONDUIT BACK TO SOURCE, UNLESS OTHERWISE NOTED.
D. REMOVE EXISTING EQUIPMENT AND DEVICES INDICATED, INCLUDING ASSOCIATED WIRE AND CONDUIT BACK TO SOURCE UNLESS OTHERWISE NOTED.
E. EXISTING CIRCUITS INTERRUPTED BY DEMOLITION, BUT ARE TO REMAIN, SHALL BE MADE CONTINUOUS.
F. WHERE DEVICES ARE TO BE REMOVED AND REINSTALLED, PROVIDE WIRE AND CONDUIT TO NEW LOCATION AS REQUIRED.
G. IN BLOCK OR CONCRETE WALLS TO REMAIN, PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR DEVICES REMOVED.
H. WHERE CIRCUITS ARE REMOVED BACK TO PANELS, ASSOCIATED BREAKERS MAY BE UTILIZED FOR NEW CIRCUITING.
I. DEMOLITION SHALL INCLUDE REMOVAL AND OFF-SITE DISPOSAL OF MATERIALS. DO NOT ABANDON IN PLACE ANY ELECTRICAL COMPONENTS UNLESS OTHERWISE NOTED ON DRAWINGS.
J. UNLESS OTHERWISE NOTED, ELECTRICAL ITEMS SHOWN HEAVY DASHED (— — —) SHALL BE REMOVED AND ELECTRICAL ITEMS SHOWN LIGHT SOLID (————) SHALL REMAIN.
K. THE EXISTING FACILITY SHALL REMAIN IN OPERATION DURING RENOVATION. INTERRUPTION TO THE EXISTING BUILDING ELECTRIC SERVICE SHALL BE COORDINATED WITH THE OWNER TO MINIMIZE DISRUPTION. INTERRUPTION OF UTILITIES SHALL NOT OCCUR DURING WORKING HOURS.
L. EXISTING CONDUITS MAY BE FOUND TO BE RUNNING IN SLAB WHERE SLAB CUTS OCCUR. SCAN FOR CONDUIT LOCATIONS IN AREAS PRIOR TO CUTTING. SEE STRUCTURAL DRAWINGS FOR OPENING LOCATIONS. WHERE CIRCUITS SERVE DEVICES TO REMAIN, REFEED EXISTING DEVICES. MATCH EXISTING CONDUIT AND WIRE SIZE.
M. ALL EMERGENCY AND EGRESS LIGHTING SERVED BY PANEL 4ELS LOCATED IN BASEMENT. REMOVE CIRCUIT BACK TO COMMON JUNCTION BOX LOCATION. CIRCUIT(S) TO BE REUSED FOR NEW WORK.
N. REMOVE AND REPLACE ALL EXISTING SWITCH PLATES AND OUTLET COVERS FROM EXISTING WALLS AND REPLACE WITH NEW PLATES PER SECTION 260534 OF SPECIFICATIONS.
O ALL DEVICES LABELED "RR" ARE TO BE REMOVED, AND RETAINED FOR REINSTALLATION IN NEW CEILING.

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INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing

FIFTH AND SIXTH FLOOR PLAN - ELECTRICAL - NEW WORK

EP102

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NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

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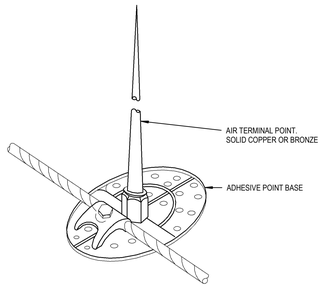

DETAIL 2 / EP103

ADHESIVE POINT BASE AND POINT

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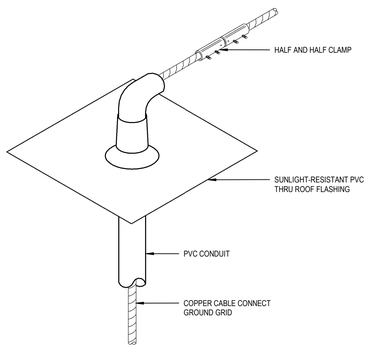

DETAIL 3 / EP103

ROOF TRANSITION

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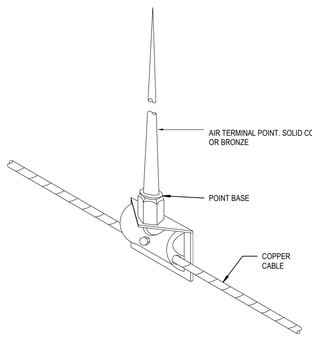

DETAIL 4 / EP103

STANDARD PARAPET BASE

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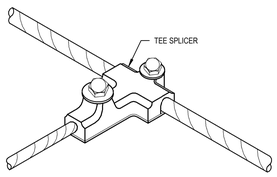

DETAIL 5 / EP103

TEE SPLICE

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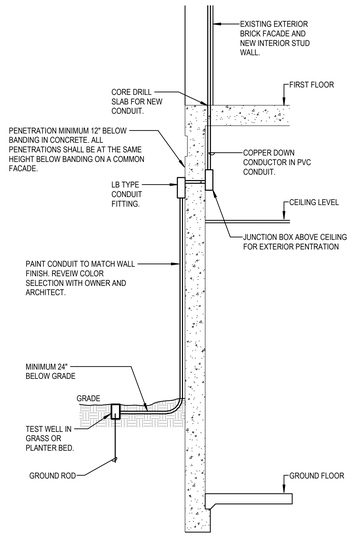
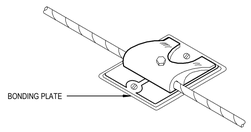


DETAIL 6 / EP103

EXTERIOR PENETRATION - LIGHTNING PROTECTION

NOT TO SCALE

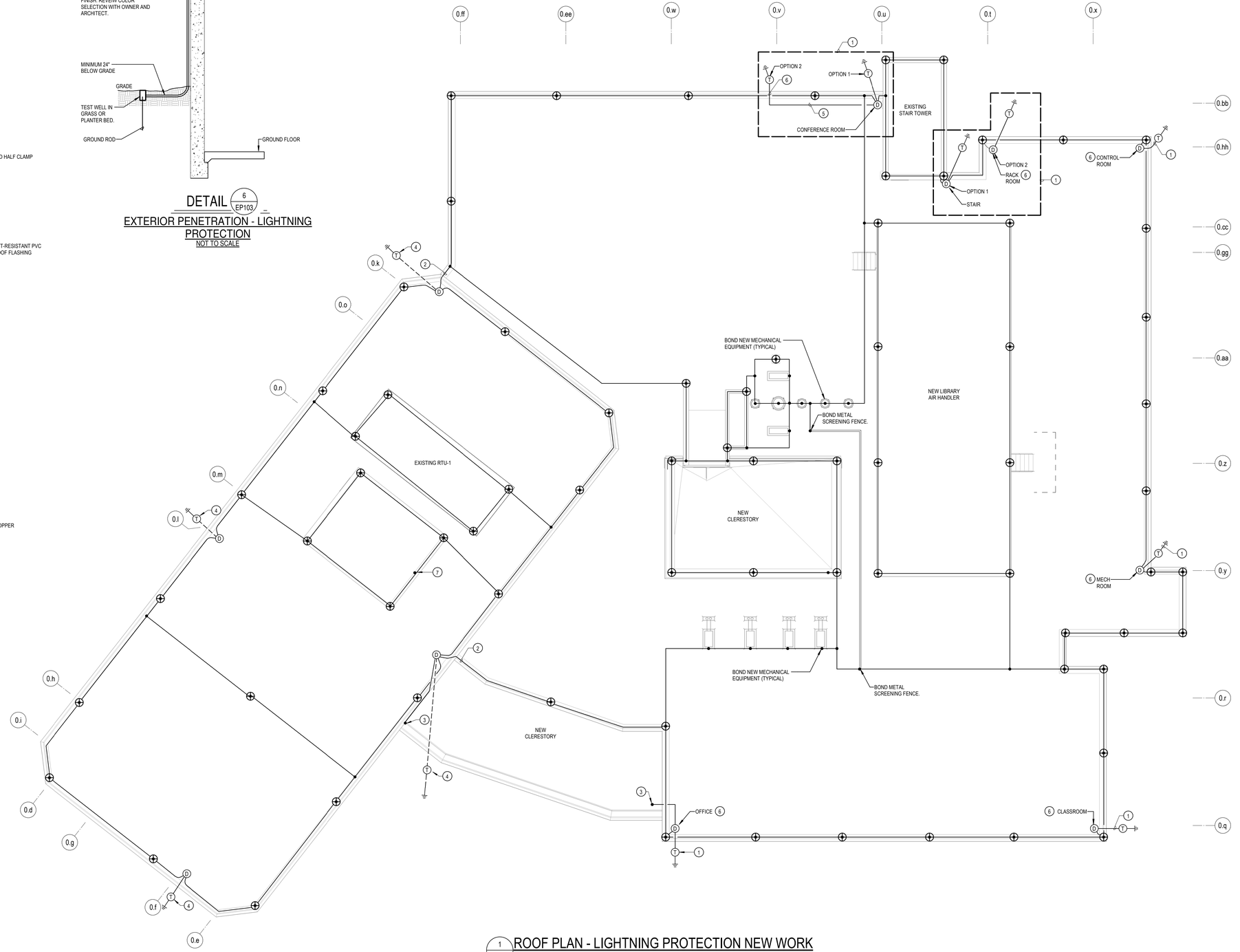


NOTE:
LOCATE EVERY 4' ALONG GROUND CABLE ON THE ROOF.

DETAIL 7 / EP103

BONDING PLATE

NOT TO SCALE



1 / EP103 ROOF PLAN - LIGHTNING PROTECTION NEW WORK

SCALE: 1/8" = 1'-0"

NORTH

8 4 0 8 16

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

A. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE EXISTING CONDITIONS IN DETAIL OR DIMENSION. DETERMINE EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.

SPECIFIC NOTES:

1. BASED ON EXISTING DRAWINGS, EXISTING DOWN CONDUCTOR IS NOTED TO EXIST. CONDUCTOR WAS NOT OBSERVED IN THE FIELD. BASED ON CONDITIONS DISCOVERED DURING DEMOLITION, PROVIDE ONE OF THE FOLLOWING OPTIONS:

   OPTION 1: REPLACE OR REUSE EXISTING DOWN CONDUCTOR BASED ON ACCESS TO CONDUCTOR / GROUND ROD.

   OPTION 2: PROVIDE NEW DOWN CONDUCTOR IN CONDUIT, GROUND ROD, AND TEST WELL AT LOCATION NOTED. INSTALL IN EXISTING PLANTING. NEW CONDUIT PATHWAY WILL REQUIRE CORE DRILL THROUGH WALL AT GROUND LEVEL.

2. CONNECT TO EXISTING DOWN CONDUCTOR IN THIRD FLOOR CEILING. COORDINATE CONNECTION WITH THIRD FLOOR RENOVATION WORK AS PART OF LIBRARY PROJECT.

3. PROVIDE NEW CONDUCTOR IN FIRST FLOOR CEILING AS PART OF RENOVATION TO BOND TO THIRD FLOOR HANDRAIL. COORDINATE CONNECTION WITH FIRST AND SECOND FLOOR RENOVATION WORK AS PART OF LIBRARY PROJECT.

4. BASED ON CONDITIONS DETERMINED DURING DEMOLITION, REUSE OR REPLACE EXISTING DOWN CONDUCTOR AND DOWN CONDUCTOR UTILIZING EXISTING PATHWAYS. WHERE GROUND ROD IS FOUND TO BE IN GRASS OR PLANTER BAEDS, PROVIDE NEW TEST WELL.

5. DOWN CONDUCTOR IN CONDUIT ROUTED IN GROUND FLOOR CEILING ABOVE CONFERENCE ROOM AND COMPUTER LAB. REMOVE AND REPLACE CEILING TILES WITHIN SPACE TO INSTALL CONDUCTOR.

6. IF NEW DOWN CONDUCTOR PATHWAY IS REQUIRED PER SPECIFIC NOTE 1, PENETRATE IN ROOM NOTED. REFER TO DETAIL 6, THIS SHEET, FOR PENETRATION REQUIREMENTS.

7. COORDINATE CONNECTION TO EMERGENCY RESPONDER RADIO SYSTEM ANTENNA INSTALLED AS PART OF LIBRARY PROJECT.

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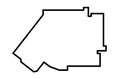
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:



Drawing

ROOF FLOOR PLAN - LIGHTNING PROTECTION - NEW WORK

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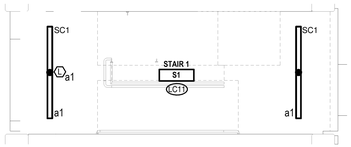
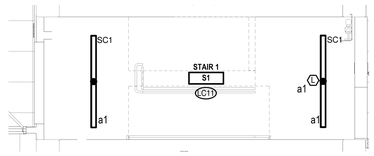


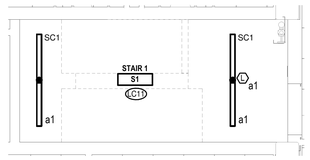
1 / E401 PART GROUND FLOOR PLAN - LIGHTING - NEW WORK - STAIR 1

SCALE: 1/4" = 1'-0"



2 / E401 PART FIRST FLOOR PLAN - LIGHTING - NEW WORK - STAIR 1

SCALE: 1/4" = 1'-0"



3 / E401 PART SECOND FLOOR PLAN - LIGHTING - NEW WORK - STAIR 1

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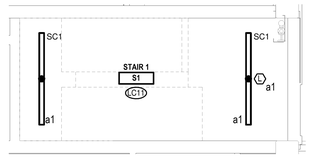

4 / E401 PART THIRD FLOOR PLAN - LIGHTING - NEW WORK - STAIR 1

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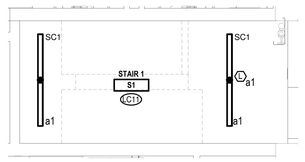

5 / E401 PART FOURTH FLOOR PLAN - LIGHTING - NEW WORK - STAIR 1

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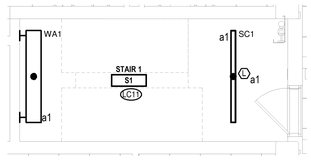

6 / E401 PART FIFTH FLOOR PLAN - LIGHTING - NEW WORK - STAIR 1

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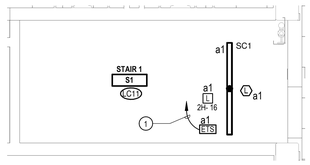

7 / E401 PART SIXTH FLOOR PLAN - LIGHTING - NEW WORK - STAIR 1

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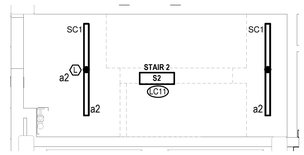
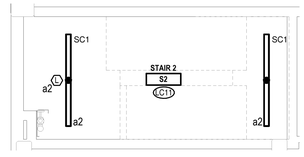


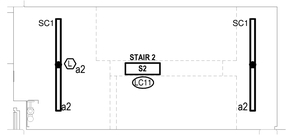
8 / E401 PART SECOND FLOOR PLAN - LIGHTING - NEW WORK - STAIR 2

SCALE: 1/4" = 1'-0"



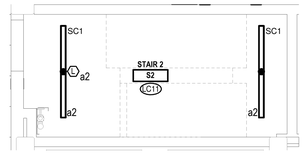
9 / E401 PART THIRD FLOOR PLAN - LIGHTING - NEW WORK - STAIR 2

SCALE: 1/4" = 1'-0"



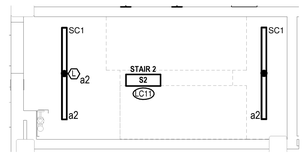
10 / E401 PART FOURTH FLOOR PLAN - LIGHTING - NEW WORK - STAIR 2

SCALE: 1/4" = 1'-0"



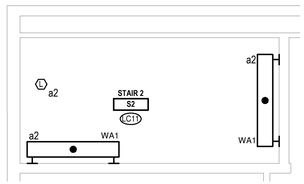
11 / E401 PART FIFTH FLOOR PLAN - LIGHTING - NEW WORK - STAIR 2

SCALE: 1/4" = 1'-0"



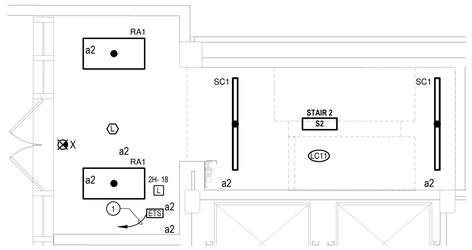
12 / E401 PART SIXTH FLOOR PLAN - LIGHTING - NEW WORK - STAIR 2

SCALE: 1/4" = 1'-0"



13 / E401 PART ROOF FLOOR PLAN - LIGHTING - NEW WORK - STAIR 2

SCALE: 1/4" = 1'-0"



14 / E401 PART FIRST FLOOR PLAN - LIGHTING - NEW WORK - STAIR 2

SCALE: 1/4" = 1'-0"

GENERAL NOTES:

A. INFORMATION SHOWN ON THIS DRAWING PERTAINING TO EXISTING CONDITIONS HAS BEEN OBTAINED FROM AVAILABLE BUILDING DRAWINGS OR GENERAL FIELD OBSERVATIONS AND MAY NOT INDICATE EXISTING CONDITIONS IN DETAIL OR DIMENSION. DETERMINE EXISTING CONDITIONS PRIOR TO FABRICATION OR PERFORMANCE OF ANY WORK. SHOULD CONDITIONS BE DISCOVERED THAT PREVENT EXECUTION OF THE WORK AS INDICATED, IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING AND AWAIT DIRECTION BEFORE PROCEEDING WITH THE WORK.

B. REFER TO LIGHTING CONTROL DETAILS, DIAGRAMS, AND SEQUENCE OF OPERATIONS ON DRAWING E-501 FOR ADDITIONAL INFORMATION.

C. REFER TO E-600 SERIES DRAWINGS FOR LIGHTING FIXTURE AND PANELBOARD SCHEDULES.

D. REFER TO EP-100 SERIES DRAWINGS FOR PLUG LOAD RELAY CONTROLS.

E. LIGHTING RELAYS, SENSORS, BUTTON STATIONS, AND SWITCHES CONTROL LUMINAIRES IN ROOM OR AREA THEY ARE LOCATED, UNLESS OTHERWISE NOTED.

F. CONNECT EXIT SIGNS TO NEAREST UNSWITCHED EMERGENCY CIRCUIT WITH 2#10+#10G IN 3/4" CONDUIT.

G. SWITCHES SHOWN DIRECTLY ADJACENT TO EACH OTHER ON PLAN SHALL BE GANGED IN A COMMON ELECTRICAL BACKBOX.

H. PROVIDE 1P-20A-120V CIRCUIT FOR LIGHTING CONTROL SYSTEM PERIPHERAL DEVICES NOT SHOWN ON PLANS (MINIMUM ONE CIRCUIT PER FLOOR), AS REQUIRED BY CONTROL SYSTEM MANUFACTURER. PERIPHERAL DEVICES INCLUDE, BUT ARE NOT LIMITED TO, SYSTEM CONTROLLERS, NETWORK BRIDGES, AND POWER SUPPLIES. CONNECT TO EXISTING SPARE CIRCUIT BREAKER OR PROVIDE NEW CIRCUIT BREAKER IN AVAILABLE EXISTING BUSSED PANEL SPACE WITH 2#12+#12G IN 3/4" CONDUIT. UPDATE PANEL DIRECTORY TO INDICATE "LIGHTING NETWORK DEVICES".

SPECIFIC NOTES:

1. CONNECT NEW EMERGENCY/EGRESS LIGHTS TO EXISTING CIRCUIT IDENTIFIED DURING DEMOLITION SERVING FLOOR. CONNECT TO EXISTING CIRCUIT WITH 2#10+#10G IN 3/4" CONDUIT.

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MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
PART PLANS - LIGHTING - STAIR 1 AND STAIR 2

E401

NOT FOR CONSTRUCTION

2025-08-29
PERMIT/BID SET

NORTH
8 4 0 8 16
SCALE: 1/8" = 1'-0"

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LIGHTING CONTROLS SEQUENCE OF OPERATIONS MATRIX

CONTROL SCHEME	SPACE TYPE	CONNECTIVITY	MANUAL CONTROLS	MANUAL ON	TIME SCHEDULE CONTROLS				OCCUPANCY - AUTOMATIC ON		OCCUPANCY - AUTOMATIC OFF (TIME-OUT DELAY)		HVAC INTEGRATION	EMERGENCY LIGHTING	ADDITIONAL REMARKS
					ON-TIME	PART	FULL	OFF-TIME	PARTIAL	FULL	PARTIAL	OFF			
LC1	BREAK ROOMS, LOUNGES, COPY ROOMS	NETWORKED	ON/OFF + DIMMING	–	–	–	–	–	X	–	–	X (15-MIN)	–	X (UL-924)	–
LC2	CONFERENCE ROOMS	NETWORKED	ON/OFF + DIMMING	–	–	–	–	–	X	–	–	X (15-MIN)	–	X (UL-924)	–
LC3	CORRIDORS	NETWORKED	ON/OFF	–	5:00 AM	–	X	9:00 PM	–	X	–	X (15-MIN)	–	X (UL-924)	CONTROLS SHALL OPERATE VIA OCCUPANCY STATUS OUTSIDE OF TIME SCHEDULE.
LC4	ENCLOSED / PRIVATE OFFICES	NETWORKED	ON/OFF + DIMMING	X	–	–	–	–	–	–	–	X (15-MIN)	X	–	OCCUPANCY SENSORS SHALL HAVE AUXILIARY CONTACTS TO RELAY STATUS TO HVAC SYSTEM.
LC5	LARGE STORAGE ROOMS	NETWORKED	ON/OFF	X	–	–	–	–	–	–	–	X (15-MIN)	–	–	–
LC6	ELEVATOR LOBBIES	STANDALONE	–	–	–	–	–	–	–	–	–	–	–	–	LIGHTING FIXTURES SHALL BE ON 24/7 FOR ELEVATOR THRESHOLD LIGHTING.
LC7	OPEN OFFICES	NETWORKED	ON/OFF + DIMMING	–	–	–	–	–	X	–	–	X (15-MIN)	X	X UL-924	OCCUPANCY SENSORS SHALL HAVE AUXILIARY CONTACTS TO RELAY STATUS TO HVAC SYSTEM.
LC8	SMALL CLOSETS / STORAGE, CUSTODIAL SERVICES CLOSETS	STANDALONE	ON/OFF	X	–	–	–	–	–	–	–	X (15-MIN)	–	–	–
LC9	ELECTRICAL / MECHANICAL ROOMS	STANDALONE	ON/OFF	X	–	–	–	–	–	–	–	–	–	–	–
LC10	SINGLE-OCCUPANT TOILETS	STANDALONE	ON/OFF	–	–	–	–	–	–	–	X	X (15-MIN)	–	–	–
LC11	STAIRWELLS	STANDALONE	N/A	–	–	–	–	–	–	X	X (20-MIN)	–	–	X (UL-1008)	–

GENERAL NOTES:

A. REFER TO LIGHTING CONTROL RISER DIAGRAM FOR CONNECTIVITY REQUIREMENTS.

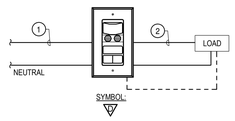
B. REFER TO LIGHTING CONTROL STATION CONFIGURATION DETAIL(S) FOR ADDITIONAL INFORMATION.

C. PARTIAL (PART) ON OR OFF SHALL BE DEFINED AS 50% LIGHT OUTPUT, UNLESS OTHERWISE NOTED IN SCHEDULE. FULL ON SHALL BE DEFINED AS 100% LIGHT OUTPUT, UNLESS OTHERWISE NOTED.

D. CONFIRM TIME SCHEDULE SETTINGS WITH OWNER PRIOR TO PROGRAMMING.

E. DAYLIGHT HARVESTING NOT REQUIRED IN ALL SPACES. REFER TO LIGHTING PLANS FOR SPECIFIC LOCATIONS. WHERE DAYLIGHT SENSOR IS SHOWN, LIGHTING IN THE DAYLIGHT ZONE SHALL CONTINUOUSLY DIM TO MEET DAYLIGHT HARVESTING TARGET INDICATED ABOVE.

F. UPON LOSS OF POWER OR ACTIVATION OF BUILDING FIRE ALARM, EMERGENCY LIGHTING IN CORRIDORS AND STAIRS SHALL TURN ON TO FULL LIGHT OUTPUT. SWITCHES AND SENSORS SHALL BE BYPASSED. LIGHTING SHALL RESUME NORMAL PROGRAMMING WHEN POWER IS RESTORED OR BUILDING FIRE ALARM CONDITION HAS BEEN CLEARED.



WIRING LEGEND
- LINE VOLTAGE (120V OR 277V)
- LOW VOLTAGE WIRING FOR 0-10V DIMMING CONTROL (2#16AWG, 600V RATED, COLOR INDICATOR: PURPLE/PINK, RUN IN POWER CONDUIT)

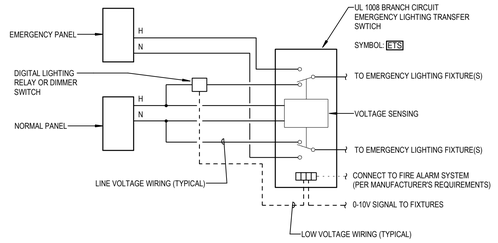
GENERAL NOTES:

A. EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN. PROVIDE GROUNDING CONDUCTORS FOR A COMPLETE SYSTEM.

SPECIFIC NOTES:

1. UNSWITCHED NORMAL OR EMERGENCY LIGHTING CIRCUIT (120V OR 277V). REFER TO LIGHTING PLANS FOR CIRCUITING.
2. SWITCHED LINE VOLTAGE (120V OR 277V) WIRING.

DETAIL 1/E501 – 0-10V DIMMING OCCUPANCY SENSOR SWITCH WIRING
NOT TO SCALE

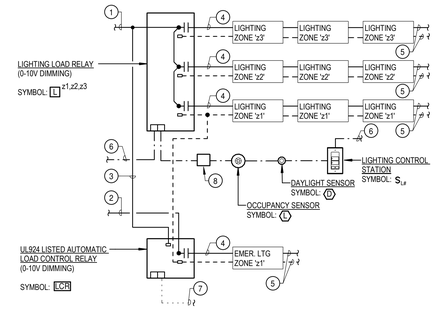


WIRING LEGEND
- LINE VOLTAGE (120V OR 277V)
- LOW VOLTAGE WIRING FOR 0-10V DIMMING CONTROL (2#16AWG, 600V RATED, COLOR INDICATOR: PURPLE/PINK, RUN IN POWER CONDUIT)

OPERATING SEQUENCE

1. EMERGENCY LIGHTING FIXTURES ARE NORMALLY CONTROLLED BY LIGHTING CONTROL RELAY.
2. BASIS-OF-DESIGN: WATTSTOPPER AD-EPC-D-F-ATS.
3. UPON LOSS OF NORMAL POWER OR ACTIVATION OF FIRE ALARM SYSTEM, LIGHTING CONTROL RELAY IS BYPASSED AND LIGHTING FIXTURES OPERATE ON EMERGENCY POWER.
4. UPON RETURN OF NORMAL CONDITIONS, THE EMERGENCY FIXTURES WILL RESUME CONTROL VIA THE LIGHTING CONTROL RELAY.
5. FIXTURES SHALL NOT OPERATE AS A "NIGHT LIGHT".

DIAGRAM 2/E501 – BRANCH CIRCUIT EMERGENCY LIGHTING TRANSFER SWITCH (UL 1008 RATED)
NOT TO SCALE



WIRING LEGEND
- LINE VOLTAGE (120V OR 277V)
- LOW VOLTAGE WIRING FOR 0-10V DIMMING CONTROL (2#16AWG, 600V RATED, COLOR INDICATOR: PURPLE/PINK, RUN IN POWER CONDUIT)
- LOW VOLTAGE LIGHTING CONTROL NETWORK CABLING (CAT5 OR MANUFACTURER EQUIVALENT)

GENERAL NOTES:

A. DIAGRAM IS SCHEMATIC. PROVIDE NUMBER OF CONDUCTORS AND PERIPHERAL LIGHTING CONTROL DEVICES AS REQUIRED BY THE MANUFACTURER FOR A COMPLETE LIGHTING CONTROL SYSTEM.

B. PROVIDE BASIS-OF-DESIGN SYSTEM BY WATTSTOPPER DLM SERIES. SUBSTITUTIONS WILL NOT BE ACCEPTED. PROVIDE ONE (1), TWO (2), OR THREE (3) RELAY CONTROLLERS AS REQUIRED TO ACCOMODATE QUANTITY OF LIGHTING CONTROL ZONES. REFER TO LIGHTING PLANS FOR ADDITIONAL INFORMATION.

C. PROVIDE A COMPLETE AND OPERATIONAL LIGHTING CONTROL SYSTEM WIRED PER MANUFACTURER'S REQUIREMENTS AND DEVICE INSTALLATION GUIDES.

D. EQUIPMENT GROUNDING CONDUCTORS ARE NOT SHOWN. PROVIDE GROUNDING CONDUCTORS FOR A COMPLETE SYSTEM.

E. LOW VOLTAGE WIRING/CABLING IS NOT SHOWN ON PLANS.

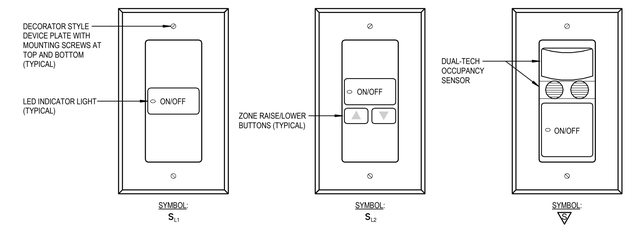
F. PROVIDE 0-10V DIMMING CONTROL WIRING FOR LUMINAIRES INDICATED WITH 0-10V DIMMING DRIVERS. FOR LUMINAIRES SPECIFIED WITH NON-DIMMING DRIVERS, LIGHTING LOAD RELAY SERVING THE ZONE SHALL BE CAPABLE OF SWITCHING (ON/OFF).

G. LIGHTING CONTROL DEVICES AND CONTROL SYSTEMS SHALL BE TESTED TO ENSURE THAT CONTROL HARDWARE AND SOFTWARE ARE CALIBRATED, ADJUSTED, PROGRAMMED, AND IN PROPER WORKING CONDITION IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND MANUFACTURER'S INSTALLATION INSTRUCTIONS.

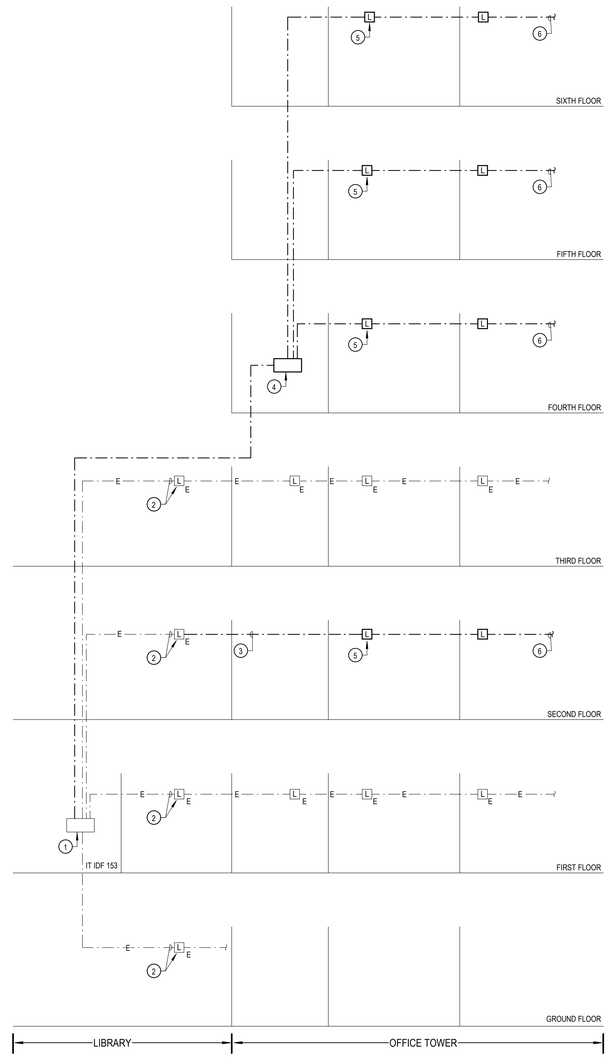
SPECIFIC NOTES:

1. UNSWITCHED NORMAL LIGHTING CIRCUIT (120V OR 277V). REFER TO LIGHTING PLANS FOR CIRCUITING.
2. UNSWITCHED EMERGENCY LIGHTING CIRCUIT (120V OR 277V). REFER TO LIGHTING PLANS FOR CIRCUITING.
3. PROVIDE NORMAL POWER SENSE TO EMERGENCY LIGHTING LOAD RELAY PER MANUFACTURER'S REQUIREMENTS.
4. SWITCHED LINE VOLTAGE (120V OR 277V) WIRING.
5. TO ADDITIONAL LUMINAIRES WITHIN SAME LIGHTING ZONE.
6. TO ADDITIONAL LIGHTING CONTROL DEVICES.
7. CONNECT TO FIRE ALARM SYSTEM CONTROL MODULE PER MANUFACTURER'S REQUIREMENTS. REFER TO FIRE ALARM DRAWINGS FOR ADDITIONAL INFORMATION.
8. PROVIDE INPUT/OUTPUT MODULE FOR INTERFACING TO HVAC INTEGRATION AS REQUIRED BY MECHANICAL SYSTEM SEQUENCES. INPUT/OUTPUT MODULES NOT SHOWN ON PLANS.

DETAIL 4/E501 – TYPICAL WIRED LIGHTING CONTROLS (0-10V DIMMING)
NOT TO SCALE



DETAIL 3/E501 – LIGHTING CONTROL STATION - BUTTON CONFIGURATIONS
NOT TO SCALE



WIRING LEGEND
- LOW VOLTAGE LIGHTING CONTROL NETWORK CABLING (CAT5 OR MANUFACTURER EQUIVALENT)

GENERAL NOTES:

A. RISER DIAGRAM IS SCHEMATIC. PROVIDE NUMBER OF CONDUCTORS AND PERIPHERAL LIGHTING CONTROL DEVICES PER MANUFACTURER'S REQUIREMENTS.

B. "NEUTRAL" GROUNDED AND EQUIPMENT GROUNDING CONDUCTORS NOT SHOWN.

C. REFER TO LIGHTING PLANS FOR QUANTITY AND LOCATIONS OF LIGHTING CONTROL DEVICES.

D. REFER TO ELECTRICAL PLANS AND WIRING PANEL SCHEDULES FOR LIGHTING CONTROL DEVICE POWER AND CIRCUITING REQUIREMENTS.

E. DEVICES SHALL BE WIRED AND INSTALLED PER MANUFACTURER'S REQUIREMENTS AND DEVICE INSTALLATION GUIDES.

F. LIGHTING CONTROL NETWORK COMPONENTS, INCLUDING SYSTEM CONTROLLERS. SHALL BE SIZED APPROPRIATELY TO MEET DESIGN LAYOUTS. MAXIMUM DEVICE QUANTITIES PER NETWORK CABLING RUN SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATIONS.

SPECIFIC NOTES:

1. LIGHTING SYSTEM CONTROLLER INSTALLED AND PROGRAMMED UNDER LIBRARY RENOVATION SCOPE.
2. LIGHTING RELAYS AND NETWORK CABLING INSTALLED AND PROGRAMMED UNDER LIBRARY RENOVATION SCOPE (TYPICAL).
3. PROVIDE LOW VOLTAGE LIGHTING CONTROL NETWORK CABLING FROM NEAREST LIGHTING LOAD RELAY INSTALLED IN LIBRARY RENOVATION SCOPE AND CONNECT TO RELAY SERVING CAMPUS COMMONS (213M).
4. LIGHTING SYSTEM CONTROLLER (WATTSTOPPER LMJA SERIES). CONTROLLER SHALL PROVIDE TIME SCHEDULING, DEVICE SETTING ADJUSTMENTS, AND INTEGRATION WITH BUILDING MANAGEMENT / DEMAND RESPONSE SYSTEMS. EQUALS WILL NOT BE ACCEPTABLE.
5. TYPICAL NETWORKED LIGHTING AND RECEPTACLE CONTROL RELAYS SERVING COMMON AREAS. REFER TO LIGHTING CONTROLS SEQUENCE OF OPERATIONS FOR ADDITIONAL INFORMATION.
6. TO ADDITIONAL LIGHTING LOAD RELAYS. REFER TO LIGHTING PLANS FOR EXACT QUANTITIES.

DIAGRAM 5/E501 – LIGHTING CONTROLS RISER
NOT TO SCALE

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MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

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ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
LIGHTING DETAILS, DIAGRAMS, AND SEQUENCE OF OPERATIONS

E501

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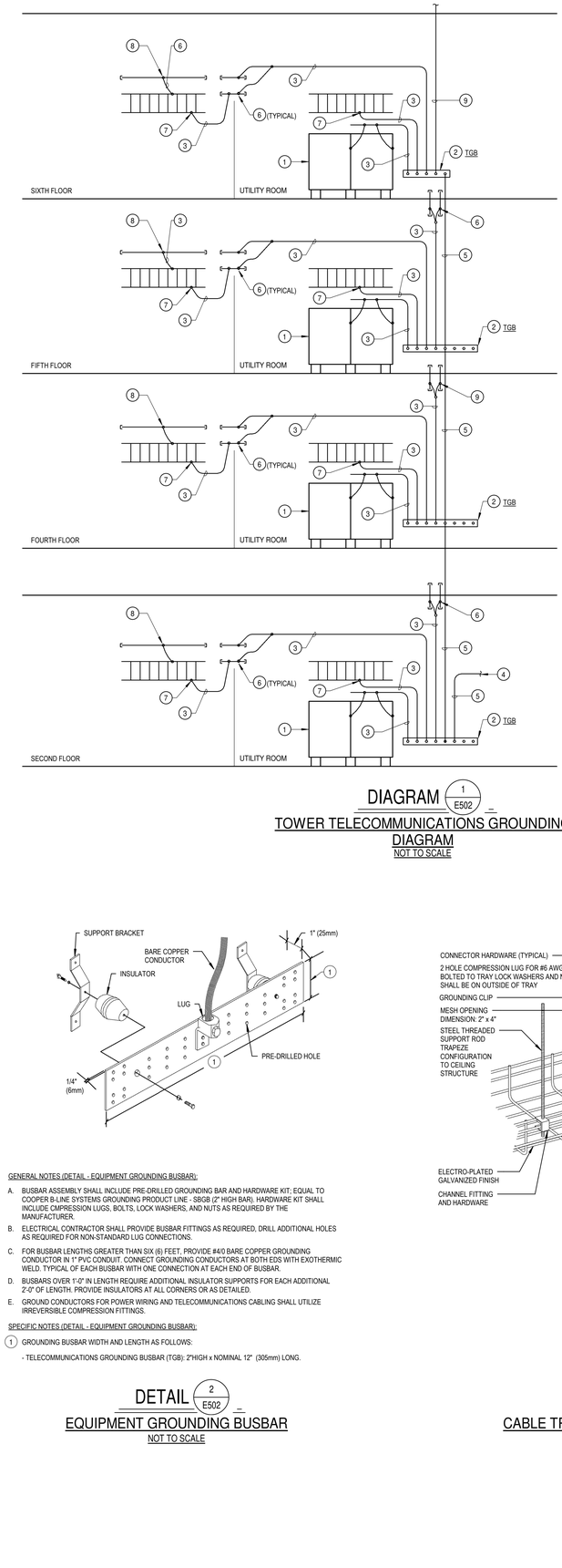


DIAGRAM 1/E502

TOWER TELECOMMUNICATIONS GROUNDING DIAGRAM

NOT TO SCALE

GENERAL NOTES:

A. THE LAYOUT AND QUANTITY OF DEVICES SHOWN ARE DIAGRAMMATIC AND SHOWS THE DESIGN INTENT FOR THE GROUNDING SYSTEM. COORDINATE QUANTITY OF COMPONENTS, CONNECTIONS, AND TERMINATIONS WITH SYSTEMS, EQUIPMENT, AND COMPONENTS SHOWN ON FLOOR PLANS. PROVIDE NFPA 70 CONNECTIONS REQUIRED BY THE NATIONAL ELECTRIC CODE.

B. TELECOMMUNICATIONS SYSTEM GROUNDING SHALL COMPLY WITH APPLICABLE TELECOMMUNICATIONS STANDARDS INCLUDING ANSI/EIA/TIA STANDARD - GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS IN COMMERCIAL BUILDINGS.

C. SEE TELECOMMUNICATIONS DRAWINGS FOR ADDITIONAL INFORMATION, EQUIPMENT AND REQUIREMENTS.

SPECIFIC NOTES:

1. EXISTING TELECOMMUNICATIONS EQUIPMENT
2. TELECOM GROUNDING BUSBAR (TGB). MOUNT MINIMUM 12" ABOVE FLOOR IN EXISTING SPACE. COORDINATE WITH EXISTING CONDITIONS. SEE DETAIL 2/E502 FOR ADDITIONAL INFORMATION.
3. TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR: PROVIDE #6 INSULATED COPPER BONDING CONDUCTOR. PROTECT CONDUCTOR IN 3/4" PVC CONDUIT WHERE SUBJECT TO PHYSICAL DAMAGE OR WHERE CONDUCTOR IS INACCESSIBLE.
4. COORDINATE INTERCONNECTION WITH EXISTING GROUNDING SYSTEM WITH THE OWNER. CONNECT IN EXISTING MDF ON GROUND LEVEL OR NEW IDF ON SECOND FLOOR AS PART OF LIBRARY RENOVATION.
5. TELECOMMUNICATIONS BONDING BACKBONE: PROVIDE BARE COPPER CONDUCTOR IN 1 1/4" PVC CONDUIT, BOND TO TGB AS INDICATED. . SIZE BASED ON FINAL INTERCONNECTION AND OVERALL LENGTH. REFER TO TABLE 1 BELOW (TIA-607) FOR SIZING.
6. BOND METAL RACEWAYS AND SLEEVES FOR TELECOMMUNICATIONS CABLING ENTERING IDF, MDF, AND IT POINT OF ENTRY ROOMS.
7. BOND METAL CABLE TRAYS FOR TELECOMMUNICATIONS CABLING TO TGB. (INSIDE TELECOM ROOM OR TO BONDED METAL SLEEVE OUTSIDE TELECOM ROOM).
8. BOND METAL RACEWAYS IN CEILING SPACE FOR TELECOMMUNICATIONS CABLING TO LOCAL CABLE TRAY.
9. COORDINATE GROUNDING FOR EMERGENCY RESPONDER ANTENNA WITH LIBRARY PROJECT.

Table 1 – TBB/BCC conductor size vs length

TBB/BBC linear length m (ft)	Conductor size (AWG)
less than 4 (13)	**6**
4 – 6 (14 – 20)	**4**
6 – 8 (21 – 26)	**3**
8 – 10 (27 – 33)	**2**
10 – 13 (34 – 41)	**1**
13 – 16 (42 – 52)	**1/0**
16 – 20 (53 – 66)	**2/0**
20 – 26 (67 – 84)	**3/0**
26 – 32 (85 – 105)	**4/0**
32 – 38 (106 – 125)	250 kcmil
38 – 46 (126 – 150)	300 kcmil
46 – 53 (151 – 175)	350 kcmil
53 – 76 (176 – 250)	500 kcmil
76 – 91 (251 – 300)	600 kcmil
Greater than 91 (301)	750 kcmil

GENERAL NOTES (DETAIL - EQUIPMENT GROUNDING BUSBAR):

A. BUSBAR ASSEMBLY SHALL INCLUDE PRE-DRILLED GROUNDING BAR AND HARDWARE KIT; EQUAL TO COOPER B-LINE SYSTEMS GROUNDING PRODUCT LINE - SBGB (2" HIGH BAR). HARDWARE KIT SHALL INCLUDE CMPRESSION LUGS, BOLTS, LOCK WASHERS, AND NUTS AS REQUIRED BY THE MANUFACTURER.

B. ELECTRICAL CONTRACTOR SHALL PROVIDE BUSBAR FITTINGS AS REQUIRED, DRILL ADDITIONAL HOLES AS REQUIRED FOR NON-STANDARD LUG CONNECTIONS.

C. FOR BUSBAR LENGTHS GREATER THAN SIX (6) FEET, PROVIDE #4/0 BARE COPPER GROUNDING CONDUCTOR IN 1" PVC CONDUIT. CONNECT GROUNDING CONDUCTORS AT BOTH EDS WITH EXOTHERMIC WELD. TYPICAL OF EACH BUSBAR WITH ONE CONNECTION AT EACH END OF BUSBAR.

D. BUSBARS OVER 1'-0" IN LENGTH REQUIRE ADDITIONAL INSULATOR SUPPORTS FOR EACH ADDITIONAL 2'-0" OF LENGTH. PROVIDE INSULATORS AT ALL CORNERS OR AS DETAILED.

E. GROUND CONDUCTORS FOR POWER WIRING AND TELECOMMUNICATIONS CABLING SHALL UTILIZE IRREVERSIBLE COMPRESSION FITTINGS.

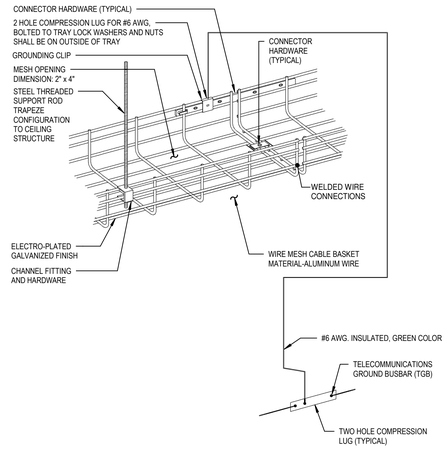
SPECIFIC NOTES (DETAIL - EQUIPMENT GROUNDING BUSBAR):

1. GROUNDING BUSBAR WIDTH AND LENGTH AS FOLLOWS:
   - TELECOMMUNICATIONS GROUNDING BUSBAR (TGB): 2"HIGH x NOMINAL 12" (305mm) LONG.

DETAIL 2/E502

EQUIPMENT GROUNDING BUSBAR

NOT TO SCALE



DETAIL 3/E502

CABLE TRAY WITH GROUNDING CONNECTION

NOT TO SCALE

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MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

hord | coplan | macht

ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
TELECOMMUNICATIONS GROUNDING DETAILS AND DIAGRAMS

E502

NOT FOR CONSTRUCTION

2025-08-29
PERMIT/BID SET

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EXISTING WIRING PANEL SCHEDULE 2H

480/277 VOLTS — 3 PHASE 4 WIRE — 225 AMP MAINS — SURFACE

CIR-CUIT	DESCRIPTION	WIRE/ CONDUIT	POLE	AMP	A		B		C		AMP	POLE	WIRE/ CONDUIT	DESCRIPTION	CIR-CUIT
1	EX CT 212, 212 & HALLWAYS	--	1	20 A	0.8	0.8					20 A	1	--	EX RM 219, 220, & 221	2
3	EX CT 212, 213, & OFFICES	--	1	20 A			0.8	0.8			20 A	1	--	EX RM 222, 223, 224, & 225	4
5	EX 218F, G, H, & I	--	1	20 A					0.6	0.2	20 A	1	#12-3/4"C	LTG OPEN & IND. STUDY 210 213	**6**
7	EX 227A, 215A, 209C, HALL, BTH...	--	1	20 A	0.6	0.5					20 A	1	--	EX LOAD	8
9	EX RM 214, 213	--	1	20 A			0.5	0.5			**20 A**	**1**	**#12-3/4"C**	**LTG WEST OFFICES, TRAINING**	**10**
11	EX LOAD	--	1	20 A					0.5	1.1	**20 A**	**1**	**#12-3/4"C**	**LTG EAST OFFICES, CORRIDOR**	**12**
13	EX SPARE	--	1	20 A	0.0	0.7					**20 A**	**1**	**#12-3/4"C**	**LTG PPHI SUITE**	**14**
15	EX SPARE	--	1	20 A			0.0	**0.0**			**20 A**	**1**	**#12-3/4"C**	**STAIR 1**	**16**
17	EX SPARE	--	1	20 A					**0.0**	**0.0**	**20 A**	**1**	**#12-3/4"C**	**STAIR 2**	**18**
19	EX SPARE	--	1	20 A	0.0	0.0					20 A	1	--	EX SPARE	20
21	EX SPARE	--	1	20 A			0.0	0.0			20 A	1	--	EX SPARE	22
23	EX SPARE	--	1	20 A					0.0	0.0	20 A	1	--	EX SPARE	24
25	EX SPARE	--	1	20 A	0.0	0.0					20 A	1	--	EX SPARE	26
27	EX SPARE	--	1	20 A			0.0	0.0			20 A	1	--	EX SPARE	28
29	EX SPARE	--	1	20 A					0.0	0.0	20 A	1	--	EX SPARE	30
31	EX SPARE	--	1	20 A	0.0	0.0					20 A	1	--	EX SPARE	32
33	EX SPARE	--	1	20 A			0.0	0.0			20 A	1	--	EX SPARE	34
35	EX SPARE	--	1	20 A					0.0	0.0	20 A	1	--	EX SPARE	36
37	EX SPARE	--	1	20 A	0.0	0.0					20 A	1	--	EX SPARE	38
39	EX SPARE	--	1	20 A			0.0	0.0			20 A	1	--	EX SPARE	40
41	EX SPARE	--	1	20 A					0.0	0.0	20 A	1	--	EX SPARE	42
					3.4		2.6		2.4						

CONNECTED LOAD = 8.3 KVA — MAIN BREAKER 225 A AMPS

DEMAND LOAD = 7.1 KVA — NUMBER OF SECTIONS 1

MIN AIC RATING = 35,000 AMPS SYMMETRICAL — LOCATION ELEC. 215A

MANUFACTURER & MODEL EATON PRL3A

LOAD	LOAD CLASSIFICATION	DESCRIPTION	CONNECTED (VA)	DEMAND (VA)	PANEL TOTALS	
ELEV	ELEVATOR	PER NEC TABLE 620.14	0.0 VA	0.0 VA		
EQP	EQUIPMENT	100% CONTINUOUS LOAD	0.0 VA	0.0 VA	**TOTAL LOAD (CONNECTED):**	8.3 kVA
KIT	KITCHEN EQUIPMENT	PER NEC TABLE 220.56	0.0 VA	0.0 VA	**TOTAL CURRENT (CONNECTED):**	10 A
LTG	LIGHTING	100% CONTINUOUS LOAD	2232.0 VA	2232.0 VA		
MECH	MECHANICAL	100% CONTINUOUS LOAD	0.0 VA	0.0 VA	**TOTAL LOAD (DEMAND):**	7.1 kVA
REC	RECEPTACLE	PER NEC TABLE 220.44	0.0 VA	0.0 VA	**TOTAL CURRENT (DEMAND):**	9 A
Spare	EXISTING	80% OF CONNECTED LOAD	5900.0 VA	4720.0 VA		

NOTES:
1) UNLESS OTHERWISE NOTED, CIRCUITS SHOWN IN BOLD ARE NEW AND UTILIZE EXISTING SPARE BREAKERS OR BREAKERS MADE SPARE AS RESULT OF DEMOLITION.

WIRING PANEL SCHEDULE 4H

480/277 VOLTS — 3 PHASE 4 WIRE — 250 AMP MAINS — SURFACE

CIR-CUIT	DESCRIPTION	WIRE/ CONDUIT	POLE	AMP	A		B		C		AMP	POLE	WIRE/ CONDUIT	DESCRIPTION	CIR-CUIT
1	MECH RM & BTH RM LIGHTS	--	1	20 A	0.0	0.0					20 A	1	--	HALLWAY LIGHTS	2
3	NORTH SIDE OFFICE LIGHTS	--	1	20 A			0.0	0.0			20 A	1	--	SOUTH SIDE OFFICE LIGHT	4
5	EAST SIDE OFFICE LIGHTS	--	1	20 A					0.0	0.0	20 A	1	--	WEST SIDE OFFICE LIGHTS	6
7	**LTG WEST SIDE OFFICE**	**#12-3/4"C**	**1**	**20 A**	**0.7**	**0.7**					**20 A**	**1**	**#12-3/4"C**	**LTG EAST SIDE OFFICES**	**8**
9	**LTG CORRIDORS**	**#12-3/4"C**	**1**	**20 A**			0.6	0.0			20 A	1	--	SPARE	10
11	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	12
13	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	14
15	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	16
17	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	18
19	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	20
21	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	22
23	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	24
25	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	26
27	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	28
29	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	30
31	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	32
33	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	34
35	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	36
37					0.0	0.0					20 A	1	--	SPARE	38
39	SPARE	--	3	30 A			0.0	0.0			20 A	1	--	SPARE	40
41									0.0	0.0	20 A	1	--	SPARE	42
					1.4		0.6		0.0						

CONNECTED LOAD = 2.0 KVA — MAIN BREAKER 225 A AMPS

DEMAND LOAD = 2.0 KVA — NUMBER OF SECTIONS 1

MIN AIC RATING = 35,000 AMPS SYMMETRICAL — LOCATION

LOAD	LOAD CLASSIFICATION	DESCRIPTION	CONNECTED (VA)	DEMAND (VA)	PANEL TOTALS	
ELEV	ELEVATOR	PER NEC TABLE 620.14	0.0 VA	0.0 VA		
EQP	EQUIPMENT	100% CONTINUOUS LOAD	0.0 VA	0.0 VA	**TOTAL LOAD (CONNECTED):**	2.0 kVA
KIT	KITCHEN EQUIPMENT	PER NEC TABLE 220.56	0.0 VA	0.0 VA	**TOTAL CURRENT (CONNECTED):**	2 A
LTG	LIGHTING	100% CONTINUOUS LOAD	1757.0 VA	1757.0 VA		
MECH	MECHANICAL	100% CONTINUOUS LOAD	0.0 VA	0.0 VA	**TOTAL LOAD (DEMAND):**	1959.0 VA
REC	RECEPTACLE	PER NEC TABLE 220.44	0.0 VA	0.0 VA	**TOTAL CURRENT (DEMAND):**	2 A

NOTES:
1) UNLESS OTHERWISE NOTED, CIRCUITS SHOWN IN BOLD ARE NEW AND UTILIZE EXISTING SPARE BREAKERS OR BREAKERS MADE SPARE AS RESULT OF DEMOLITION.

WIRING PANEL SCHEDULE 5H

480/277 VOLTS — 3 PHASE 4 WIRE — 225 AMP MAINS — SURFACE

CIR-CUIT	DESCRIPTION	WIRE/ CONDUIT	POLE	AMP	A		B		C		AMP	POLE	WIRE/ CONDUIT	DESCRIPTION	CIR-CUIT
1	EXISTING CIRCUIT	--	1	20 A	0.0	0.0					20 A	1	--	EXISTING CIRCUIT	2
3	EXISTING CIRCUIT	--	1	20 A			0.0	0.0			20 A	1	--	EXISTING CIRCUIT	4
5	EXISTING CIRCUIT	--	1	20 A					0.0	0.0	20 A	1	--	EXISTING CIRCUIT	6
7					0.0	0.0									8
9	EXISTING CIRCUIT	--	3	50 A			0.0	0.0			50 A	3	--	EXISTING CIRCUIT	10
11									0.0	0.0					12
13					0.0	0.0									14
15	EXISTING CIRCUIT	--	3	30 A			0.0	0.0			30 A	3	--	EXISTING CIRCUIT	16
17									0.0	0.0					18
19	**LTG WEST OFFICES**	**#12-3/4"C**	**1**	**20 A**	**0.4**	**0.4**					**20 A**	**1**	**#12-3/4"C**	**LTG NORTH OFFICES**	**20**
21	**LTG SOUTH OFFICES, ENG. DEPT.**	**#12-3/4"C**	**1**	**20 A**			**0.4**	**0.2**			**20 A**	**1**	**#12-3/4"C**	**LTG EAST OFFICES**	**22**
23	**LTG CORRIDOR, AND UTILITIES**	**#12-3/4"C**	**1**	**20 A**					**0.4**	0.0	20 A	1	--	SPARE	24
25	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	26
27	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	28
29	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	30
31	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	32
33	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	34
35	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	36
37					0.0	0.0					20 A	1	--	SPARE	38
39	SPARE	--	3	30 A			0.0	0.0			20 A	1	--	SPARE	40
41									0.0	0.0	20 A	1	--	SPARE	42
					0.8		0.6		0.4						

CONNECTED LOAD = 1.8 KVA — MAIN BREAKER 225 A AMPS

DEMAND LOAD = 1.8 KVA — NUMBER OF SECTIONS 1

MIN AIC RATING = 35,000 AMPS SYMMETRICAL — LOCATION

LOAD	LOAD CLASSIFICATION	DESCRIPTION	CONNECTED (VA)	DEMAND (VA)	PANEL TOTALS	
ELEV	ELEVATOR	PER NEC TABLE 620.14	0.0 VA	0.0 VA		
EQP	EQUIPMENT	100% CONTINUOUS LOAD	0.0 VA	0.0 VA	**TOTAL LOAD (CONNECTED):**	1.8 kVA
KIT	KITCHEN EQUIPMENT	PER NEC TABLE 220.56	0.0 VA	0.0 VA	**TOTAL CURRENT (CONNECTED):**	2 A
LTG	LIGHTING	100% CONTINUOUS LOAD	1613.0 VA	1613.0 VA		
MECH	MECHANICAL	100% CONTINUOUS LOAD	0.0 VA	0.0 VA	**TOTAL LOAD (DEMAND):**	1842.0 VA
REC	RECEPTACLE	PER NEC TABLE 220.44	0.0 VA	0.0 VA	**TOTAL CURRENT (DEMAND):**	2 A

NOTES:
1) UNLESS OTHERWISE NOTED, CIRCUITS SHOWN IN BOLD ARE NEW AND UTILIZE EXISTING SPARE BREAKERS OR BREAKERS MADE SPARE AS RESULT OF DEMOLITION.

WIRING PANEL SCHEDULE 6H

480/277 VOLTS — 3 PHASE 4 WIRE — 250 AMP MAINS — SURFACE

CIR-CUIT	DESCRIPTION	WIRE/ CONDUIT	POLE	AMP	A		B		C		AMP	POLE	WIRE/ CONDUIT	DESCRIPTION	CIR-CUIT
1	HALL LIGHTS	--	1	20 A	0.0	0.0					20 A	1	--	LIGHTS 606,608,611,MECH RM	2
3	LIGHTS RM 212,614	--	1	20 A			0.0	0.0			20 A	1	--	LIGHTS 601,603,609	4
5	LIGHTS RM 615	--	1	20 A					0.0	0.0	20 A	1	--	LIGHTS 602,607,609	6
7	**LTG 617,618,620,621,622**	**#12-3/4"C**	**1**	**20 A**	**0.7**	**0.3**					**20 A**	**1**	**#12-3/4"C**	**LTG 605,606,607,608,609**	**8**
9	**LTG EAST OFFICES**	**#12-3/4"C**	**1**	**20 A**			**0.2**	**0.3**			**20 A**	**1**	**#12-3/4"C**	**LTG WEST OFFICES**	**10**
11	SPARE	--	1	20 A					0.0	**0.3**	**20 A**	**1**	**#12-3/4"C**	**LTG HALLWAYS**	**12**
13	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	14
15	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	16
17	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	18
19	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	20
21	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	22
23	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	24
25	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	26
27	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	28
29	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	30
31	SPARE	--	1	20 A	0.0	0.0					20 A	1	--	SPARE	32
33	SPARE	--	1	20 A			0.0	0.0			20 A	1	--	SPARE	34
35	SPARE	--	1	20 A					0.0	0.0	20 A	1	--	SPARE	36
37					0.0	0.0					20 A	1	--	SPARE	38
39	SPARE	--	3	30 A			0.0	0.0			20 A	1	--	SPARE	40
41									0.0	0.0	20 A	1	--	SPARE	42
					1.0		0.6		0.3						

CONNECTED LOAD = 1.8 KVA — MAIN BREAKER 225 A AMPS

DEMAND LOAD = 1.8 KVA — NUMBER OF SECTIONS 1

MIN AIC RATING = 35,000 AMPS SYMMETRICAL — LOCATION

LOAD	LOAD CLASSIFICATION	DESCRIPTION	CONNECTED (VA)	DEMAND (VA)	PANEL TOTALS	
ELEV	ELEVATOR	PER NEC TABLE 620.14	0.0 VA	0.0 VA		
EQP	EQUIPMENT	100% CONTINUOUS LOAD	0.0 VA	0.0 VA	**TOTAL LOAD (CONNECTED):**	1.8 kVA
KIT	KITCHEN EQUIPMENT	PER NEC TABLE 220.56	0.0 VA	0.0 VA	**TOTAL CURRENT (CONNECTED):**	2 A
LTG	LIGHTING	100% CONTINUOUS LOAD	1713.0 VA	1713.0 VA		
MECH	MECHANICAL	100% CONTINUOUS LOAD	0.0 VA	0.0 VA	**TOTAL LOAD (DEMAND):**	1840.0 VA
REC	RECEPTACLE	PER NEC TABLE 220.44	0.0 VA	0.0 VA	**TOTAL CURRENT (DEMAND):**	2 A

NOTES:
1) UNLESS OTHERWISE NOTED, CIRCUITS SHOWN IN BOLD ARE NEW AND UTILIZE EXISTING SPARE BREAKERS OR BREAKERS MADE SPARE AS RESULT OF DEMOLITION.

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	LAMP	NOMINAL LUMENS	MAXIMUM WATTAGE	VOLTAGE	DRIVER	MOUNTING	BASIS-OF-DESIGN MANUFACTURER	BASIS-OF-DESIGN CATALOG NUMBER	APPROVED EQUALS	NOTES
PA1	4-FT LONG LED STRIPLIGHT, CODE-GAUGE STEEL HOUSING, CURVED FROSTED LENS, WHITE FINISH.	LED 4000K 90 CRI	4500 LM	32 W	277 V	INTEGRAL 0-10V DIM-TO-10%	PENDANT, 9'-0" AFF	COLUMBIA	MPS 4 9 40 ML C W ED U	LITHONIA (CLX) HE WILLIAMS (75R) METALUX (SNX) DAY-BRITE (FLP)	2
PB1	DECORATIVE RING PENDANT, 3-FT DIAMETER, ALUMINUM BODY WITH STEEL CABLE SUSPENSION, DIRECT DISTRIBUTION, OPAL POLYCARBONATE DIFFUSER, WHITE LOUVER AND SILVER METALLIC FINISH.	LED 4000K 90 CRI	DIRECT: 500 LM/FT INDIRECT: 300 LM/FT	70 W	277 V	REMOTE 0-10V DIM-TO-1%	PENDANT, 8'-0" AFF	BETA CALCO	HLNP2P03 LV3 LPF500 LPG030 CR90 CTA40 UD2 V1 DA01 SS1 FA20 CF20 AP00 E0 CS1 C0	SPI LIGHTING (ZYNN 2" RING - MOD)	2
RA1	2-FT BY 4-FT RECESSED TROFFER, SHALLOW COLD-ROLLED STEEL HOUSING (2.25" MAXIMUM DEPTH), HIGH TRANSMISSION EXTRUDED ACRYLIC CURVED LENS, HIGH-REFLECTIVITY MATTE WHITE FINISH.	LED 4000K 90 CRI	4200 LM	30 W	277 V	INTEGRAL 0-10V DIM-TO-10%	RECESSED	COLUMBIA	LCAT24 S 940 L042 G ED U	LITHONIA (BLT) HE WILLIAMS (PT)	–
RA2	2-FT BY 4-FT RECESSED TROFFER, SHALLOW COLD-ROLLED STEEL HOUSING (2.25" MAXIMUM DEPTH), HIGH TRANSMISSION EXTRUDED ACRYLIC CURVED LENS, HIGH-REFLECTIVITY MATTE WHITE FINISH.	LED 4000K 90 CRI	5900 LM	40 W	277 V	INTEGRAL 0-10V DIM-TO-10%	RECESSED	COLUMBIA	LCAT24 S 940 L058 G ED U	LITHONIA (BLT) HE WILLIAMS (PT)	–
RB1	2-FT BY 2-FT RECESSED TROFFER, COLD-ROLLED STEEL HOUSING (2.25" MAXIMUM DEPTH), HIGH TRANSMISSION EXTRUDED ACRYLIC CURVED LENS, HIGH-REFLECTIVITY MATTE WHITE FINISH.	LED 4000K 90 CRI	3800 LM	28 W	277 V	INTEGRAL 0-10V DIM-TO-10%	RECESSED	COLUMBIA	LCAT22 S 940 L036 G ED U	LITHONIA (BLT) HE WILLIAMS (PT)	–
RK1	3" ADJUSTABLE ROUND DOWNLIGHT WITH 0-35° TILT AND 360° HORIZONTAL ROTATION, STANDARD ANGLE CUT CONE, BLACK ENCLOSED STEEL PLATFORM, 45° WIDE DISTRIBUTION, SEMI-SPECULAR FINISH.	LED 4000K 90 CRI	2000 LM	25 W	277 V	INTEGRAL 0-10V DIM-TO-1%	RECESSED	PRESCOLITE	LTR-3RA-H 20L 40K 9 XW DM1 LTR-3RA-T SS	ACULUX (AX3) AMERLUX (HP SELECT)	–
RL1	1-FT BY 4-FT RECESSED TROFFER, COLD-ROLLED STEEL HOUSING (2.25" MAXIMUM DEPTH), HIGH TRANSMISSION EXTRUDED ACRYLIC CURVED LENS, HIGH-REFLECTIVITY MATTE WHITE FINISH.	LED 4000K 90 CRI	2500 LM	19 W	277 V	INTEGRAL 0-10V DIM-TO-10%	RECESSED	COLUMBIA	LCAT14 S 940 L025 G ED U	LITHONIA (BLT) HE WILLIAMS (PT)	–
SB1	NOMINAL 24" DIAMETER ROUND SURFACE MOUNTED FIXTURE; ROLLED AND SEAMLESSLY WELDED EXTRUDED ALUMINUM HOUSING, UNIFORM LAMBERTIAN OPTIC WITH FLUSH ACRYLIC LENS, WHITE FINISH.	LED 4000K 90 CRI	4500 LM	45 W	277 V	INTEGRAL 0-10V DIM-TO-1%	SURFACE	LUMENWERX	PCROS 24IN UL0 FH SW 90 4500 40 UNV D1 1 SUR W	FOCAL POINT (SKYDOME EDGE) HE WILLIAMS (RNDS)	–
SC1	NOMINAL 6-FT LONG BY 3.7"-WIDE LINEAR FIXTURE;, EXTRUDED ALUMINUM HOUSING, DIE-CAST ALUMINUM END CAPS, ACRYLIC BELL SHAPED LENS, WHITE FINISH.	LED 4000K 90 CRI	5700 LM	8.0 W/FT	277 V	INTEGRAL 0-10V DIM-TO-1%	SURFACE, CEILING	LITECONTROL	67L W D 6' 6 DM C1 40K9 D095 D01 1C UNV	KENALL (MLHA3) HE WILLIAMS (LLM) PRUDENTIAL (FLAIR-PRO)	–
WA1	NOMINAL 6-FT LONG BY 3.7"-WIDE LINEAR FIXTURE;, EXTRUDED ALUMINUM HOUSING, DIE-CAST ALUMINUM END CAPS, ACRYLIC BELL SHAPED LENS, WHITE FINISH.	LED 4000K 90 CRI	5700 LM	8.0 W/FT	277 V	INTEGRAL 0-10V DIM-TO-1%	WALL, 8'-0" ABOVE FLOOR OR LANDING UON	LITECONTROL	67L W D 6' 6 DM C1 40K9 D095 D01 1C UNV	KENALL (MLHA3) HE WILLIAMS (LLM) PRUDENTIAL (FLAIR-PRO)	–
X	EXIT SIGN, EDGE-LIT, LOW-PROFILE SATIN EXTRUDED ALUMINUM CONSTRUCTION, RED LETTERING, AC ONLY.	LED	–	< 5 W PER FACE	277 V	–	RECESSED, CEILING OR WALL	DUAL LITE	LES (MOUNTING) (FACES) R (ARROWS) N A	LITHONIA (EDG) SURE-LITES (EU) LIGHTALARMS (SIMPLICITY) CARPENTER (CEDG-AC)	1

GENERAL NOTES:

A. ALTERNATIVE PRODUCTS NOT SPECIFICALLY LISTED IN THE LIGHTING FIXTURE SCHEDULE MAY BE SUBMITTED FOR REVIEW AS A SUBSTITUTION IN ACCORDANCE WITH BIDDING AND CONTRACTING REQUIREMENTS AND DIVISION 01 GENEREAL REQUIREMENTS UNLESS OTHERWISE NOTED IN THE LIGHTING FIXTURE SCHEDULE. PROPOSED FIXTURES MUST COMPLY WITH THE PERFORMANCE CRITERIA LISTED. ADDITIONAL DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, PHOTOMETRIC REPORTS, LIGHTING CALCULATIONS, AND SAMPLES SHALL BE MADE AVAILABLE UPON REQUEST.

B. INTERIOR LIGHTING FIXTURES SHALL BE PROVIDED WITH 4000K COLOR TEMPERATURE, WITHIN +/- 100K, AND WITHIN THREE MCADAM ELLIPSES, UNLESS OTHERWISE NOTED ABOVE. COLOR RENDERING INDEX SHALL BE 90 OR GREATER, UNLESS OTHERWISE NOTED ABOVE.

C. CONFIRM CEILING AND WALL CONSTRUCTION TYPES WITH ARCHITECTURAL DRAWINGS PRIOR TO ORDERING FIXTURES. PROVIDE APPROPRIATE MOUNTING HARDWARE REQUIRED FOR FIXTURE INSTALLATION.

D. PROVIDE CEILING GRID ATTACHEMENT ACCESSORIES IN ACCORDANCE WITH NEC ARTICLE 410 WHERE LUMINAIRES ARE INSTALLED IN A SUSPENDED CEILING SYSTEM.

E. VERIFY FINAL FINISHES WITH ARCHITECT.

SPECIFIC NOTES:

1. PROVIDE DIRECTIONAL CHEVRON ARROWS AND NUMBER OF FACES AS INDICATED ON LIGHTING PLANS. EXIT SIGN SHALL BE RECESSED IN CEILING, OR WALL MOUNTED 7'-6" ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED.
2. COORDINATE FINAL MOUNTING HEIGHT OF FIXTURE WITH ARCHITECTURAL DRAWINGS, SECTIONS, AND ELEVATIONS.

SCHEDULE KEY

PANEL 2H | PANEL 4H | PANEL 5H | PANEL 6H | LIGHTING FIXTURE SCHEDULE

ARCHITECT
HORD COPLAN MACHT
1925 BALLENGER AVENUE, SUITE 525
ALEXANDRIA, VA 22314
571.388.7761

STRUCTURAL ENGINEER
A&F ENGINEERS, INC
1112 16TH ST UNIT 920
WASHINGTON, DC 20036
202.828.1600

FPME ENGINEER
JAMES POSEY ASSOCIATES INC
11150 RED RUN BLVD
OWINGS MILLS, MD 21117
410.265.6100

EXTERIOR ENVELOPE CONSULTANT
GALE ASSOCIATES, INC
1122 KENILWORTH DRIVE, SUITE 206
TOWSON, MD 21204
443.279.4500

CIVIL ENGINEER
A. MORTON THOMAS & ASSOCIATES, INC
700 King Farm BLVD., SUITE 300
Rockville, MD 20850
301.545.2646

MONTGOMERY COLLEGE
MACKLIN TOWER ROOF REPLACEMENT AND LIMITED HVAC UPGRADES
51 MANNAKEE STREET
ROCKVILLE, MD 20850

MC PROJECT # FP24-0003 | BUILDING # 206
MHEC PROJECT #483

hord | coplan | macht
ARCHITECTURE
LANDSCAPE ARCHITECTURE
PLANNING
INTERIOR DESIGN

JPA Project No.: 8091-25

Δ	DATE	DESCRIPTION

Project Number: 224112.00
Drawn By: CPJ
Checked By: PMM

KEY PLAN:

Drawing
PANELBOARD AND LIGHTING FIXTURE SCHEDULES

E601

NOT FOR CONSTRUCTION

2025-08-29
PERMIT/BID SET

© Hord Coplan Macht, Inc.

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PIT LINE SHOWN ABOVE IS EXACTLY ONE INCH LONG AT THIS SHEET'S ORIGINAL PAPER SIZE

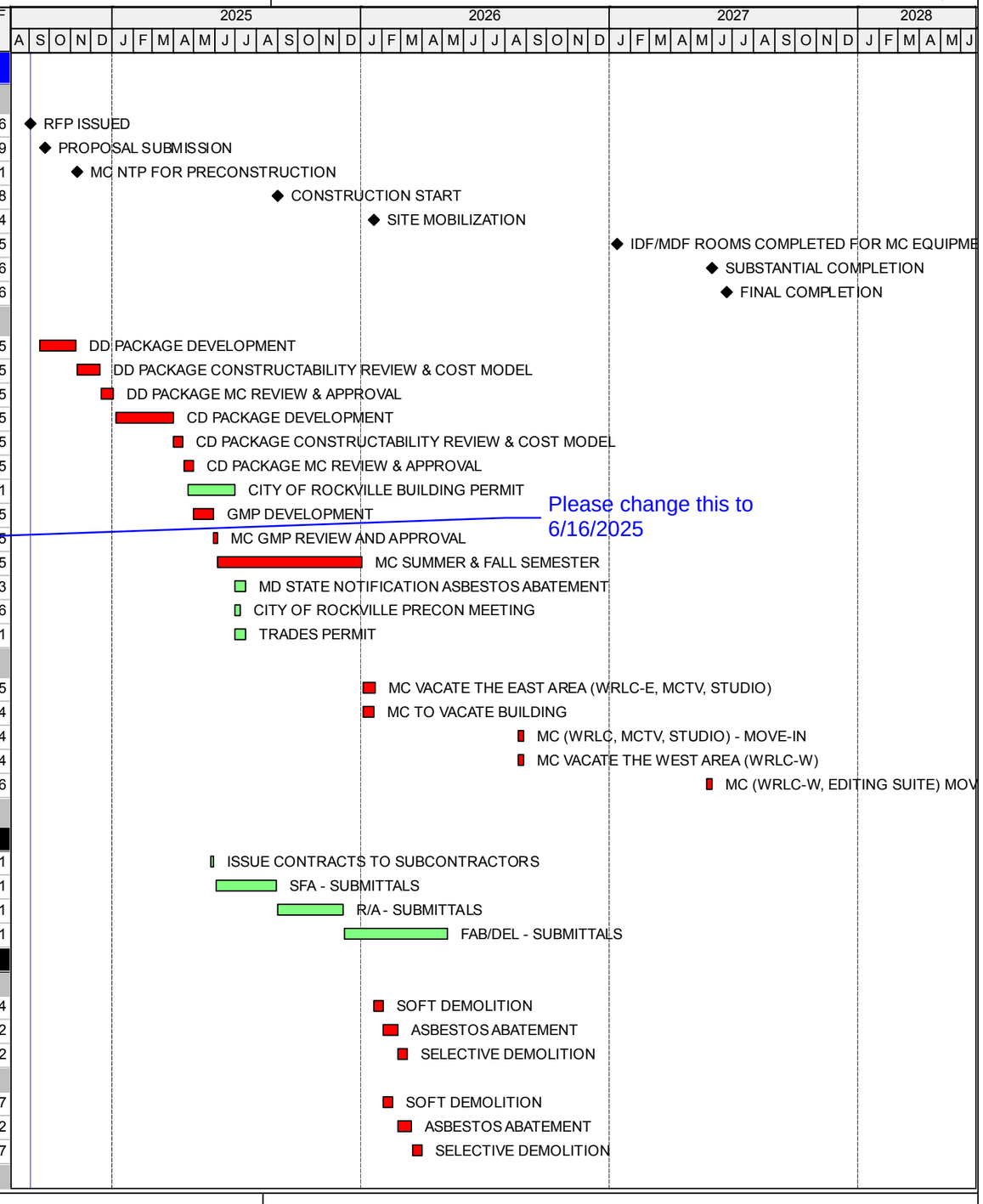
THE SQUARES ABOVE ARE COLOR: WITH BLACK AND WHITE LETTERS IF PRINTED CORRECTLY

Y | M | C

APPENDIX C

MC RFP 625-004R - MC Macklin Tower Library Renovation-UPDT 01 | 00 ALL ACTIVITIES | Print Date: 16-May-25

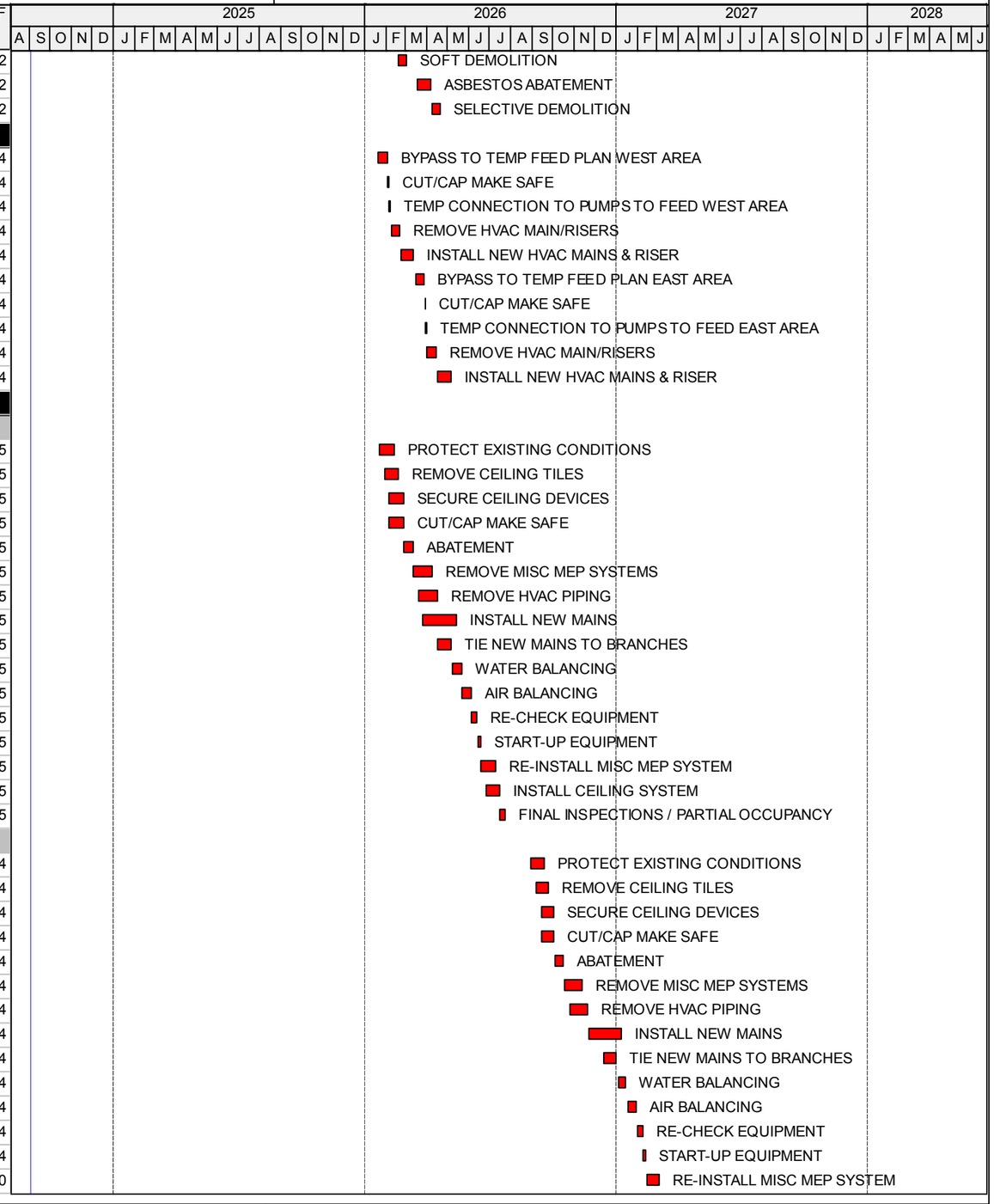
Activity ID	Activity Name	OD	RD	Start	Finish	TF
MC Macklin Tower Library Renovation-UPDT 01						
MILESTONES						
MC-10000	RFP ISSUED	0	0	03-Sep-24*		-16
MC-10010	PROPOSAL SUBMISSION	0	0	24-Sep-24*		9
MC-10020	MC NTP FOR PRECONSTRUCTION	0	0	11-Nov-24*		221
MC-10030	CONSTRUCTION START	0	0	01-Sep-25*		88
MC-10070	SITE MOBILIZATION	0	0	21-Jan-26*		-14
MC-10040	IDF/MDF ROOMS COMPLETED FOR MC EQUIPMENT	0	0	12-Jan-27		-25
MC-10050	SUBSTANTIAL COMPLETION	0	0		01-Jun-27	-46
MC-10060	FINAL COMPLETION	0	0		22-Jun-27	-46
DESIGN & ADMINISTRATIVE PHASE						
DA-20000	DD PACKAGE DEVELOPMENT	40	40	16-Sep-24*	08-Nov-24	-25
DA-20010	DD PACKAGE CONSTRUCTABILITY REVIEW & COST MODEL	25	25	11-Nov-24*	13-Dec-24	-25
DA-20020	DD PACKAGE MC REVIEW & APPROVAL	15	15	16-Dec-24*	03-Jan-25	-25
DA-20030	CD PACKAGE DEVELOPMENT	61	61	06-Jan-25*	31-Mar-25	-25
DA-20040	CD PACKAGE CONSTRUCTABILITY REVIEW & COST MODEL	11	11	01-Apr-25*	15-Apr-25	-25
DA-20050	CD PACKAGE MC REVIEW & APPROVAL	11	11	16-Apr-25*	30-Apr-25	-25
DA-20080	CITY OF ROCKVILLE BUILDING PERMIT	49	49	23-Apr-25*	30-Jun-25	121
DA-20060	GMP DEVELOPMENT	21	21	01-May-25*	29-May-25	-25
DA-20070	MC GMP REVIEW AND APPROVAL	4	4	30-May-25*	04-Jun-25	-25
DA-20120	MC SUMMER & FALL SEMESTER	152	152	05-Jun-25	02-Jan-26	-25
DA-20090	MD STATE NOTIFICATION ASBESTOS ABATEMENT	11	11	01-Jul-25*	15-Jul-25	133
DA-20100	CITY OF ROCKVILLE PRECON MEETING	6	6	01-Jul-25*	08-Jul-25	126
DA-20110	TRADES PERMIT	11	11	01-Jul-25*	15-Jul-25	121
MOVE IN AND MOVE OUT						
GF3000	MC VACATE THE EAST AREA (WRLC-E, MCTV, STUDIO)	14	14	05-Jan-26	22-Jan-26	-25
DA-20130	MC TO VACATE BUILDING	12	12	05-Jan-26	20-Jan-26	-14
GF3170	MC (WRLC, MCTV, STUDIO) - MOVE-IN	7	7	20-Aug-26*	28-Aug-26	-34
GF3005	MC VACATE THE WEST AREA (WRLC-W)	7	7	20-Aug-26	28-Aug-26	-34
GF3360	MC (WRLC-W, EDITING SUITE) MOVE-IN	6	6	25-May-27*	01-Jun-27	-46
CONSTRUCTION						
PROCUREMENT						
P-3000	ISSUE CONTRACTS TO SUBCONTRACTORS	5	5	26-May-25*	30-May-25	81
P-3010	SFA - SUBMITTALS	65	65	02-Jun-25*	29-Aug-25	81
P-3020	R/A - SUBMITTALS	70	70	01-Sep-25*	05-Dec-25	81
P-3030	FAB/DEL - SUBMITTALS	110	110	08-Dec-25*	08-May-26	81
DEMOLITION						
3RD FLOOR						
DEM-30000	SOFT DEMOLITION	10	10	21-Jan-26*	03-Feb-26	-14
DEM-30010	ASBESTOS ABATEMENT	15	15	04-Feb-26	24-Feb-26	-12
DEM-30020	SELECTIVE DEMOLITION	10	10	25-Feb-26	10-Mar-26	-2
2ND FLOOR						
DEM-20030	SOFT DEMOLITION	10	10	04-Feb-26	17-Feb-26	-7
DEM-20040	ASBESTOS ABATEMENT	15	15	25-Feb-26	17-Mar-26	-12
DEM-20050	SELECTIVE DEMOLITION	10	10	18-Mar-26	31-Mar-26	-7
1ST FLOOR						



Remaining Level of Effort ◆ Milestone
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work

DRAFT

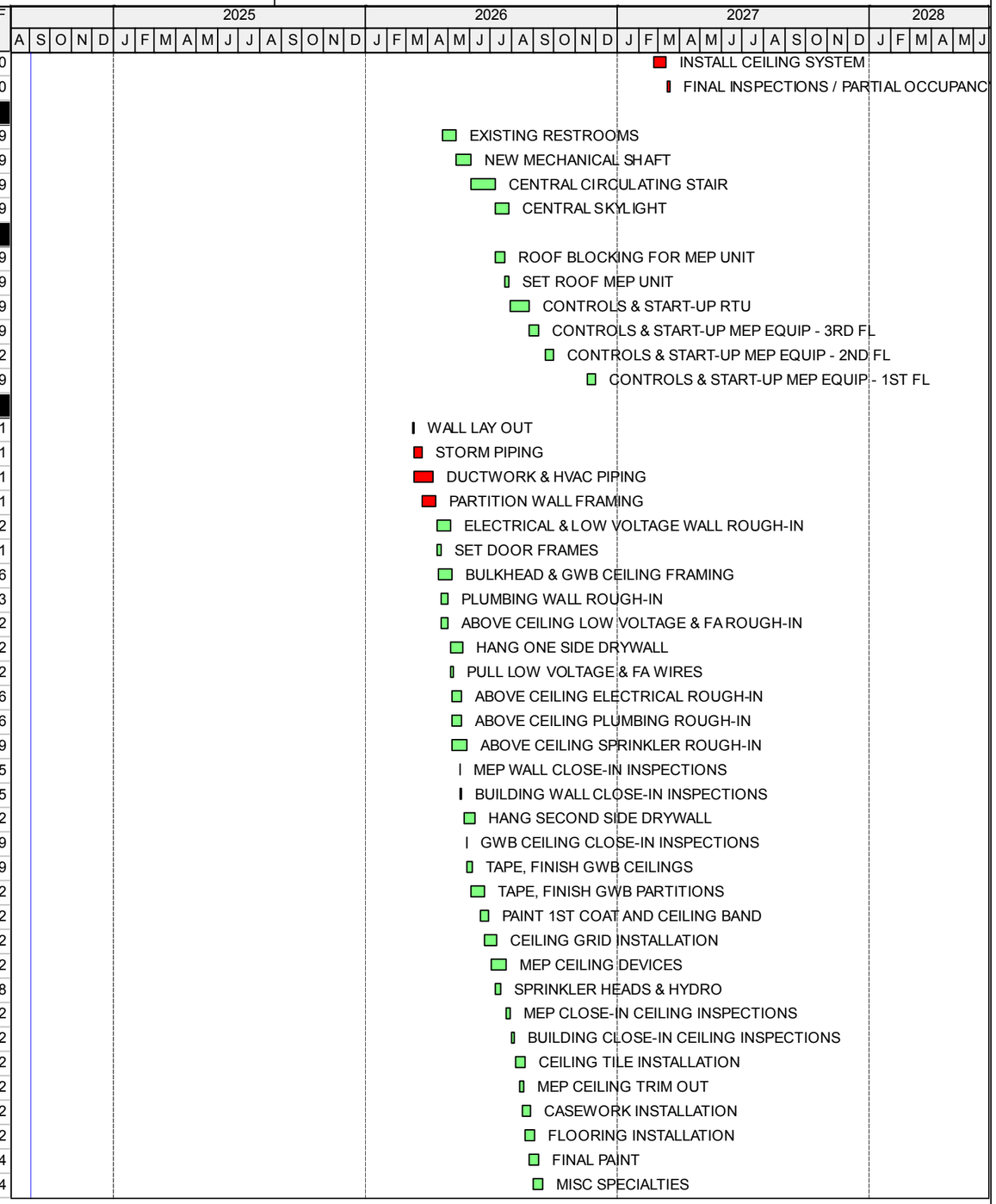
Activity ID	Activity Name	OD	RD	Start	Finish	TF
DEM-10000	SOFT DEMOLITION	10	10	18-Feb-26	03-Mar-26	-2
DEM-10010	ASBESTOS ABATEMENT	15	15	18-Mar-26	07-Apr-26	-12
DEM-10020	SELECTIVE DEMOLITION	10	10	08-Apr-26	21-Apr-26	-12
MT MECHANICAL ROOM						
MEP2000	BYPASS TO TEMP FEED PLAN WEST AREA	10	10	21-Jan-26*	03-Feb-26	-14
MEP2010	CUT/CAP MAKE SAFE	1	1	04-Feb-26	04-Feb-26	-14
MEP2020	TEMP CONNECTION TO PUMPS TO FEED WEST AREA	2	2	05-Feb-26	06-Feb-26	-14
MEP2030	REMOVE HVAC MAIN/RISERS	10	10	09-Feb-26	20-Feb-26	-14
MEP2040	INSTALL NEW HVAC MAINS & RISER	15	15	23-Feb-26	13-Mar-26	-14
MEP2050	BYPASS TO TEMP FEED PLAN EAST AREA	10	10	16-Mar-26	27-Mar-26	-14
MEP2060	CUT/CAP MAKE SAFE	1	1	30-Mar-26	30-Mar-26	-14
MEP2070	TEMP CONNECTION TO PUMPS TO FEED EAST AREA	2	2	31-Mar-26	01-Apr-26	-14
MEP2080	REMOVE HVAC MAIN/RISERS	10	10	02-Apr-26	15-Apr-26	-14
MEP2090	INSTALL NEW HVAC MAINS & RISER	15	15	16-Apr-26	06-May-26	-14
MT HVAC PIPING GROUND FL						
PLAN EAST - GROUND FL HVAC PIPING REPLACEMENT						
GF3010	PROTECT EXISTING CONDITIONS	15	15	23-Jan-26	12-Feb-26	-25
GF3020	REMOVE CEILING TILES	15	15	30-Jan-26	19-Feb-26	-25
GF3030	SECURE CEILING DEVICES	15	15	06-Feb-26	26-Feb-26	-25
GF3040	CUT/CAP MAKE SAFE	15	15	06-Feb-26	26-Feb-26	-25
GF3050	ABATEMENT	10	10	27-Feb-26	12-Mar-26	-25
GF3060	REMOVE MISC MEP SYSTEMS	20	20	13-Mar-26	09-Apr-26	-25
GF3070	REMOVE HVAC PIPING	20	20	20-Mar-26	16-Apr-26	-25
GF3080	INSTALL NEW MAINS	35	35	27-Mar-26	14-May-26	-25
GF3090	TIE NEW MAINS TO BRANCHES	15	15	17-Apr-26	07-May-26	-15
GF3100	WATER BALANCING	10	10	08-May-26	21-May-26	-15
GF3110	AIR BALANCING	10	10	22-May-26	04-Jun-26	-15
GF3120	RE-CHECK EQUIPMENT	6	6	05-Jun-26	12-Jun-26	-15
GF3130	START-UP EQUIPMENT	4	4	15-Jun-26	18-Jun-26	-15
GF3140	RE-INSTALL MISC MEP SYSTEM	15	15	19-Jun-26	09-Jul-26	-15
GF3150	INSTALL CEILING SYSTEM	15	15	26-Jun-26	16-Jul-26	-15
GF3160	FINAL INSPECTIONS / PARTIAL OCCUPANCY	5	5	17-Jul-26	23-Jul-26	-15
PLAN WEST - GROUND FL HVAC PIPING REPLACEMENT						
GF3200	PROTECT EXISTING CONDITIONS	15	15	31-Aug-26	18-Sep-26	-34
GF3210	REMOVE CEILING TILES	15	15	07-Sep-26	25-Sep-26	-34
GF3220	SECURE CEILING DEVICES	15	15	14-Sep-26	02-Oct-26	-34
GF3230	CUT/CAP MAKE SAFE	15	15	14-Sep-26	02-Oct-26	-34
GF3240	ABATEMENT	10	10	05-Oct-26	16-Oct-26	-34
GF3250	REMOVE MISC MEP SYSTEMS	20	20	19-Oct-26	13-Nov-26	-34
GF3260	REMOVE HVAC PIPING	20	20	26-Oct-26	20-Nov-26	-34
GF3270	INSTALL NEW MAINS	35	35	23-Nov-26	08-Jan-27	-34
GF3280	TIE NEW MAINS TO BRANCHES	15	15	14-Dec-26	01-Jan-27	-34
GF3290	WATER BALANCING	10	10	04-Jan-27	15-Jan-27	-34
GF3300	AIR BALANCING	10	10	18-Jan-27	29-Jan-27	-34
GF3310	RE-CHECK EQUIPMENT	6	6	01-Feb-27	08-Feb-27	-34
GF3320	START-UP EQUIPMENT	4	4	09-Feb-27	12-Feb-27	-34
GF3330	RE-INSTALL MISC MEP SYSTEM	15	15	15-Feb-27	05-Mar-27	0



Remaining Level of Effort ◆ ◆ Milestone
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work

DRAFT

Activity ID	Activity Name	OD	RD	Start	Finish	TF
GF3340	INSTALL CEILING SYSTEM	15	15	22-Feb-27	12-Mar-27	0
GF3350	FINAL INSPECTIONS / PARTIAL OCCUPANCY	5	5	15-Mar-27	19-Mar-27	0
STRUCTURE						
STR-50000	EXISTING RESTROOMS	15	15	22-Apr-26	12-May-26	59
STR-50010	NEW MECHANICAL SHAFT	15	15	13-May-26	02-Jun-26	59
STR-50020	CENTRAL CIRCULATING STAIR	25	25	03-Jun-26	07-Jul-26	59
STR-50030	CENTRAL SKYLIGHT	15	15	08-Jul-26	28-Jul-26	59
BUILDING ENVELOPE						
BLDG-70000	ROOF BLOCKING FOR MEP UNIT	10	10	08-Jul-26	21-Jul-26	59
BLDG-70010	SET ROOF MEP UNIT	5	5	22-Jul-26	28-Jul-26	59
BLDG-70020	CONTROLS & START-UP RTU	20	20	29-Jul-26	25-Aug-26	59
BLDG-70030	CONTROLS & START-UP MEP EQUIP - 3RD FL	10	10	26-Aug-26	08-Sep-26	59
BLDG-70040	CONTROLS & START-UP MEP EQUIP - 2ND FL	10	10	18-Sep-26	01-Oct-26	52
BLDG-70050	CONTROLS & START-UP MEP EQUIP - 1ST FL	10	10	18-Nov-26	01-Dec-26	19
3RD FLOOR WORK						
FL3-30000	WALL LAY OUT	2	2	11-Mar-26	12-Mar-26	-1
FL3-30010	STORM PIPING	9	9	12-Mar-26	24-Mar-26	-1
FL3-30020	DUCTWORK & HVAC PIPING	20	20	13-Mar-26	09-Apr-26	-1
FL3-30030	PARTITION WALL FRAMING	15	15	24-Mar-26	13-Apr-26	-1
FL3-30040	ELECTRICAL & LOW VOLTAGE WALL ROUGH-IN	15	15	14-Apr-26	04-May-26	22
FL3-30110	SET DOOR FRAMES	5	5	14-Apr-26	20-Apr-26	51
FL3-30060	BULKHEAD & GWB CEILING FRAMING	15	15	16-Apr-26	06-May-26	26
FL3-30050	PLUMBING WALL ROUGH-IN	10	10	20-Apr-26	01-May-26	23
FL3-30080	ABOVE CEILING LOW VOLTAGE & FA ROUGH-IN	10	10	20-Apr-26	01-May-26	62
FL3-30120	HANG ONE SIDE DRYWALL	15	15	04-May-26	22-May-26	42
FL3-30370	PULL LOW VOLTAGE & FA WIRES	5	5	04-May-26	08-May-26	62
FL3-30070	ABOVE CEILING ELECTRICAL ROUGH-IN	10	10	07-May-26	20-May-26	26
FL3-30090	ABOVE CEILING PLUMBING ROUGH-IN	10	10	07-May-26	20-May-26	26
FL3-30100	ABOVE CEILING SPRINKLER ROUGH-IN	15	15	07-May-26	27-May-26	49
FL3-30130	MEP WALL CLOSE-IN INSPECTIONS	1	1	18-May-26	18-May-26	45
FL3-30140	BUILDING WALL CLOSE-IN INSPECTIONS	1	1	19-May-26	19-May-26	45
FL3-30150	HANG SECOND SIDE DRYWALL	11	11	25-May-26	08-Jun-26	42
FL3-30160	GWB CEILING CLOSE-IN INSPECTIONS	1	1	28-May-26	28-May-26	49
FL3-30170	TAPE, FINISH GWB CEILINGS	5	5	29-May-26	04-Jun-26	49
FL3-30180	TAPE, FINISH GWB PARTITIONS	15	15	03-Jun-26	23-Jun-26	42
FL3-30190	PAINT 1ST COAT AND CEILING BAND	10	10	16-Jun-26	29-Jun-26	42
FL3-30200	CEILING GRID INSTALLATION	15	15	22-Jun-26	10-Jul-26	42
FL3-30210	MEP CEILING DEVICES	15	15	03-Jul-26	23-Jul-26	42
FL3-30220	SPRINKLER HEADS & HYDRO	5	5	09-Jul-26	15-Jul-26	48
FL3-30230	MEP CLOSE-IN CEILING INSPECTIONS	5	5	24-Jul-26	30-Jul-26	42
FL3-30240	BUILDING CLOSE-IN CEILING INSPECTIONS	4	4	31-Jul-26	05-Aug-26	42
FL3-30250	CEILING TILE INSTALLATION	11	11	06-Aug-26	20-Aug-26	42
FL3-30260	MEP CEILING TRIM OUT	6	6	12-Aug-26*	19-Aug-26	42
FL3-30270	CASEWORK INSTALLATION	10	10	17-Aug-26	28-Aug-26	42
FL3-30280	FLOORING INSTALLATION	10	10	21-Aug-26	03-Sep-26	42
FL3-30290	FINAL PAINT	10	10	27-Aug-26	09-Sep-26	64
FL3-30300	MISC SPECIALTIES	10	10	02-Sep-26	15-Sep-26	64



Remaining Level of Effort ◆ Milestone
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work

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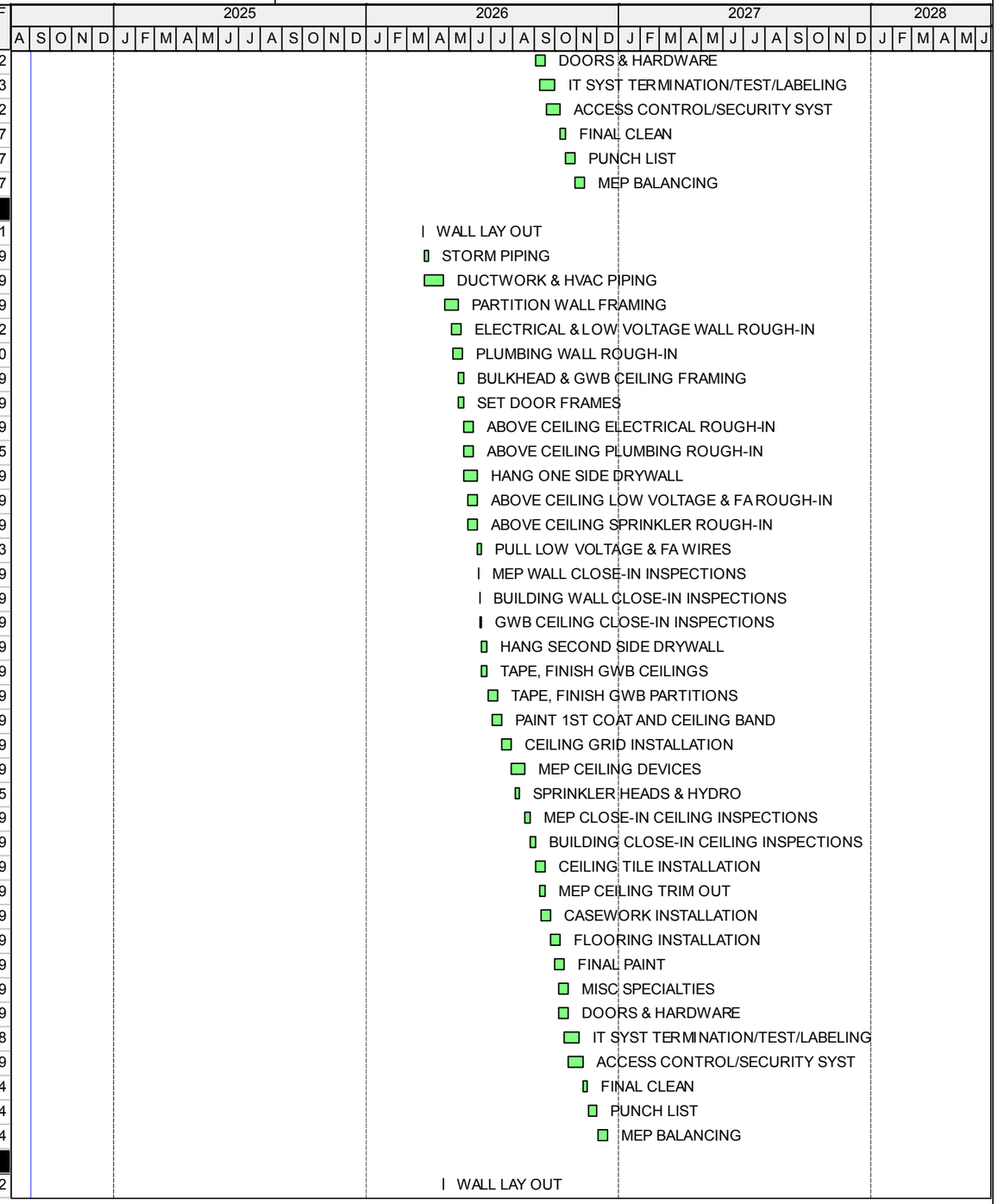
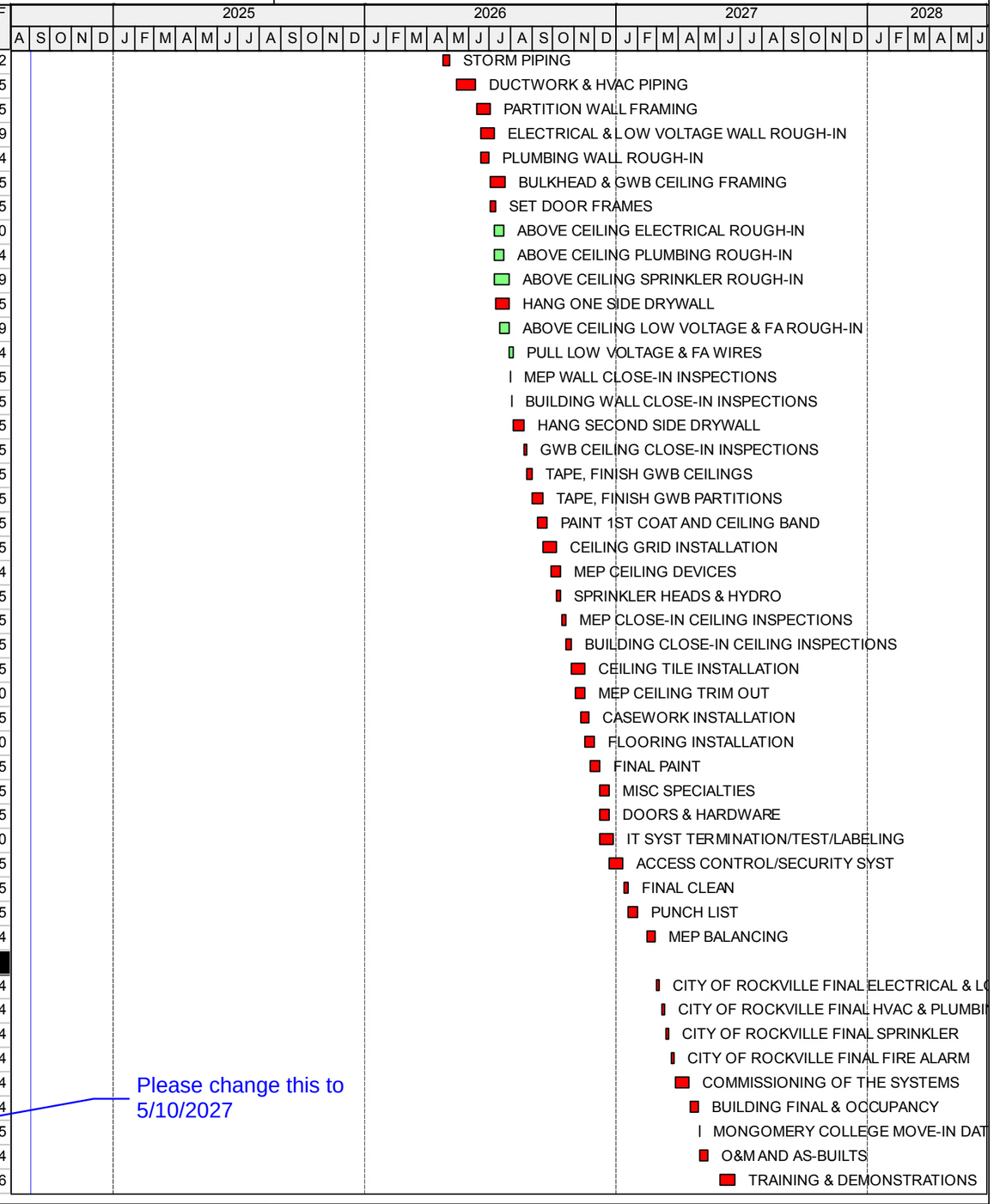
Activity ID	Activity Name	OD	RD	Start	Finish	TF
FL3-30310	DOORS & HARDWARE	10	10	04-Sep-26	17-Sep-26	42
FL3-30320	IT SYST TERMINATION/TEST/LABELING	15	15	10-Sep-26	30-Sep-26	53
FL3-30330	ACCESS CONTROL/SECURITY SYST	15	15	18-Sep-26	08-Oct-26	42
FL3-30340	FINAL CLEAN	5	5	09-Oct-26	15-Oct-26	47
FL3-30350	PUNCH LIST	10	10	16-Oct-26	29-Oct-26	47
FL3-30360	MEP BALANCING	10	10	30-Oct-26	12-Nov-26	47
2ND FLOOR WORK						
FL2-20000	WALL LAY OUT	1	1	24-Mar-26	24-Mar-26	-1
FL2-20010	STORM PIPING	4	4	26-Mar-26	31-Mar-26	19
FL2-20020	DUCTWORK & HVAC PIPING	20	20	27-Mar-26	23-Apr-26	19
FL2-20030	PARTITION WALL FRAMING	15	15	24-Apr-26	14-May-26	19
FL2-20040	ELECTRICAL & LOW VOLTAGE WALL ROUGH-IN	10	10	05-May-26	18-May-26	22
FL2-20050	PLUMBING WALL ROUGH-IN	10	10	07-May-26	20-May-26	20
FL2-20060	BULKHEAD & GWB CEILING FRAMING	5	5	15-May-26	21-May-26	19
FL2-20110	SET DOOR FRAMES	5	5	15-May-26	21-May-26	19
FL2-20070	ABOVE CEILING ELECTRICAL ROUGH-IN	10	10	22-May-26	04-Jun-26	19
FL2-20090	ABOVE CEILING PLUMBING ROUGH-IN	10	10	22-May-26	04-Jun-26	25
FL2-20120	HANG ONE SIDE DRYWALL	15	15	22-May-26	11-Jun-26	19
FL2-20080	ABOVE CEILING LOW VOLTAGE & FA ROUGH-IN	10	10	28-May-26	10-Jun-26	19
FL2-20100	ABOVE CEILING SPRINKLER ROUGH-IN	10	10	28-May-26	10-Jun-26	19
FL2-20370	PULL LOW VOLTAGE & FA WIRES	5	5	11-Jun-26	17-Jun-26	63
FL2-20130	MEP WALL CLOSE-IN INSPECTIONS	1	1	12-Jun-26	12-Jun-26	19
FL2-20140	BUILDING WALL CLOSE-IN INSPECTIONS	1	1	15-Jun-26	15-Jun-26	19
FL2-20160	GWB CEILING CLOSE-IN INSPECTIONS	2	2	15-Jun-26	16-Jun-26	19
FL2-20150	HANG SECOND SIDE DRYWALL	8	8	16-Jun-26	25-Jun-26	19
FL2-20170	TAPE, FINISH GWB CEILINGS	6	6	17-Jun-26	24-Jun-26	19
FL2-20180	TAPE, FINISH GWB PARTITIONS	10	10	26-Jun-26	09-Jul-26	19
FL2-20190	PAINT 1ST COAT AND CEILING BAND	10	10	02-Jul-26	15-Jul-26	19
FL2-20200	CEILING GRID INSTALLATION	10	10	16-Jul-26	29-Jul-26	19
FL2-20210	MEP CEILING DEVICES	15	15	29-Jul-26	18-Aug-26	19
FL2-20220	SPRINKLER HEADS & HYDRO	5	5	04-Aug-26	10-Aug-26	25
FL2-20230	MEP CLOSE-IN CEILING INSPECTIONS	5	5	19-Aug-26	25-Aug-26	19
FL2-20240	BUILDING CLOSE-IN CEILING INSPECTIONS	6	6	26-Aug-26	02-Sep-26	19
FL2-20250	CEILING TILE INSTALLATION	11	11	03-Sep-26*	17-Sep-26	19
FL2-20260	MEP CEILING TRIM OUT	6	6	09-Sep-26	16-Sep-26	19
FL2-20270	CASEWORK INSTALLATION	10	10	11-Sep-26	24-Sep-26	19
FL2-20280	FLOORING INSTALLATION	10	10	25-Sep-26	08-Oct-26	19
FL2-20290	FINAL PAINT	10	10	01-Oct-26	14-Oct-26	19
FL2-20300	MISC SPECIALTIES	10	10	07-Oct-26	20-Oct-26	39
FL2-20310	DOORS & HARDWARE	10	10	07-Oct-26	20-Oct-26	19
FL2-20320	IT SYST TERMINATION/TEST/LABELING	15	15	15-Oct-26	04-Nov-26	28
FL2-20330	ACCESS CONTROL/SECURITY SYST	15	15	21-Oct-26	10-Nov-26	19
FL2-20340	FINAL CLEAN	5	5	11-Nov-26	17-Nov-26	24
FL2-20350	PUNCH LIST	10	10	18-Nov-26	01-Dec-26	24
FL2-20360	MEP BALANCING	10	10	02-Dec-26	15-Dec-26	24
1ST FLOOR WORK						
FL1-10000	WALL LAY OUT	2	2	22-Apr-26	23-Apr-26	-12



Remaining Level of Effort ◆ Milestone
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work

DRAFT

Activity ID	Activity Name	OD	RD	Start	Finish	TF
FL1-10010	STORM PIPING	8	8	24-Apr-26	05-May-26	-12
FL1-10020	DUCTWORK & HVAC PIPING	20	20	15-May-26	11-Jun-26	-25
FL1-10030	PARTITION WALL FRAMING	15	15	12-Jun-26	02-Jul-26	-25
FL1-10040	ELECTRICAL & LOW VOLTAGE WALL ROUGH-IN	15	15	18-Jun-26	08-Jul-26	-9
FL1-10050	PLUMBING WALL ROUGH-IN	10	10	18-Jun-26	01-Jul-26	-4
FL1-10060	BULKHEAD & GWB CEILING FRAMING	15	15	03-Jul-26	23-Jul-26	-5
FL1-10110	SET DOOR FRAMES	5	5	03-Jul-26	09-Jul-26	-25
FL1-10070	ABOVE CEILING ELECTRICAL ROUGH-IN	10	10	09-Jul-26	22-Jul-26	10
FL1-10090	ABOVE CEILING PLUMBING ROUGH-IN	10	10	09-Jul-26	22-Jul-26	14
FL1-10100	ABOVE CEILING SPRINKLER ROUGH-IN	15	15	09-Jul-26	29-Jul-26	9
FL1-10120	HANG ONE SIDE DRYWALL	15	15	10-Jul-26	30-Jul-26	-25
FL1-10080	ABOVE CEILING LOW VOLTAGE & FA ROUGH-IN	10	10	16-Jul-26	29-Jul-26	9
FL1-10370	PULL LOW VOLTAGE & FA WIRES	5	5	30-Jul-26	05-Aug-26	24
FL1-10130	MEP WALL CLOSE-IN INSPECTIONS	1	1	31-Jul-26	31-Jul-26	-25
FL1-10140	BUILDING WALL CLOSE-IN INSPECTIONS	1	1	03-Aug-26	03-Aug-26	-25
FL1-10150	HANG SECOND SIDE DRYWALL	13	13	04-Aug-26	20-Aug-26	-25
FL1-10160	GWB CEILING CLOSE-IN INSPECTIONS	2	2	21-Aug-26	24-Aug-26	-25
FL1-10170	TAPE, FINISH GWB CEILINGS	6	6	25-Aug-26	01-Sep-26	-25
FL1-10180	TAPE, FINISH GWB PARTITIONS	12	12	02-Sep-26	17-Sep-26	-25
FL1-10190	PAINT 1ST COAT AND CEILING BAND	10	10	10-Sep-26	23-Sep-26	-25
FL1-10200	CEILING GRID INSTALLATION	15	15	16-Sep-26	06-Oct-26	-25
FL1-10210	MEP CEILING DEVICES	10	10	29-Sep-26	12-Oct-26	-24
FL1-10220	SPRINKLER HEADS & HYDRO	5	5	07-Oct-26	13-Oct-26	-25
FL1-10230	MEP CLOSE-IN CEILING INSPECTIONS	5	5	14-Oct-26	20-Oct-26	-25
FL1-10240	BUILDING CLOSE-IN CEILING INSPECTIONS	5	5	21-Oct-26	27-Oct-26	-25
FL1-10250	CEILING TILE INSTALLATION	15	15	28-Oct-26	17-Nov-26	-25
FL1-10260	MEP CEILING TRIM OUT	10	10	03-Nov-26	16-Nov-26	-20
FL1-10270	CASEWORK INSTALLATION	10	10	10-Nov-26	23-Nov-26	-25
FL1-10280	FLOORING INSTALLATION	10	10	17-Nov-26	30-Nov-26	-20
FL1-10290	FINAL PAINT	10	10	24-Nov-26	07-Dec-26	-25
FL1-10300	MISC SPECIALTIES	10	10	08-Dec-26	21-Dec-26	-25
FL1-10310	DOORS & HARDWARE	10	10	08-Dec-26	21-Dec-26	-25
FL1-10320	IT SYST TERMINATION/TEST/LABELING	15	15	08-Dec-26	28-Dec-26	-10
FL1-10330	ACCESS CONTROL/SECURITY SYST	15	15	22-Dec-26	11-Jan-27	-25
FL1-10340	FINAL CLEAN	5	5	12-Jan-27	18-Jan-27	-25
FL1-10350	PUNCH LIST	10	10	19-Jan-27	01-Feb-27	-25
FL1-10360	MEP BALANCING	10	10	15-Feb-27	26-Feb-27	-34
FINAL INSPECTIONS & CLOSE-OUT						
FIN-50000	CITY OF ROCKVILLE FINAL ELECTRICAL & LOW VOLTAGE	5	5	01-Mar-27	05-Mar-27	-34
FIN-50010	CITY OF ROCKVILLE FINAL HVAC & PLUMBING	5	5	08-Mar-27	12-Mar-27	-34
FIN-50020	CITY OF ROCKVILLE FINAL SPRINKLER	5	5	15-Mar-27	19-Mar-27	-34
FIN-50030	CITY OF ROCKVILLE FINAL FIRE ALARM	5	5	22-Mar-27	26-Mar-27	-34
FIN-50040	COMMISSIONING OF THE SYSTEMS	15	15	29-Mar-27	16-Apr-27	-34
FIN-50050	BUILDING FINAL & OCCUPANCY	10	10	19-Apr-27	30-Apr-27	-34
FIN-50060	MONGOMERY COLLEGE MOVE-IN DATE	1	1	03-May-27	03-May-27	-25
FIN-50070	O&M AND AS-BUILTS	10	10	03-May-27	14-May-27	-34
FIN-50080	TRAINING & DEMONSTRATIONS	15	15	02-Jun-27	22-Jun-27	-46



Please change this to 5/10/2027

Remaining Level of Effort ◆ ◆ Milestone
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work

DRAFT

APPENDIX D

ASBESTOS-CONTAINING MATERIALS SURVEY

Conducted at:

GORDON & MARILYN MACKLIN TOWER (LIBRARY)
ROCKVILLE CAMPUS

51 Mannakee Street
Rockville, Maryland 20850

Prepared for:

MONTGOMERY COLLEGE

9221 Corporate Boulevard
Rockville, Maryland 20850

Attention: Ms. Yu (Judy) Zhu, Purchasing Manager
Yu.zhu@montgomerycollege.edu

BEC Project # MD20187

Fieldwork Conducted: May 10-14, 2021

Final Technical Report Date: July 2, 2021

Prepared by:

BOGGS ENVIRONMENTAL CONSULTANTS
Middletown, MD ~ Morgantown, WV
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ENVIRONMENTAL SCIENCE, ENGINEERING & INDUSTRIAL HYGIENE SERVICES

ASBESTOS-CONTAINING MATERIALS SURVEY

Conducted at:

GORDON & MARILYN MACKLIN TOWER (LIBRARY)
ROCKVILLE CAMPUS

51 Mannakee Street
Rockville, Maryland 20850

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TABLE A: US EPA Minimum Number of Bulk Samples Required to Rebut ACM Designation

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BOGGS ENVIRONMENTAL CONSULTANTS, INC.

On-site Fieldwork & Final Technical Report By:

Derrick A. Klein
Project Manager
State of Maryland Asbestos Inspector (License No. 18006521)

SECTION 1.0 SUBJECT SITE DESCRIPTION & SCOPE OF WORK

Project Site:	**GORDON & MARILYN MACKLIN TOWER (LIBRARY)** 51 Mannakee Street Rockville, Maryland 20850
Requester Name:	Ms. Yu (Judy) Zhu, Purchasing Manager
Requestor Address:	**MONTGOMERY COLLEGE** 9221 Corporate Boulevard Rockville, Maryland 20850

Subject Site Description & Scope of Work:

The focus of this inspection was the readily-accessible suspect asbestos-containing material located within the Gordon & Marilyn Macklin Tower, situated on the Rockville Montgomery College campus located at 51 Mannakee Street, Rockville, Maryland 20850.

BEC received authorization from Ms. Ms. Sharmila Pradhan, Environmental Safety Manager, to provide industrial hygiene services to determine the presence of asbestos-containing materials to determine applicability (and impact) of (***i***) United States (US) Environmental Protection Agency (EPA) / (***ii***) Maryland Department of the Environment (MDE) and (***iii***) US Occupational Safety and Health Administration (US OSHA) worker protection regulations.

SECTION 2.0 ASBESTOS-CONTAINING MATERIALS SURVEY

2.1 Background

BOGGS ENVIRONMENTAL CONSULTANTS, INC. (BEC) conducted an asbestos-containing building construction materials (ACBMs) survey within the Gordon and Marilyn Macklin Tower, situated on the Rockville Montgomery College campus, located at 51 Mannakee Street, Rockville, Maryland 20850 on May 10, 2021.

BEC conducted interviews with Mr. Michael Rocke, Environmental Safety Specialist to become familiar with the building history and the limits of the inspection, prior to proceeding with the field inspection activities. BEC notes, only readily accessible materials identified within the subject site were sampled during the course of this asbestos-containing materials survey. BEC cautions that additional suspect asbestos-containing building construction materials may exist outside this asbestos inspection scope of work; but were not sampled during the conduct of this work effort.

2.2 Field Sampling

BEC staff licensed State of Maryland Department of the Environment (MDE) "Asbestos Inspector", Derrick A. Klein conducted preliminary field walk inspections for the purpose of developing an inventory of suspect ACBMs associated with the interior of the subject site. Subsequently, Mr. Klein collected multiple bulk samples of suspect asbestos-containing materials observed at the subject site on May 10, 2021.

BEC advises, based upon current United States Environmental Protection Agency (US EPA) asbestos hazard control regulations, the minimum number of samples necessary to definitively determine the presence (or absence) of ACBMs is dependent on the nature and quantity of the suspect building construction material. Additionally, the US EPA has established a standardized schedule for bulk sample collection of suspect ACBMs based upon homogeneous areas. Homogeneous areas are defined as "…building construction materials that are similar in color, consistency, texture, and appearance of similar application/installation time period".

SECTION 2.0 ASBESTOS-CONTAINING MATERIALS SURVEY

2.2 Field Sampling (continued)

Based upon on-site visual inspection and bulk sampling guidelines, one hundred and fifty-four (154) samples of the suspect ACBMs were collected and submitted to the analytical laboratory; which upon standard polarized light microscopy with dispersion staining (PLM/DS) examination revealed the presence of two hundred and fifty-nine (259) individual PLM/DS layers.

BEC advises, based upon the US EPA asbestos regulations' prescribed (mandatory) analytical method, the laboratory analyst has the sole discretion/responsibility in determining whether the bulk sample is composed of one or multiple layers.

2.3 Material Classification

Asbestos-containing materials (ACMs) are any building construction materials containing greater than one percent (>1%) asbestos. Friable ACM is any material which can be broken, crumbled, pulverized, or reduced to powder under hand pressure; conversely, non-friable ACMs are materials incapable of reduction to powder via hand pressure.

In accordance with Federal asbestos hazard control regulations (40 CFR Part 763 - Asbestos, Subpart E), bulk sampling is not required to designate (i.e., presume and treat) a construction material suspected to contain asbestos as Presumed Asbestos-Containing Material (PACM), should a duly trained and accredited asbestos inspector observe/inspect and assign the PACM designation to the suspect ACM.

However, BEC advises, in accordance with Federal regulations, rebuttal of the PACM designation and re-classification of a material to non-ACM, requires collection and analysis of a minimum number of samples of the suspect ACM. As a reminder, a homogeneous material is a unique group of construction materials (eg, surfacing material, thermal system insulation material, or miscellaneous material) that possesses uniform properties such as color, texture, age, and functionality.

For a summary of the minimum number of samples required to undergo collection and analysis to rebut the PACM designation, please refer to **TABLE A: US EPA Minimum Number of Bulk Samples Required to Rebut ACM Designation** on the following page.

TABLE A: US EPA Minimum Number of Bulk Samples Required to Rebut ACM Designation

Thermal System Insulation (TSI): Thermal System Insulation includes materials such as boiler insulation, pipe insulation, and ductwork insulation.		
At least three (3) samples from each homogeneous material of TSI.	At least one (1) sample from patched TSI that is less than six square feet.	For pipe fittings, in a manner sufficient to determine if the material is asbestos-containing.
Surfacing Material: Surfacing material includes materials such as spray-applied fireproofing, troweled-on plasters or ceiling textures.		
At least three samples from homogeneous materials of 1,000 square feet or less.	At least five samples from homogeneous materials of greater than 1,000 square feet but less than 5,000 square feet.	At least seven samples from homogeneous materials of greater than 5000 square feet, with an additional 1 sample per each increment of 1,000 sf, in excess of 5,000 sf.
Miscellaneous Material and Non-friable Suspect ACM: Miscellaneous materials include all materials that are not *TSI* or *Surfacing Materials*, such as vinyl floor tile, acoustical ceiling tile, vinyl sheet goods (linoleum), roofing materials, *et cetera*.		
For each homogeneous material, a sufficient number are required to be collected and analyzed to determine if the material is ACM.	Samples are not required to be collected from homogeneous materials, of which the trained accredited asbestos inspector has determined to be non-asbestos-containing material, such as fiberglass or rubber.	

SECTION 2.0 ASBESTOS-CONTAINING MATERIALS SURVEY

2.4 Laboratory Analysis

Pursuant to the field screen and bulk sample collection, BEC submitted the bulk samples to Eurofins CEI Labs Inc. (Eurofins) of Cary, North Carolina for asbestos content analysis. Eurofins is fully accredited by the American Industrial Hygiene Association and the National Institute of Standards and Technology's (NIST) National Voluntary Laboratory Accreditation Program (NVLAP) as proficient in the analysis of asbestos in bulk samples.

Eurofins performed PLM/DS analysis of all bulk samples, in accordance with the "*Test Method for the Determination of Asbestos in Bulk Building Materials*" (US EPA 600/R-93/116, July 1993). BEC advises PLM/DS analysis revealed multiple suspect ACM bulk samples submitted to Eurofins contained US EPA and US OSHA regulated asbestos concentrations. The results of the bulk sample analysis can be found in Appendix A: PLM: Bulk Sampling Results.

2.5 Asbestos Survey Limitations

The above inspection was characterized by making observations for suspect ACBMs and conducting bulk sampling of same, limited to only readily-accessible interior building areas. All accessible areas within the scope of work were inspected in accordance with US EPA regulations and generally accepted engineering work practices.

BEC asbestos survey sampling strategy included collection of multiple samples of the same materials chosen at random. However, BEC advises, due to the inconsistencies of manufacturer processes and contractor installation methods, materials of similar construction may have varied quantities of asbestos.

Furthermore, BEC advises locating all asbestos-containing materials present at a structure can only be definitively achieved by bulk sampling every section of pipe insulation, every fitting or valve covering, every square yard of fireproofing, and every square foot of other surface coating materials, for suspect materials both readily-accessible and hidden.

Therefore, BEC makes no warranty, expressed or implied, that all asbestos within the subject site has been found. Accordingly, BEC recommends bulk sampling and analysis of all suspect ACBMs (not otherwise evaluated during this survey) during work which will, or can be reasonably anticipated to, result in the disturbance or damage of same, prior to commencement and/or during demolition/renovation work.

SECTION 3.0 CONCLUSIONS & RECOMMENDATIONS

3.1 Conclusions

1. BEC concludes, based upon on-site visual inspection and review of analytical data, US EPA-regulated asbestos-containing materials **were identified** at the subject site and can be found in Appendix B: Homogenous Area Materials Log Sheet.

2. BEC concludes, based upon review of US EPA and State of Maryland Department of the Environment law, specific regulations governing the disturbance, removal, and disposal of asbestos, **DO APPLY** to **ANY** work, of which is planned and/or can be reasonably anticipated to result in the disturbance of the regulated asbestos-containing materials (RACM) identified in the course of this inspection.

3. BEC concludes, based upon review of United States Occupational Safety and Health Administration (Construction Industry: 29 CFR 1926.1101 and General Industry: 29 CFR 1910.1001) regulations governing non-occupational and occupational worker exposure to asbestos, **DO APPLY** to **ANY** renovation/demolition, housekeeping, maintenance, and/or repair activities directly and/or indirectly impacting (collateral disturbance/damage) the regulated-asbestos-containing materials.

SECTION 3.0 CONCLUSIONS & RECOMMENDATIONS

3.1 Conclusions (continued)

4. BEC concludes, based upon Federal law, a US EPA accredited and licensed "asbestos abatement project designer" is required to prepare a detailed work plan to govern abatement (removal) of regulated asbestos-containing material (RACM), including periodic work area visual inspections/air quality surveillance, and clearance testing for re-occupancy of RACM abatement work areas.

5. BEC concludes, based upon Federal law, a licensed asbestos abatement contractor is required to conduct removal of RACM prior to renovation work disturbing/damaging these materials. Removal of these materials is required by law whenever renovation/demolition workplans specify (require) their disturbance and/or their disturbance can be reasonably anticipated to occur during the renovation work activities.

3.2 Recommendations

1. BEC recommends, in accordance with Federal law, secure a licensed asbestos abatement contractor to conduct the removal of any ACBMs or suspect asbestos-containing materials that would be disturbed (renovation/demolition and/or maintenance) at the subject site.

2. Asbestos-Containing Materials Disclosure:

   BEC advises, based upon US OSHA's Construction Industry (29 CFR 1926.1101) and General Industry (29 CFR 1910.1001) regulations, the Building Owner is required to disclose the location of any asbestos-containing materials (trace asbestos content and $\geq$ 1% asbestos concentration) to Owner employees, contractors/subcontractors, and tenants whom occupy and/or conduct work activities within building areas, at which trace ACM, and/or RACM are present.

3. In the event the client elects to abate any asbestos-containing materials identified at the subject site, BEC recommends a third-party Industrial Hygiene firm perform baseline, continuous, and post abatement air quality surveillance at the asbestos abatement work area(s) prior to permitting re-occupancy of the work area(s).

4. BEC recommends should any planned renovation/demolition activities result in the discovery of additional suspect ACBMs, halting all work activities with subsequent bulk sample collection and analysis of discovered ACBMs, to determine asbestos content.

   PLM/DS Limitations

   BEC advises all bulk samples were analyzed by Polarized Light Microscopy with Dispersion Staining (PLM/DS). This is a standard method of analysis in optical mineralogy and a suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The resultant characteristic color display enables mineral identification.

   Although PLM/DS analysis is the primary technique used for asbestos determination, it can show significant bias leading to false negatives and false positives for certain types of materials. PLM is limited by the visibility of the asbestos fibers. In some samples the fibers may be reduced to a diameter so small or masked by coatings to such an extent that they cannot be reliably observed or identified using PLM.

   As such, BEC recommends further evaluation via (**i**) the stratified point count methodology and/or (**ii**) gravimetric reduction sample preparation technique and PLM/DS analysis – and if necessary- subsequent TEM analysis (10,000-20,000x magnification), prior to designation as "non-asbestos-containing".

APPENDIX A

PLM BULK SAMPLING RESULTS

BOGGS ENVIRONMENTAL CONSULTANTS

BULK SAMPLING RESULTS

HA #	Sample #	Material Class.	Sampling Location	Building Construction Material	Asbestos (%)
1	MT-51021-1	Misc.	Room 625: Hallway	Gypsum Board Sheeting	None Detected
1	MT-51021-2	Misc.	Room 303L: Conference	Gypsum Board Sheeting	None Detected
1	MT-51021-3	Misc.	Room 112: Library	Gypsum Board Sheeting	None Detected
2	MT-51021-4	Misc.	Room 625: Hallway	Joint Finishing Compound	None Detected
2	MT-51021-5	Misc.	Room 303L: Conference	Joint Finishing Compound	**2% Chrysotile**
2	MT-51021-6	Misc.	Room 112: Library	Joint Finishing Compound	None Detected
3	MT-51021-7	Misc.	Room 600: Corridor	Black Floor Tile Mastic	**5% Chrysotile**
3	MT-51021-8	Misc.	Room 492: North Corridor	Black Floor Tile Mastic	**5% Chrysotile**
3	MT-51021-9	Misc.	Room 109: Lounge	Black Floor Tile Mastic	**5% Chrysotile**
4	MT-51021-10	Misc.	Room 303L: Conference	Yellow Carpet Mastic	None Detected
4	MT-51021-11	Misc.	Room 212: Office	Yellow Carpet Mastic	None Detected
4	MT-51021-12	Misc.	Room 304: Library	Yellow/Black Carpet Mastic	**2% Chrysotile**
5	MT-51021-13	Misc.	Room 427: Office	2' x 4' White Pinhole & Puncture ACT	None Detected
5	MT-51021-14	Misc.	Room 218B: Office	2' x 4' White Pinhole & Puncture ACT	None Detected
5	MT-51021-15	Misc.	Room 301: Library	2' x 4' White Pinhole & Puncture ACT	None Detected
6	MT-51021-16	Misc.	Room 606: Copy/Fax	2' x 2' White Pinhole & Puncture ACT	None Detected
6	MT-51021-17	Misc.	Room 400: Elevator Lobby	2' x 2' White Pinhole & Puncture ACT	None Detected
6	MT-51021-18	Misc.	Room 500: Elevator Lobby	2' x 2' White Pinhole & Puncture ACT	None Detected
7	MT-51021-19	Misc.	Room 607: Conference	Tan Vinyl Cove Base	None Detected
				Tan Mastic	None Detected
				Associated White Mud (Joint Compound)	**2% Chrysotile**
7	MT-51021-20	Misc.	Room 423: Office	Tan Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
7	MT-51021-21	Misc.	Room 218H: Office	Tan Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
8	MT-51021-22	Misc.	Room 607: Conference	2' x 2' White Textured ACT	None Detected
8	MT-51021-23	Misc.	Room 600: Corridor	2' x 2' White Textured ACT	None Detected
8	MT-51021-24	Misc.	Room 212: Office	2' x 2' White Textured ACT	None Detected
9	MT-51021-25	Misc.	Room 606: Copy/Fax	Dark Blue & Black VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
9	MT-51021-26	Misc.	Room 615: Storage	12" x 12" Dark Blue & Black VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BULK SAMPLING RESULTS

HA #	Sample #	Material Class.	Sampling Location	Building Construction Material	Asbestos (%)
9	MT-51021-27	Misc.	Room 608: Pantry	12" x 12" Dark Blue w/ Black Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
10	MT-51021-28	Misc.	Room 600: Corridor	12" x 12" Off-White w/ Black Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
10	MT-51021-29	Misc.	Room 600: Corridor	12" x 12" Off-White w/ Black Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
10	MT-51021-30	Misc.	Room 600: Corridor	12" x 12" Off-White w/ Black Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
11	MT-51021-31	Misc.	Room 600: Corridor	12" x 12" Brown w/ Black Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
11	MT-51021-32	Misc.	Room 600: Corridor	12" x 12" Yellow w/ Black Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
11	MT-51021-33	Misc.	Room 600: Corridor	12" x 12" Brown w/ Black VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
12	MT-51021-34	Misc.	Room 591: South Corridor	12" x 12" Pink w/ Multicolored Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
12	MT-51021-35	Misc.	Room 592: North Corridor	12" x 12" Pink w/ Multicolored Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
12	MT-51021-36	Misc.	Room 400: Elevator Lobby	12" x 12" Pink w/ Multicolored Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
13	MT-51021-37	Misc.	Room 610: Mech	Brown Metal Duct Seam Sealant	None Detected
13	MT-51021-38	Misc.	Room 433: Mech/IT	Brown Metal Duct Seam Sealant	None Detected
13	MT-51021-39	Misc.	Room 301B: Mech	Brown Metal Duct Seam Sealant	None Detected
14	MT-51021-40	Misc.	Room 610: Mech	White Pipe Insulation Mastic	None Detected
14	MT-51021-41	Misc.	Room 534A: Mech	White Pipe Insulation Mastic	None Detected
14	MT-51021-42	Misc.	Room 433: Mech/IT	White Pipe Insulation Mastic	None Detected
15	MT-51021-43	Misc.	Room 610: Mech	Red Fire Stop	None Detected
15	MT-51021-44	Misc.	Room 534A: Mech	Red Fire Stop	None Detected
15	MT-51021-45	Misc.	Room 433: Mech/IT	Red Fire Stop	None Detected
16	MT-51021-46	Misc.	Room 622: Office	Off-White Pipe Wrap Mastic	**5% Chrysotile**
16	MT-51021-47	Misc.	Room 625: Hallway	Off-White Pipe Wrap Mastic	**5% Chrysotile**
16	MT-51021-48	Misc.	Room 625: Hallway	Off-White Pipe Wrap Mastic	**5% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BULK SAMPLING RESULTS

HA #	Sample #	Material Class.	Sampling Location	Building Construction Material	Asbestos (%)
17	MT-51021-49	Misc.	Room 610: Mech	Gray Metal Duct Seam Sealant	None Detected
17	MT-51021-50	Misc.	Room 433: Mech/IT	Gray Metal Duct Seam Sealant	None Detected
17	MT-51021-51	Misc.	Room 209C: Mech	Gray Metal Duct Seam Sealant	None Detected
18	MT-51021-52	Misc.	Room 2C1: Corridor	Gray Vinyl Cove Base	None Detected
				Associated Yellow Mastic	None Detected
18	MT-51021-53	Misc.	Room 2C2: Elevator Lobby	Gray Vinyl Cove Base	None Detected
				Associated Yellow Mastic	None Detected
18	MT-51021-54	Misc.	Room 2C3: Corridor	Gray Vinyl Cove Base	None Detected
				Associated Yellow Mastic	None Detected
19	MT-51021-55	Misc.	Room 2C1: Corridor	12" x 12" Light Blue w/ Black Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
19	MT-51021-56	Misc.	Room 2C2: Elevator Lobby	12" x 12" Yellow w/ Black Spots Mastic	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
19	MT-51021-57	Misc.	Room 2C3: Corridor	12" x 12" Light Blue w/ Black Spots VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
20	MT-51021-58	Misc.	Room 2C3: Corridor	Maroon Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
20	MT-51021-59	Misc.	Room 212: Office	Maroon Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
20	MT-51021-60	Misc.	Room 213: Conference	Maroon Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
21	MT-51021-61	Misc.	Room 212B: Office	2' x 4' White Small & Large Pinhole ACT	None Detected
21	MT-51021-62	Misc.	Room 212D: Office	2' x 4' White Small & Large Pinhole ACT	None Detected
21	MT-51021-63	Misc.	Room 213: Conference	2' x 4' White Small & Large Pinhole ACT	None Detected
22	MT-51021-64	Misc.	Room 307: Lounge	12" x 12" Navy Blue w/ Light Blue Specks VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
22	MT-51021-65	Misc.	Room 307: Lounge	12" x 12" Navy Blue w/ Light Blue Specks VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
22	MT-51021-66	Misc.	Room 307: Lounge	12" x 12" Navy Blue w/ Light Blue Specks VFT	None Detected
				Associated Yellow/Black Mastic	**3% Chrysotile**
23	MT-51021-67	Misc.	Room 307: Lounge	Navy Blue Vinyl Cove Base	None Detected
				Associated Yellow Mastic	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BULK SAMPLING RESULTS

HA #	Sample #	Material Class.	Sampling Location	Building Construction Material	Asbestos (%)
23	MT-51021-68	Misc.	Room 307: Lounge	Navy Blue Vinyl Cove Base	None Detected
				Associated Yellow Mastic	None Detected
23	MT-51021-69	Misc.	Room 307: Lounge	Navy Blue Vinyl Cove Base	None Detected
				Associated Yellow Mastic	None Detected
24	MT-51021-70	Misc.	Room 301: Library	Black Vinyl Cove Base	None Detected
				Associated Yellow Mastic	None Detected
24	MT-51021-71	Misc.	Room 203: Library	Black Vinyl Cove Base	None Detected
				Associated Yellow Mastic	None Detected
24	MT-51021-72	Misc.	Room 116: Library	Black Vinyl Cove Base	None Detected
				Associated Yellow Mastic	None Detected
25	MT-51021-73	Misc.	Room 301: Library	12" x 12" Light Blue w/ Blue Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
				Associated Tan VFT	None Detected
				Associated Yellow Mastic	None Detected
25	MT-51021-74	Misc.	Room 2SE: Stair 5	12" x 12" Light Blue w/ Blue Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
25	MT-51021-75	Misc.	Room 1SE: Stair 5	12" x 12" Light Blue w/ Blue Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
26	MT-51021-76	Misc.	Room 3SE: Stair 5	Navy Blue Vinyl Stair Tread	None Detected
				Associated Yellow Mastic	None Detected
26	MT-51021-77	Misc.	Room 2SE: Stair 5	Navy Blue Vinyl Stair Tread	None Detected
				Associated Yellow Mastic	None Detected
26	MT-51021-78	Misc.	Room 1SE: Stair 5	Navy Blue Vinyl Stair Tread	None Detected
				Associated Yellow Mastic	None Detected
27	MT-51021-79	Misc.	Room 303K: Copy/Print	Beige VFT (under Carpet)	None Detected
				Associated Yellow Mastic	None Detected
				Associated Black Mastic	**5% Chrysotile**
27	MT-51021-80	Misc.	Room 303L: Conference	Beige VFT (under Carpet)	None Detected
				Associated Yellow Mastic	None Detected
				Associated Black Mastic	**5% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BULK SAMPLING RESULTS

HA #	Sample #	Material Class.	Sampling Location	Building Construction Material	Asbestos (%)
27	MT-51021-81	Misc.	Room 303M: Workstation	Beige VFT (under Carpet)	None Detected
				Associated Yellow Mastic	None Detected
				Associated Black Mastic	**5% Chrysotile**
28	MT-51021-82	Misc.	Room 306: Library	2' x 2' Off-White Inset Pinhole & Fissure ACT	None Detected
28	MT-51021-83	Misc.	Room 202: Library	2' x 2' Off-White Inset Pinhole & Fissure ACT	None Detected
28	MT-51021-84	Misc.	Room 112: Library	2' x 2' Off-White Inset Pinhole & Fissure ACT	None Detected
29	MT-51021-85	Misc.	Room 301: Library	2' x 2' White Pinhole & Fissure ACT	None Detected
29	MT-51021-86	Misc.	Room 202: Library	2' x 2' White Pinhole & Fissure ACT	None Detected
29	MT-51021-87	Misc.	Room 112: Library	2' x 2' White Pinhole & Fissure ACT	None Detected
30	MT-51021-88	Misc.	Room 301: Library	White Duct Insulation Mastic	**10% Chrysotile**
30	MT-51021-89	Misc.	Room 304: Library	White Duct Insulation Mastic	**10% Chrysotile**
30	MT-51021-90	Misc.	Room 305: Library	White Duct Insulation Mastic	**10% Chrysotile**
31	MT-51021-91	Misc.	Room 305: Library	12" x 12" Marble Pattern Flooring VFT	None Detected
				Associated Yellow Mastic	None Detected
31	MT-51021-92	Misc.	Room 305: Library	12" x 12" Marble Pattern Flooring VFT	None Detected
				Associated Yellow Mastic	None Detected
31	MT-51021-93	Misc.	Room 305: Library	12" x 12" Marble Pattern Flooring VFT	None Detected
				Associated Yellow Mastic	None Detected
32	MT-51021-94	Surfacing	Room 305: Library	Finished Plaster Skim Coat	None Detected
				Finished Plaster Base Coat	None Detected
32	MT-51021-95	Surfacing	Room 203: Library	Finished Plaster Skim Coat	None Detected
				Finished Plaster Base Coat	None Detected
32	MT-51021-96	Surfacing	Room 113: Library	Finished Plaster Skim Coat	None Detected
				Finished Plaster Base Coat	None Detected
32	MT-51021-97	Surfacing	Room 116: Library	Finished Plaster Skim Coat	None Detected
				Finished Plaster Base Coat	None Detected
32	MT-51021-98	Surfacing	Room 020: Writing Center	Finished Plaster Skim Coat	None Detected
				Finished Plaster Base Coat	None Detected
33	MT-51021-99	Misc.	Room 112: Library	12" x 12" Tan w/ Brown & Green Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
33	MT-51021-100	Misc.	Room 112: Library	12" x 12" Tan w/ Brown & Green Specks VFT	None Detected
				Associated Yellow Mastic	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BULK SAMPLING RESULTS

HA #	Sample #	Material Class.	Sampling Location	Building Construction Material	Asbestos (%)
33	MT-51021-101	Misc.	Room 110: Library Service	12" x 12" Tan w/ Brown & Green Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
34	MT-51021-102	Misc.	Room 109: Lounge	12" x 12" Tan w/ Brown Specks VFT	**10% Chrysotile**
				Associated Black Mastic	**5% Chrysotile**
34	MT-51021-103	Misc.	Room 109: Lounge	12" x 12" Tan w/Brown Specks VFT	**10% Chrysotile**
				Associated Black Mastic	**5% Chrysotile**
34	MT-51021-104	Misc.	Room 109: Lounge	12" x 12" Tan w/ Brown Specks VFT	**10% Chrysotile**
				Associated Black Mastic	**5% Chrysotile**
35	MT-51021-105	Misc.	Room 020: Writing Center	12" x 12" Off-White w/ Tan Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
35	MT-51021-106	Misc.	Room 020: Writing Center	12" x 12" Off-White w/ Tan Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
35	MT-51021-107	Misc.	Room 020: Writing Center	12" x 12" Off-White w/ Tan Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
36	MT-51021-108	Misc.	Room 304B: Mechanical	White Interior Duct Insulation	None Detected
36	MT-51021-109	Misc.	Room 202A: Mechanical	White Interior Duct Insulation	None Detected
36	MT-51021-110	Misc.	Room 112B: Mechanical	White Interior Duct Insulation	None Detected
37	MT-51021-111	Misc.	Room 303F: IT Closet	12" x 12" White w/ Black Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
37	MT-51021-112	Misc.	Room 303F: IT Closet	12" x 12" White w/ Black Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
37	MT-51021-113	Misc.	Room 004: IT Closet	12" x 12" White w/ Black Specks VFT	None Detected
				Associated Yellow Mastic	None Detected
38	MT-51021-114	Misc.	Room 001: Lounge/Vend	12" x 12" Gray/Orange w/ Black Spots VFT	None Detected
				Associated Yellow Mastic	None Detected
38	MT-51021-115	Misc.	Room 001: Lounge/Vend	12" x 12" Gray/Orange w/ Black Spots VFT	None Detected
				Associated Yellow Mastic	None Detected
38	MT-51021-116	Misc.	Room 001: Lounge/Vend	12" x 12" Gray/Orange w/ Black Spots VFT	None Detected
				Associated Yellow Mastic	None Detected
39	MT-51021-117	Misc.	Room 095: Corridor	18" x 18" Gray VFT & Mastic	None Detected
				Associated Gray Mastic	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BULK SAMPLING RESULTS

HA #	Sample #	Material Class.	Sampling Location	Building Construction Material	Asbestos (%)
39	MT-51021-118	Misc.	Room 008: Storage	18" x 18" Gray VFT & Mastic	None Detected
				Associated Gray Mastic	None Detected
39	MT-51021-119	Misc.	Room 092: Vestibule	18" x 18" Gray VFT & Mastic	None Detected
				Associated Gray Mastic	None Detected
40	MT-51021-120	Surfacing	Room 024A: Studio	Gray Spray Applied Fireproofing	None Detected
40	MT-51021-121	Surfacing	Room 024A: Studio	Gray Spray Applied Fireproofing	None Detected
40	MT-51021-122	Surfacing	Room 024A: Studio	Gray Spray Applied Fireproofing	None Detected
41	MT-51021-123	Misc.	Room 095: Corridor	Dark Gray Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
41	MT-51021-124	Misc.	Room 017: Conference	Dark Gray Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
41	MT-51021-125	Misc.	Room 092: Vestibule	Dark Gray Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
42	MT-51021-126	Misc.	Room 090: Corridor	Brown Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
42	MT-51021-127	Misc.	Room 090: Corridor	Brown Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
42	MT-51021-128	Misc.	Room 001: Lounge/Vend	Brown Vinyl Cove Base	None Detected
				Associated Tan Mastic	None Detected
43	MT-51021-129	Misc.	Room 090: Corridor	18" x 18" Gray/Red w/ Black Spots VFT	None Detected
				Associated Clear Mastic	None Detected
43	MT-51021-130	Misc.	Room 090: Corridor	18" x 18" Gray/Red w/ Black Spots VFT	None Detected
				Associated Clear Mastic	None Detected
43	MT-51021-131	Misc.	Room 090: Corridor	18" x 18" Gray/Red w/ Black Spots VFT	None Detected
				Associated Clear Mastic	None Detected
44	MT-51021-132	Misc.	Room 600: Corridor	Black Vinyl Threshold Strip	None Detected
				Associated Black Matic	**2% Chrysotile**
44	MT-51021-133	Misc.	Room 303Q: Corridor	Black Vinyl Threshold Strip	None Detected
44	MT-51021-134	Misc.	Room 001: Lounge/Vend	Black Vinyl Threshold Strip	None Detected
				Associated Brown Mastic	None Detected
45	MT-51021-135	Misc.	Room 190: Corridor	18" x 18" Orange VFT	None Detected
				Associated Clear Mastic	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BULK SAMPLING RESULTS

HA #	Sample #	Material Class.	Sampling Location	Building Construction Material	Asbestos (%)
45	MT-51021-136	Misc.	Room 190: Corridor	18" x 18" Orange VFT	None Detected
				Associated Clear Mastic	None Detected
46	MT-51021-137	Misc.	Room 190: Corridor	18" x 18" Marble Pattern VFT	None Detected
				Associated Yellow Mastic	None Detected
46	MT-51021-138	Misc.	Room 190: Corridor	18" x 18" Marble Pattern VFT	None Detected
				Associated Yellow Mastic	None Detected
47	MT-51021-139	Misc.	Room 1E1: Elevator 1	Yellow Textured VFT	None Detected
				Associated Yellow Mastic	None Detected
				Gray Leveling Compound	None Detected
				Associated Black Mastic	**5% Chrysotile**
47	MT-51021-140	Misc.	Room 1E2: Elevator 2	Yellow Textured VFT	None Detected
				Associated Yellow Mastic	None Detected
				Gray Leveling Compound	None Detected
				Associated Black Mastic	**5% Chrysotile**
48	MT-51021-141	Misc.	Room 2C3: Corridor	Purple & Orange VSG	None Detected
				Associated Black Mastic	**3% Chrysotile**
48	MT-51021-142	Misc.	Room 2C3: Corridor	Purple & Orange VSG	None Detected
				Associated Black Mastic	**3% Chrysotile**
49	MT-51021-143	Misc.	Room B2: Electrical	Tan Ceiling Insulation Pin Mastic	**5% Chrysotile**
49	MT-51021-144	Misc.	Room B1: Mechanical	Tan Ceiling Insulation Pin Mastic	**5% Chrysotile**
50	MT-51021-145	Misc.	Room 214: Elite Training	12" x 12" Pink w/ Black Spots VFT	None Detected
				Associated Black/Brown Mastic	**5% Chrysotile**
50	MT-51021-146	Misc.	Room 214: Elite Training	12" x 12" Pink w/ Black Spots VFT	None Detected
				Associated Black/Brown Mastic	**5% Chrysotile**
51	MT-51021-147	Misc.	Room 610: Mechanical	Black Tar Sealant	None Detected
51	MT-51021-148	Misc.	Room 304B: Mechanical	Black Tar Sealant	None Detected
52	MT-51021-149	Misc.	Room 212G: Office	12" x 12" Black w/ White Spots VFT	None Detected
				Associated Yellow Mastic	None Detected
52	MT-51021-150	Misc.	Room 212G: Office	12" x 12" Black w/ White Spots VFT	None Detected
				Associated Yellow Mastic	None Detected
53	MT-51021-151	Misc.	Room 2E3: Elevator 3	Red Textured VFT	None Detected
				Associated Yellow Mastic	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BULK SAMPLING RESULTS

HA #	Sample #	Material Class.	Sampling Location	Building Construction Material	Asbestos (%)
53	MT-51021-152	Misc.	Room 2E3: Elevator 3	Red Textured VFT	None Detected
				Associated Yellow Mastic	None Detected
54	MT-51021-153	Misc.	Room 015: Break Room	Wood Pattern VSG	None Detected
				Associated Gray Mastic	None Detected
54	MT-51021-154	Misc.	Room 015: Break Room	Wood Pattern VSG	None Detected
				Associated Gray Mastic	None Detected

APPENDIX B

HOMOGENOUS AREA MATERIAL LOG SHEET

BOGGS ENVIRONMENTAL CONSULTANTS

Homogenous Area Building Construction Materials

HA #	Material Description	Material Category	EPA Regulated	OSHA Regulated	Material Quantity
1	Gypsum Board Sheeting	Misc.	No	No	N/A
2	**Joint Finishing Compound**	**Misc.**	**Yes**	**Yes**	**155,101 SF**
3	**Black Floor Tile Mastic**	**Misc.**	**Yes**	**Yes**	**58,917 SF**
4	**Yellow Carpet Mastic**	**Misc.**	**Yes**	**Yes**	**63,110 SF**
5	2' x 4' White Pinhole & Puncture ACT	Misc.	No	No	N/A
6	2' x 2' White Pinhole & Puncture ACT	Misc.	No	No	N/A
7	Tan Vinyl Cove Base w/ Mastic	Misc.	No	No	N/A
8	2' x 2' White Textured ACT	Misc.	No	No	N/A
9	12" x 12" Dark Blue w/ Black Spots VFT	Misc.	No	No	N/A
10	12" x 12" Off-White w/ Black Spots VFT	Misc.	No	No	N/A
11	12" x 12" Brown w/ Black Spots VFT	Misc.	No	No	N/A
12	12" x 12" Pink w/ Multicolored Spots VFT	Misc.	No	No	N/A
13	Brown Metal Duct Seam Sealant	Misc.	No	No	N/A
14	White Pipe Insulation Mastic	Misc.	No	No	N/A
15	Red Fire Stop	Misc.	No	No	N/A
16	**Off-White Pipe Wrap Mastic**	**Misc.**	**Yes**	**Yes**	**652 LF**
17	Gray Metal Duct Seam Sealant	Misc.	No	No	N/A
18	Gray Vinyl Cove Base w/ Mastic	Misc.	No	No	N/A
19	12" x 12" Light Blue w/ Black Spots VFT	Misc.	No	No	N/A
20	Maroon Vinyl Cove Base w/ Mastic	Misc.	No	No	N/A
21	2' x 4' White Small & Large Pinhole ACT	Misc.	No	No	N/A
22	12" x 12" Navy Blue w/ Light Blue Specks VFT	Misc.	No	No	N/A
23	Navy Blue Vinyl Cove Base w/ Mastic	Misc.	No	No	N/A
24	Black Vinyl Cove Base w/ Mastic	Misc.	No	No	N/A
25	12" x 12" Light Blue w/ Blue Specks VFT	Misc.	No	No	N/A
26	Navy Blue Vinyl Stair Tread w/ Mastic	Misc.	No	No	N/A
27	Beige VFT under Carpet	Misc.	No	No	N/A
28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Misc.	No	No	N/A
29	2' x 2' White Pinhole & Fissure ACT	Misc.	No	No	N/A
30	**White Duct Insulation Mastic**	**Misc.**	**Yes**	**Yes**	**300 LF**
31	12" x 12" Marble Pattern Flooring VFT	Misc.	No	No	N/A
32	Finished Plaster	Surfacing	No	No	N/A
33	12" x 12" Tan w/ Brown & Green Specks VFT	Misc.	No	No	N/A
34	**12" x 12" Tan w/ Brown Specks VFT**	**Misc.**	**Yes**	**Yes**	**282 SF**
35	12" x 12" Off-White w/ Tan Specks VFT	Misc.	No	No	N/A
36	White Interior Duct Insulation	Misc.	No	No	N/A
37	12" x 12" White w/ Black Specks VFT	Misc.	No	No	N/A
38	12" x 12" Gray/Orange w/ Black Spots VFT	Misc.	No	No	N/A
39	18" x 18" Gray VFT & Mastic	Misc.	No	No	N/A
40	Gray Spray Applied Fireproofing	Surfacing	No	No	N/A

HA #	Material Description	Material Category	EPA Regulated	OSHA Regulated	Material Quantity
41	Dark Gray Vinyl Cove Base w/ Mastic	Misc.	No	No	N/A
42	Brown Vinyl Cove Base w/ Mastic	Misc.	No	No	N/A
43	18" x 18" Gray/Red w/ Black Spots VFT & Mastic	Misc.	No	No	N/A
44	Black Vinyl Threshold Strip	Misc.	No	No	N/A
45	18" x 18" Orange VFT & Mastic	Misc.	No	No	N/A
46	18" x 18" Marble Pattern VFT & Mastic	Misc.	No	No	N/A
47	Yellow Textured VFT	Misc.	No	No	N/A
48	Purple & Orange VSG	Misc.	No	No	N/A
49	**Tan Ceiling Insulation Pin Mastic**	**Misc.**	**Yes**	**Yes**	**2,715 SF**
50	12" x 12" Pink w/ Black Spots VFT & Mastic	Misc.	No	No	N/A
51	Black Tar Sealant	Misc.	No	No	N/A
52	12" x 12" Black w/ White Spots VFT & Mastic	Misc.	No	No	N/A
53	Red Textured VFT & Mastic	Misc.	No	No	N/A
54	Wood Pattern VSG & Mastic	Misc.	No	No	N/A

Presumed-Asbestos Containing Building Construction Materials

HA #	Material Description	Material Category	EPA Regulated	OSHA Regulated	Material Quantity
P1	**12" x 12" Gray Ceramic Floor Tile Grout & Thinset**	**Misc.**	**YES**	**YES**	**1,722 SF**
P2	**12" x 12" Tan Ceramic Wall Tile Grout & Adhesive**	**Misc.**	**YES**	**YES**	**5,861 SF**
P3	**1" x 1" Brown Ceramic Floor Tile Grout & Thinset**	**Misc.**	**YES**	**YES**	**247 SF**
P4	**Vibration Dampening Cloth**	**Misc.**	**YES**	**YES**	**5 SF**
P5	**Fire Door**	**Misc.**	**YES**	**YES**	**17 Each**
~~**P6**~~	~~**Gray Ceramic Floor & Wall Tile Grout & Adhesive**~~	~~**Misc.**~~	~~**YES**~~	~~**YES**~~	~~**645 SF**~~
P7	**Multicolor Ceramic Wall Tile Grout & Adhesive**	**Misc.**	**YES**	**YES**	**120 SF**

APPENDIX C

BUILDING CONSTRUCTION MATERIALS LOCATION

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	6th	600C	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600B	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	**Presumed**
MC RC	MT	6th	600B	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	173	SF	Good	**Presumed**
MC RC	MT	6th	600B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600B	2	Joint Finishing Compound	Walls	173	SF	Good	**2% Chrysotile**
MC RC	MT	6th	600B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600A	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	**Presumed**
MC RC	MT	6th	600A	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	173	SF	Good	**Presumed**
MC RC	MT	6th	600A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600A	2	Joint Finishing Compound	Walls	173	SF	Good	**2% Chrysotile**
MC RC	MT	6th	600A	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	625	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	625	2	Joint Finishing Compound	Walls	2832	SF	Good	**2% Chrysotile**
MC RC	MT	6th	625	3	Black Floor Tile Mastic	Floor	944	SF	Good	**5% Chrysotile**
MC RC	MT	6th	625	4	Yellow Carpet Mastic	Floor	944	SF	Good	**2% Chrysotile**
MC RC	MT	6th	625	16	Off-White Pipe Wrap Mastic	Plenum	60	LF	Good	**5% Chrysotile**
MC RC	MT	6th	625	8	2' x 2' White Textured ACT	Between Corridor 600 & Offices 601-602	N/A	N/A	N/A	None Detected
MC RC	MT	6th	625	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	625	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	624	N/A	No HA Materials Present	N/A	N/A	N/A	N/A	N/A
MC RC	MT	6th	623	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	623	2	Joint Finishing Compound	Walls	516	SF	Good	**2% Chrysotile**
MC RC	MT	6th	623	3	Black Floor Tile Mastic	Floor	158	SF	Good	**5% Chrysotile**
MC RC	MT	6th	623	4	Yellow Carpet Mastic	Floor	158	SF	Good	**2% Chrysotile**
MC RC	MT	6th	623	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	623	16	Off-White Pipe Wrap Mastic	Plenum	20	LF	Good	**5% Chrysotile**
MC RC	MT	6th	623	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	622	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	622	2	Joint Finishing Compound	Walls	646	SF	Good	**2% Chrysotile**
MC RC	MT	6th	622	3	Black Floor Tile Mastic	Floor	261	SF	Good	**5% Chrysotile**
MC RC	MT	6th	622	4	Yellow Carpet Mastic	Floor	261	SF	Good	**2% Chrysotile**
MC RC	MT	6th	622	16	Off-White Pipe Wrap Mastic	Plenum	15	LF	Good	**5% Chrysotile**
MC RC	MT	6th	622	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	622	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	621	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	621	2	Joint Finishing Compound	Walls	648	SF	Good	**2% Chrysotile**
MC RC	MT	6th	621	3	Black Floor Tile Mastic	Floor	262	SF	Good	**5% Chrysotile**
MC RC	MT	6th	621	4	Yellow Carpet Mastic	Floor	262	SF	Good	**2% Chrysotile**
MC RC	MT	6th	621	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	621	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	620	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	620	2	Joint Finishing Compound	Walls	584	SF	Good	**2% Chrysotile**
MC RC	MT	6th	620	3	Black Floor Tile Mastic	Floor	193	SF	Good	**5% Chrysotile**
MC RC	MT	6th	620	4	Yellow Carpet Mastic	Floor	193	SF	Good	**2% Chrysotile**
MC RC	MT	6th	620	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	620	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	619	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	6th	619	2	Joint Finishing Compound	Walls	646	SF	Good	**2% Chrysotile**
MC RC	MT	6th	619	3	Black Floor Tile Mastic	Floor	259	SF	Good	**5% Chrysotile**
MC RC	MT	6th	619	4	Yellow Carpet Mastic	Floor	259	SF	Good	**2% Chrysotile**
MC RC	MT	6th	619	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	619	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	618	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	618	2	Joint Finishing Compound	Walls	655	SF	Good	**2% Chrysotile**
MC RC	MT	6th	618	3	Black Floor Tile Mastic	Floor	269	SF	Good	**5% Chrysotile**
MC RC	MT	6th	618	4	Yellow Carpet Mastic	Floor	269	SF	Good	**2% Chrysotile**
MC RC	MT	6th	618	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	618	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	617	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	617	2	Joint Finishing Compound	Walls	646	SF	Good	**2% Chrysotile**
MC RC	MT	6th	617	3	Black Floor Tile Mastic	Floor	259	SF	Good	**5% Chrysotile**
MC RC	MT	6th	617	4	Yellow Carpet Mastic	Floor	259	SF	Good	**2% Chrysotile**
MC RC	MT	6th	617	16	Off-White Pipe Wrap Mastic	Plenum	15	LF	Good	**5% Chrysotile**
MC RC	MT	6th	617	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	617	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	616	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	616	2	Joint Finishing Compound	Walls	516	SF	Good	**2% Chrysotile**
MC RC	MT	6th	616	3	Black Floor Tile Mastic	Floor	158	SF	Good	**5% Chrysotile**
MC RC	MT	6th	616	4	Yellow Carpet Mastic	Floor	158	SF	Good	**2% Chrysotile**
MC RC	MT	6th	616	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	616	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	615	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	615	2	Joint Finishing Compound	Walls	330	SF	Good	**2% Chrysotile**
MC RC	MT	6th	615	9	12" x 12" Dark Blue w/ Black Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	615	3	Black Floor Tile Mastic	Floor	65	SF	Good	**5% Chrysotile**
MC RC	MT	6th	615	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	615	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	614	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	614	2	Joint Finishing Compound	Walls	516	SF	Good	**2% Chrysotile**
MC RC	MT	6th	614	3	Black Floor Tile Mastic	Floor	158	SF	Good	**5% Chrysotile**
MC RC	MT	6th	614	4	Yellow Carpet Mastic	Floor	158	SF	Good	**2% Chrysotile**
MC RC	MT	6th	614	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	614	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	613	P3	1" x 1" Brown Ceramic Floor Tile Grout & Thinset	Floor	17	SF	Good	**Presumed**
MC RC	MT	6th	612	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	612	2	Joint Finishing Compound	Walls	390	SF	Good	**2% Chrysotile**
MC RC	MT	6th	612	3	Black Floor Tile Mastic	Floor	120	SF	Good	**5% Chrysotile**
MC RC	MT	6th	612	4	Yellow Carpet Mastic	Floor	120	SF	Good	**2% Chrysotile**
MC RC	MT	6th	612	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	612	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	611	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	611	2	Joint Finishing Compound	Walls	520	SF	Good	**2% Chrysotile**
MC RC	MT	6th	611	3	Black Floor Tile Mastic	Floor	161	SF	Good	**5% Chrysotile**
MC RC	MT	6th	611	4	Yellow Carpet Mastic	Floor	161	SF	Good	**2% Chrysotile**
MC RC	MT	6th	611	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	6th	611	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	610	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	6th	610	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	6th	610	51	Black Tar Sealant	On Pipe Insulation	N/A	N/A	N/A	None Detected
MC RC	MT	6th	610	13	Brown Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	6th	610	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	6th	609	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	609	2	Joint Finishing Compound	Walls	656	SF	Good	**2% Chrysotile**
MC RC	MT	6th	609	3	Black Floor Tile Mastic	Floor	267	SF	Good	**5% Chrysotile**
MC RC	MT	6th	609	4	Yellow Carpet Mastic	Floor	267	SF	Good	**2% Chrysotile**
MC RC	MT	6th	609	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	609	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	608	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	608	2	Joint Finishing Compound	Walls	340	SF	Good	**2% Chrysotile**
MC RC	MT	6th	608	9	12" x 12" Dark Blue w/ Black Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	608	3	Black Floor Tile Mastic	Floor	70	SF	Good	**5% Chrysotile**
MC RC	MT	6th	608	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	608	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	607	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	607	2	Joint Finishing Compound	Walls	650	SF	Good	**2% Chrysotile**
MC RC	MT	6th	607	3	Black Floor Tile Mastic	Floor	262	SF	Good	**5% Chrysotile**
MC RC	MT	6th	607	4	Yellow Carpet Mastic	Floor	262	SF	Good	**2% Chrysotile**
MC RC	MT	6th	607	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	607	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	606	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	606	2	Joint Finishing Compound	Walls	320	SF	Good	**2% Chrysotile**
MC RC	MT	6th	606	9	12" x 12" Dark Blue w/ Black Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	606	3	Black Floor Tile Mastic	Floor	61	SF	Good	**5% Chrysotile**
MC RC	MT	6th	606	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	606	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	605	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	605	2	Joint Finishing Compound	Walls	670	SF	Good	**2% Chrysotile**
MC RC	MT	6th	605	3	Black Floor Tile Mastic	Floor	270	SF	Good	**5% Chrysotile**
MC RC	MT	6th	605	4	Yellow Carpet Mastic	Floor	270	SF	Good	**2% Chrysotile**
MC RC	MT	6th	605	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	605	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	604	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	604	2	Joint Finishing Compound	Walls	876	SF	Good	**2% Chrysotile**
MC RC	MT	6th	604	3	Black Floor Tile Mastic	Floor	120	SF	Good	**5% Chrysotile**
MC RC	MT	6th	604	4	Yellow Carpet Mastic	Floor	120	SF	Good	**2% Chrysotile**
MC RC	MT	6th	604	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	604	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	603	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	603	2	Joint Finishing Compound	Walls	364	SF	Good	**2% Chrysotile**
MC RC	MT	6th	603	3	Black Floor Tile Mastic	Floor	112	SF	Good	**5% Chrysotile**
MC RC	MT	6th	603	4	Yellow Carpet Mastic	Floor	112	SF	Good	**2% Chrysotile**
MC RC	MT	6th	603	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	603	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	6th	602	1	Gypsum Board Sheeting	West Wall	N/A	N/A	N/A	None Detected
MC RC	MT	6th	602	2	Joint Finishing Compound	West Wall	403	SF	Good	**2% Chrysotile**
MC RC	MT	6th	602	3	Black Floor Tile Mastic	Floor	124	SF	Good	**5% Chrysotile**
MC RC	MT	6th	602	4	Yellow Carpet Mastic	Floor	124	SF	Good	**2% Chrysotile**
MC RC	MT	6th	602	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	602	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	601	1	Gypsum Board Sheeting	East Wall	N/A	N/A	N/A	None Detected
MC RC	MT	6th	601	2	Joint Finishing Compound	East Wall	403	SF	Good	**2% Chrysotile**
MC RC	MT	6th	601	3	Black Floor Tile Mastic	Floor	124	SF	Good	**5% Chrysotile**
MC RC	MT	6th	601	4	Yellow Carpet Mastic	Floor	124	SF	Good	**2% Chrysotile**
MC RC	MT	6th	601	16	Off-White Pipe Wrap Mastic	Plenum	10	LF	Good	**5% Chrysotile**
MC RC	MT	6th	601	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	6th	601	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600	10	12" x 12" Off-White w/ Black Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600	11	12" x 12" Brown w/ Black Spots VFT & Mastic	Elevator Lobby Area	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600	3	Black Floor Tile Mastic	Floor	325	SF	Good	**5% Chrysotile**
MC RC	MT	6th	600	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600	2	Joint Finishing Compound	Walls	1138	SF	Good	**2% Chrysotile**
MC RC	MT	6th	600	6	2' x 2' White Pinhole & Puncture ACT	North Hallway Section	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600	8	2' x 2' White Textured ACT	Elevator Lobby Area	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600	44	Black Vinyl Threshold Strip	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	6th	600	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	535A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	5th	534B	P3	1" x 1" Brown Ceramic Floor Tile Grout & Thinset	Floor	17	SF	Good	**Presumed**
MC RC	MT	5th	534A	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	5th	534A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	5th	531A	N/A	No HA Materials Present	N/A	N/A	N/A	N/A	N/A
MC RC	MT	5th	526C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526C	2	Joint Finishing Compound	Walls	380	SF	Good	**2% Chrysotile**
MC RC	MT	5th	526C	3	Black Floor Tile Mastic	Floor	90	SF	Good	**5% Chrysotile**
MC RC	MT	5th	526C	4	Yellow Carpet Mastic	Floor	90	SF	Good	**2% Chrysotile**
MC RC	MT	5th	526C	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526C	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526B	2	Joint Finishing Compound	Walls	320	SF	Good	**2% Chrysotile**
MC RC	MT	5th	526B	3	Black Floor Tile Mastic	Floor	60	SF	Good	**5% Chrysotile**
MC RC	MT	5th	526B	4	Yellow Carpet Mastic	Floor	60	SF	Good	**2% Chrysotile**
MC RC	MT	5th	526B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526B	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526A	2	Joint Finishing Compound	Walls	432	SF	Good	**2% Chrysotile**
MC RC	MT	5th	526A	3	Black Floor Tile Mastic	Floor	114	SF	Good	**5% Chrysotile**
MC RC	MT	5th	526A	4	Yellow Carpet Mastic	Floor	114	SF	Good	**2% Chrysotile**
MC RC	MT	5th	526A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526A	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	512B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	512B	2	Joint Finishing Compound	Walls	490	SF	Good	**2% Chrysotile**
MC RC	MT	5th	512B	3	Black Floor Tile Mastic	Floor	150	SF	Good	**5% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	5th	512B	4	Yellow Carpet Mastic	Floor	150	SF	Good	**2% Chrysotile**
MC RC	MT	5th	512B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	512B	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	512A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	512A	2	Joint Finishing Compound	Walls	490	SF	Good	**2% Chrysotile**
MC RC	MT	5th	512A	3	Black Floor Tile Mastic	Floor	150	SF	Good	**5% Chrysotile**
MC RC	MT	5th	512A	4	Yellow Carpet Mastic	Floor	150	SF	Good	**2% Chrysotile**
MC RC	MT	5th	512A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	512A	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	502B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	500B	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	**Presumed**
MC RC	MT	5th	500B	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	**Presumed**
MC RC	MT	5th	500B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	500B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	500B	2	Joint Finishing Compound	Walls	240	SF	Good	**2% Chrysotile**
MC RC	MT	5th	500A	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	**Presumed**
MC RC	MT	5th	500A	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	**Presumed**
MC RC	MT	5th	500A	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	500A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	500A	2	Joint Finishing Compound	Walls	240	SF	Good	**2% Chrysotile**
MC RC	MT	5th	592	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	592	2	Joint Finishing Compound	Walls	1360	SF	Good	**2% Chrysotile**
MC RC	MT	5th	592	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	592	3	Black Floor Tile Mastic	Floor	327	SF	Good	**5% Chrysotile**
MC RC	MT	5th	592	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	592	44	Black Vinyl Threshold Strip	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	5th	592	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	591	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	591	2	Joint Finishing Compound	Walls	1490	SF	Good	**2% Chrysotile**
MC RC	MT	5th	591	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	591	3	Black Floor Tile Mastic	Floor	360	SF	Good	**5% Chrysotile**
MC RC	MT	5th	591	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	591	44	Black Vinyl Threshold Strip	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	5th	591	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	530	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	530	2	Joint Finishing Compound	Walls	464	SF	Good	**2% Chrysotile**
MC RC	MT	5th	530	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	530	3	Black Floor Tile Mastic	Floor	132	SF	Good	**5% Chrysotile**
MC RC	MT	5th	530	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	530	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	529	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	529	2	Joint Finishing Compound	Walls	364	SF	Good	**2% Chrysotile**
MC RC	MT	5th	529	3	Black Floor Tile Mastic	Floor	82	SF	Good	**5% Chrysotile**
MC RC	MT	5th	529	4	Yellow Carpet Mastic	Floor	82	SF	Good	**2% Chrysotile**
MC RC	MT	5th	529	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	529	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	528	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	528	2	Joint Finishing Compound	Walls	460	SF	Good	**2% Chrysotile**

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	5th	528	3	Black Floor Tile Mastic	Floor	130	SF	Good	**5% Chrysotile**
MC RC	MT	5th	528	4	Yellow Carpet Mastic	Floor	130	SF	Good	**2% Chrysotile**
MC RC	MT	5th	528	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	528	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	527	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	527	2	Joint Finishing Compound	Walls	364	SF	Good	**2% Chrysotile**
MC RC	MT	5th	527	3	Black Floor Tile Mastic	Floor	82	SF	Good	**5% Chrysotile**
MC RC	MT	5th	527	4	Yellow Carpet Mastic	Floor	82	SF	Good	**2% Chrysotile**
MC RC	MT	5th	527	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	527	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526	2	Joint Finishing Compound	Walls	966	SF	Good	**2% Chrysotile**
MC RC	MT	5th	526	3	Black Floor Tile Mastic	Floor	575	SF	Good	**5% Chrysotile**
MC RC	MT	5th	526	4	Yellow Carpet Mastic	Floor	575	SF	Good	**2% Chrysotile**
MC RC	MT	5th	526	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	526	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	525	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	525	2	Joint Finishing Compound	Walls	352	SF	Good	**2% Chrysotile**
MC RC	MT	5th	525	3	Black Floor Tile Mastic	Floor	78	SF	Good	**5% Chrysotile**
MC RC	MT	5th	525	4	Yellow Carpet Mastic	Floor	78	SF	Good	**2% Chrysotile**
MC RC	MT	5th	525	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	525	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	524	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	524	2	Joint Finishing Compound	Walls	352	SF	Good	**2% Chrysotile**
MC RC	MT	5th	524	3	Black Floor Tile Mastic	Floor	78	SF	Good	**5% Chrysotile**
MC RC	MT	5th	524	4	Yellow Carpet Mastic	Floor	78	SF	Good	**2% Chrysotile**
MC RC	MT	5th	524	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	524	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	523	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	523	2	Joint Finishing Compound	Walls	352	SF	Good	**2% Chrysotile**
MC RC	MT	5th	523	3	Black Floor Tile Mastic	Floor	78	SF	Good	**5% Chrysotile**
MC RC	MT	5th	523	4	Yellow Carpet Mastic	Floor	78	SF	Good	**2% Chrysotile**
MC RC	MT	5th	523	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	523	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	522	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	522	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	522	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	522	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	522	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	522	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	521	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	521	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	521	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	521	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	521	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	521	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	520	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	520	2	Joint Finishing Compound	Walls	352	SF	Good	**2% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	5th	520	3	Black Floor Tile Mastic	Floor	78	SF	Good	**5% Chrysotile**
MC RC	MT	5th	520	4	Yellow Carpet Mastic	Floor	78	SF	Good	**2% Chrysotile**
MC RC	MT	5th	520	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	520	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	519	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	519	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	519	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	519	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	519	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	519	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	518	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	518	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	518	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	518	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	518	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	518	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	517	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	517	2	Joint Finishing Compound	Walls	364	SF	Good	**2% Chrysotile**
MC RC	MT	5th	517	3	Black Floor Tile Mastic	Floor	82	SF	Good	**5% Chrysotile**
MC RC	MT	5th	517	4	Yellow Carpet Mastic	Floor	82	SF	Good	**2% Chrysotile**
MC RC	MT	5th	517	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	517	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	516	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	516	2	Joint Finishing Compound	Walls	388	SF	Good	**2% Chrysotile**
MC RC	MT	5th	516	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	516	3	Black Floor Tile Mastic	Floor	94	SF	Good	**5% Chrysotile**
MC RC	MT	5th	516	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	516	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	514	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	514	2	Joint Finishing Compound	Walls	364	SF	Good	**2% Chrysotile**
MC RC	MT	5th	514	3	Black Floor Tile Mastic	Floor	82	SF	Good	**5% Chrysotile**
MC RC	MT	5th	514	4	Yellow Carpet Mastic	Floor	82	SF	Good	**2% Chrysotile**
MC RC	MT	5th	514	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	514	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	513	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	513	2	Joint Finishing Compound	Walls	330	SF	Good	**2% Chrysotile**
MC RC	MT	5th	513	3	Black Floor Tile Mastic	Floor	65	SF	Good	**5% Chrysotile**
MC RC	MT	5th	513	4	Yellow Carpet Mastic	Floor	65	SF	Good	**2% Chrysotile**
MC RC	MT	5th	513	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	513	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	512	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	512	2	Joint Finishing Compound	Walls	320	SF	Good	**2% Chrysotile**
MC RC	MT	5th	512	3	Black Floor Tile Mastic	Floor	60	SF	Good	**5% Chrysotile**
MC RC	MT	5th	512	4	Yellow Carpet Mastic	Floor	60	SF	Good	**2% Chrysotile**
MC RC	MT	5th	512	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	512	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	511	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	511	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	5th	511	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	511	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	511	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	511	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	510	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	510	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	510	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	510	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	510	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	510	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	509	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	509	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	509	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	509	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	509	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	509	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	508	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	508	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	508	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	508	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	508	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	508	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	507	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	507	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	507	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	507	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	507	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	507	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	506	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	506	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	506	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	506	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	506	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	506	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	505	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	505	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	505	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	505	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	505	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	505	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	504	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	504	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	5th	504	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	504	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	504	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	504	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	503	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	503	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	5th	503	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	5th	503	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	5th	503	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	503	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	502	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	502	2	Joint Finishing Compound	Walls	369	SF	Good	**2% Chrysotile**
MC RC	MT	5th	502	3	Black Floor Tile Mastic	Floor	84	SF	Good	**5% Chrysotile**
MC RC	MT	5th	502	4	Yellow Carpet Mastic	Floor	84	SF	Good	**2% Chrysotile**
MC RC	MT	5th	502	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	502	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	501	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	501	2	Joint Finishing Compound	Walls	369	SF	Good	**2% Chrysotile**
MC RC	MT	5th	501	3	Black Floor Tile Mastic	Floor	84	SF	Good	**5% Chrysotile**
MC RC	MT	5th	501	4	Yellow Carpet Mastic	Floor	84	SF	Good	**2% Chrysotile**
MC RC	MT	5th	501	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	501	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	500	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	5th	500	2	Joint Finishing Compound	Walls	595	SF	Good	**2% Chrysotile**
MC RC	MT	5th	500	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	5th	500	3	Black Floor Tile Mastic	Floor	327	SF	Good	**5% Chrysotile**
MC RC	MT	5th	500	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	5th	500	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	434A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	4th	433A	P3	1" x 1" Brown Ceramic Floor Tile Grout & Thinset	Floor	17	SF	Good	**Presumed**
MC RC	MT	4th	433A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431D	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431D	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	431D	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	431D	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	431D	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431D	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431C	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	431C	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	431C	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	431C	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431C	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431B	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	431B	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	431B	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	431B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431B	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431A	2	Joint Finishing Compound	Walls	352	SF	Good	**2% Chrysotile**
MC RC	MT	4th	431A	3	Black Floor Tile Mastic	Floor	78	SF	Good	**5% Chrysotile**
MC RC	MT	4th	431A	4	Yellow Carpet Mastic	Floor	78	SF	Good	**2% Chrysotile**
MC RC	MT	4th	431A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	4th	431A	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	431A	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	430A	N/A	No HA Materials Present	N/A	N/A	N/A	N/A	N/A
MC RC	MT	4th	429B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	429B	2	Joint Finishing Compound	Walls	226	SF	Good	**2% Chrysotile**
MC RC	MT	4th	429B	3	Black Floor Tile Mastic	Floor	32	SF	Good	**5% Chrysotile**
MC RC	MT	4th	429B	4	Yellow Carpet Mastic	Floor	32	SF	Good	**2% Chrysotile**
MC RC	MT	4th	429B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	429B	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	429A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	429A	2	Joint Finishing Compound	Walls	600	SF	Good	**2% Chrysotile**
MC RC	MT	4th	429A	3	Black Floor Tile Mastic	Floor	200	SF	Good	**5% Chrysotile**
MC RC	MT	4th	429A	4	Yellow Carpet Mastic	Floor	200	SF	Good	**2% Chrysotile**
MC RC	MT	4th	429A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	429A	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428A	2	Joint Finishing Compound	Walls	270	SF	Good	**2% Chrysotile**
MC RC	MT	4th	428A	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428A	3	Black Floor Tile Mastic	Floor	45	SF	Good	**5% Chrysotile**
MC RC	MT	4th	428A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428A	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428A	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	427C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	427C	2	Joint Finishing Compound	Walls	230	SF	Good	**2% Chrysotile**
MC RC	MT	4th	427C	3	Black Floor Tile Mastic	Floor	34	SF	Good	**5% Chrysotile**
MC RC	MT	4th	427C	4	Yellow Carpet Mastic	Floor	34	SF	Good	**2% Chrysotile**
MC RC	MT	4th	427C	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	427C	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	427A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	427A	2	Joint Finishing Compound	Walls	600	SF	Good	**2% Chrysotile**
MC RC	MT	4th	427A	3	Black Floor Tile Mastic	Floor	200	SF	Good	**5% Chrysotile**
MC RC	MT	4th	427A	4	Yellow Carpet Mastic	Floor	200	SF	Good	**2% Chrysotile**
MC RC	MT	4th	427A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	427A	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	492	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	492	2	Joint Finishing Compound	Walls	2498	SF	Good	**2% Chrysotile**
MC RC	MT	4th	492	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	North & East Corridor	N/A	N/A	N/A	None Detected
MC RC	MT	4th	492	3	Black Floor Tile Mastic	Floor	613	SF	Good	**5% Chrysotile**
MC RC	MT	4th	492	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	492		Black Vinyl Threshold Strip	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	4th	492	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	491	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	491	2	Joint Finishing Compound	Walls	2634	SF	Good	**2% Chrysotile**
MC RC	MT	4th	491	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	South & West Corridor	N/A	N/A	N/A	None Detected
MC RC	MT	4th	491	3	Black Floor Tile Mastic	Floor	687	SF	Good	**5% Chrysotile**
MC RC	MT	4th	491	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	491	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	433	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	4th	433	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	4th	433	13	Brown Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	4th	433	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	4th	429	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	429	2	Joint Finishing Compound	Walls	642	SF	Good	**2% Chrysotile**
MC RC	MT	4th	429	3	Black Floor Tile Mastic	Floor	257	SF	Good	**5% Chrysotile**
MC RC	MT	4th	429	4	Yellow Carpet Mastic	Floor	257	SF	Good	**2% Chrysotile**
MC RC	MT	4th	429	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	429	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428	2	Joint Finishing Compound	Walls	326	SF	Good	**2% Chrysotile**
MC RC	MT	4th	428	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428	3	Black Floor Tile Mastic	Floor	107	SF	Good	**5% Chrysotile**
MC RC	MT	4th	428	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	428	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	427	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	427	2	Joint Finishing Compound	Walls	653	SF	Good	**2% Chrysotile**
MC RC	MT	4th	427	3	Black Floor Tile Mastic	Floor	262	SF	Good	**5% Chrysotile**
MC RC	MT	4th	427	4	Yellow Carpet Mastic	Floor	262	SF	Good	**2% Chrysotile**
MC RC	MT	4th	427	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	427	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	426	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	426	2	Joint Finishing Compound	Walls	360	SF	Good	**2% Chrysotile**
MC RC	MT	4th	426	3	Black Floor Tile Mastic	Floor	80	SF	Good	**5% Chrysotile**
MC RC	MT	4th	426	4	Yellow Carpet Mastic	Floor	80	SF	Good	**2% Chrysotile**
MC RC	MT	4th	426	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	426	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	425	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	425	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	425	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	425	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	425	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	425	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	424	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	424	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	424	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	424	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	424	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	424	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	423	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	423	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	423	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	423	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	423	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	423	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	422	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	422	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	4th	422	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	422	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	422	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	422	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	421	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	421	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	421	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	421	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	421	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	421	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	420	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	420	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	420	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	420	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	420	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	420	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	419	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	419	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	419	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	419	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	419	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	419	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	418	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	418	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	418	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	418	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	418	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	418	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	417	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	417	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	417	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	417	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	417	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	417	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	416	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	416	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	416	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	416	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	416	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	416	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	415	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	415	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	415	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	415	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	415	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	415	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	414	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	414	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	4th	414	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	414	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	414	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	414	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	413	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	413	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	413	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	413	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	413	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	413	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	412	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	412	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	412	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	412	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	412	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	412	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	411	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	411	2	Joint Finishing Compound	Walls	352	SF	Good	**2% Chrysotile**
MC RC	MT	4th	411	3	Black Floor Tile Mastic	Floor	77	SF	Good	**5% Chrysotile**
MC RC	MT	4th	411	4	Yellow Carpet Mastic	Floor	77	SF	Good	**2% Chrysotile**
MC RC	MT	4th	411	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	411	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	410	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	410	2	Joint Finishing Compound	Walls	352	SF	Good	**2% Chrysotile**
MC RC	MT	4th	410	3	Black Floor Tile Mastic	Floor	77	SF	Good	**5% Chrysotile**
MC RC	MT	4th	410	4	Yellow Carpet Mastic	Floor	77	SF	Good	**2% Chrysotile**
MC RC	MT	4th	410	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	410	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	409	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	409	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	409	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	409	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	409	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	409	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	408	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	408	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	408	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	408	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	408	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	408	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	407	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	407	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	4th	407	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	4th	407	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	4th	407	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	407	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	406	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	406	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	4th	406	3	Black Floor Tile Mastic	Floor	76	SF	Good	5% Chrysotile
MC RC	MT	4th	406	4	Yellow Carpet Mastic	Floor	76	SF	Good	2% Chrysotile
MC RC	MT	4th	406	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	406	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	405	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	405	2	Joint Finishing Compound	Walls	350	SF	Good	2% Chrysotile
MC RC	MT	4th	405	3	Black Floor Tile Mastic	Floor	76	SF	Good	5% Chrysotile
MC RC	MT	4th	405	4	Yellow Carpet Mastic	Floor	76	SF	Good	2% Chrysotile
MC RC	MT	4th	405	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	405	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	404	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	404	2	Joint Finishing Compound	Walls	350	SF	Good	2% Chrysotile
MC RC	MT	4th	404	3	Black Floor Tile Mastic	Floor	76	SF	Good	5% Chrysotile
MC RC	MT	4th	404	4	Yellow Carpet Mastic	Floor	76	SF	Good	2% Chrysotile
MC RC	MT	4th	404	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	404	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	403	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	403	2	Joint Finishing Compound	Walls	350	SF	Good	2% Chrysotile
MC RC	MT	4th	403	3	Black Floor Tile Mastic	Floor	76	SF	Good	5% Chrysotile
MC RC	MT	4th	403	4	Yellow Carpet Mastic	Floor	76	SF	Good	2% Chrysotile
MC RC	MT	4th	403	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	403	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	402	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	Presumed
MC RC	MT	4th	402	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	Presumed
MC RC	MT	4th	402	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	402	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	402	2	Joint Finishing Compound	Walls	240	SF	Good	2% Chrysotile
MC RC	MT	4th	401	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	Presumed
MC RC	MT	4th	401	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	Presumed
MC RC	MT	4th	401	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	401	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	401	2	Joint Finishing Compound	Walls	240	SF	Good	2% Chrysotile
MC RC	MT	4th	400	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	4th	400	2	Joint Finishing Compound	Walls	420	SF	Good	2% Chrysotile
MC RC	MT	4th	400	12	12" x 12" Pink w/ Multicolored Spots VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	4th	400	3	Black Floor Tile Mastic	Floor	207	SF	Good	5% Chrysotile
MC RC	MT	4th	400	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	4th	400	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306B	2	Joint Finishing Compound	Walls	444	SF	Good	2% Chrysotile
MC RC	MT	3rd	306B	3	Black Floor Tile Mastic	Floor	122	SF	Good	5% Chrysotile
MC RC	MT	3rd	306B	4	Yellow Carpet Mastic	Floor	122	SF	Good	2% Chrysotile
MC RC	MT	3rd	306B	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306B	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306A	2	Joint Finishing Compound	Walls	568	SF	Good	2% Chrysotile
MC RC	MT	3rd	306A	22	12" x 12" Navy Blue w/ Light Blue Specks VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	3rd	306A	3	Black Floor Tile Mastic	Floor	184	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	306A	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306A	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305E	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305E	2	Joint Finishing Compound	Walls	388	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	305E	3	Black Floor Tile Mastic	Floor	93	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	305E	4	Yellow Carpet Mastic	Floor	93	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	305E	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305E	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305D	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305D	2	Joint Finishing Compound	Walls	388	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	305D	3	Black Floor Tile Mastic	Floor	93	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	305D	4	Yellow Carpet Mastic	Floor	93	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	305D	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305D	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305C	2	Joint Finishing Compound	Walls	388	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	305C	3	Black Floor Tile Mastic	Floor	93	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	305C	4	Yellow Carpet Mastic	Floor	93	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	305C	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305C	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305B	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	145	SF	Good	**Presumed**
MC RC	MT	3rd	305B	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	418	SF	Good	**Presumed**
MC RC	MT	3rd	305B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305B	2	Joint Finishing Compound	Walls	418	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	305A	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	158	SF	Good	**Presumed**
MC RC	MT	3rd	305A	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	444	SF	Good	**Presumed**
MC RC	MT	3rd	305A	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305A	2	Joint Finishing Compound	Walls	444	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	304B	51	Black Tar Sealant	On Pipe Insulation	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	304B	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	304B	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	304B	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	304B	36	White Interior Duct Insulation	South Corner	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	304A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303T	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303T	2	Joint Finishing Compound	Walls	510	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303T	3	Black Floor Tile Mastic	Under Carpet	150	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303T	4	Yellow Carpet Mastic	Under Carpet	150	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303T	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303T	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303S	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303S	2	Joint Finishing Compound	Walls	430	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303S	3	Black Floor Tile Mastic	Under Carpet	115	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303S	4	Yellow Carpet Mastic	Under Carpet	115	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303S	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	3rd	303S	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303R	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303R	2	Joint Finishing Compound	Walls	420	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303R	3	Black Floor Tile Mastic	Under Carpet	109	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303R	4	Yellow Carpet Mastic	Under Carpet	109	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303R	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303R	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303Q	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303Q	2	Joint Finishing Compound	Walls	1425	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303Q	4	Yellow Carpet Mastic	Eastern Hallway between 303R & 303E	475	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303Q	27	Beige VFT under Carpet	Eastern Hallway between 303R & 303E	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303Q	3	Black Floor Tile Mastic	North, South, & West Corridors	567	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303Q	44	Black Vinyl Threshold Strip	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303Q	4	Yellow Carpet Mastic	North, South, & West Corridors	567	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303P	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303P	2	Joint Finishing Compound	Walls	282	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303P	3	Black Floor Tile Mastic	Under Carpet	60	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303P	4	Yellow Carpet Mastic	Under Carpet	60	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303P	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303P	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303P	27	Beige VFT under Carpet	Along North Wall, Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303N	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303N	2	Joint Finishing Compound	Walls	566	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303N	4	Yellow Carpet Mastic	Under Carpet	200	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303N	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303N	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303N	27	Beige VFT under Carpet	By Entrance, Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303N	3	Black Floor Tile Mastic	Beige VFT	20	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303M	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303M	2	Joint Finishing Compound	Walls	332	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303M	4	Yellow Carpet Mastic	Under Carpet	68	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303M	27	Beige VFT under Carpet	Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303M	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303M	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303L	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303L	2	Joint Finishing Compound	Walls	632	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303L	4	Yellow Carpet Mastic	Under Carpet	240	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303L	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303L	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303L	27	Beige VFT under Carpet	By Entrance, Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303K	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303K	2	Joint Finishing Compound	Walls	200	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303K	4	Yellow Carpet Mastic	Under Carpet	141	SF	Good	**2% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	3rd	303K	27	Beige VFT under Carpet	Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303K	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303K	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303J	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303J	2	Joint Finishing Compound	Walls	566	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303J	4	Yellow Carpet Mastic	Under Carpet	200	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303J	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303J	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303J	27	Beige VFT under Carpet	By Entrance, Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303H	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303H	2	Joint Finishing Compound	Walls	360	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303H	3	Black Floor Tile Mastic	Under Carpet	80	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303H	4	Yellow Carpet Mastic	Under Carpet	80	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303H	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303H	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303G	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303G	2	Joint Finishing Compound	Walls	472	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303G	3	Black Floor Tile Mastic	Under Carpet	140	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303G	4	Yellow Carpet Mastic	Under Carpet	140	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303G	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303G	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303F	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303F	2	Joint Finishing Compound	Walls	314	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303F	37	12" x 12" White w/ Black Specks VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303F	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303F	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303E	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303E	2	Joint Finishing Compound	Walls	360	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303E	3	Black Floor Tile Mastic	Under Carpet	80	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303E	4	Yellow Carpet Mastic	Under Carpet	80	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303E	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303E	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303D	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303D	2	Joint Finishing Compound	Walls	370	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303D	3	Black Floor Tile Mastic	Under Carpet	89	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303D	4	Yellow Carpet Mastic	Under Carpet	89	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303D	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303D	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303C	2	Joint Finishing Compound	Walls	366	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303C	3	Black Floor Tile Mastic	Under Carpet	84	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303C	4	Yellow Carpet Mastic	Under Carpet	84	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303C	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303C	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303B	2	Joint Finishing Compound	Walls	366	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	303B	3	Black Floor Tile Mastic	Under Carpet	84	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	303B	4	Yellow Carpet Mastic	Under Carpet	84	SF	Good	**2% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	3rd	303B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303B	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	303A	N/A	No HA Materials Present	N/A	N/A	N/A	N/A	N/A
MC RC	MT	3rd	302C	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	**Presumed**
MC RC	MT	3rd	302C	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	**Presumed**
MC RC	MT	3rd	302C	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	302C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	302C	2	Joint Finishing Compound	Walls	240	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	302B	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	**Presumed**
MC RC	MT	3rd	302B	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	**Presumed**
MC RC	MT	3rd	302B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	302B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	302B	2	Joint Finishing Compound	Walls	240	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	302A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301C	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301B	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301B	13	Brown Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301B	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301B	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301A	P3	1" x 1" Brown Ceramic Floor Tile Grout & Thinset	Floor	50	SF	Good	**Presumed**
MC RC	MT	3rd	301A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	307	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	307	2	Joint Finishing Compound	Walls	290	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	307	22	12" x 12" Navy Blue w/ Light Blue Specks VFT	Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	307	3	Black Floor Tile Mastic	Under Carpet	460	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	307	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	307	23	Navy Blue Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306	2	Joint Finishing Compound	Walls	1508	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	306	3	Black Floor Tile Mastic	Floor	2737	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	306	4	Yellow Carpet Mastic	Floor	2737	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	306	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306	29	2' x 2' White Pinhole & Fissure ACT	Ceiling -- Around Perimeter	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	306	30	White Duct Insulation Mastic	Plenum- Corridor	80	LF	Good	**10% Chrysotile**
MC RC	MT	3rd	306	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305	2	Joint Finishing Compound	Walls	1478	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	305	3	Black Floor Tile Mastic	Floor	2679	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	305	4	Yellow Carpet Mastic	Floor	2679	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	305	31	12" x 12" Marble Pattern Flooring VFT & Mastic	Under Carpet-- Through Center Columns	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling--Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305	29	2' x 2' White Pinhole & Fissure ACT	Ceiling--Around NW Perimeter	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	305	30	White Duct Insulation Mastic	Plenum- Corridor	100	LF	Good	**10% Chrysotile**
MC RC	MT	3rd	305	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	3rd	304	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	304	2	Joint Finishing Compound	Walls	1508	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	304	3	Black Floor Tile Mastic	Floor	2737	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	304	4	Yellow Carpet Mastic	Floor	2737	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	304	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	304	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	304	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	304	30	White Duct Insulation Mastic	Plenum- Corridor	70	LF	Good	**10% Chrysotile**
MC RC	MT	3rd	304	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301	2	Joint Finishing Compound	Walls	3246	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	301	3	Black Floor Tile Mastic	Floor	6075	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	301	4	Yellow Carpet Mastic	Floor	6075	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	301	5	2' x 4' White Pinhole & Puncture ACT	Eastern Edge, Surrounding Room 301B	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Between 303 offices & 3E3 Elev 3	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301	30	White Duct Insulation Mastic	Plenum- Corridor	50	LF	Good	**10% Chrysotile**
MC RC	MT	3rd	301	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	301	25	12" x 12" Light Blue w/ Blue Specks VFT & Mastic	At Entrance to 3SE Stair 5	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C3	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C3	2	Joint Finishing Compound	Walls	652	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	2C3	19	12" x 12" Light Blue w/ Black Spots VFT & Mastic	Throughout Majority of Corridor	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C3	3	Black Floor Tile Mastic	Throughout Floor	272	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	2C3	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C3	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C3	20	Maroon Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C3	48	Purple & Orange VSG & Mastic	Throughout Western End of Corridor	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C2	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C2	2	Joint Finishing Compound	Walls	518	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	2C2	19	12" x 12" Light Blue w/ Black Spots VFT & Mastic	Throughout--Floor	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C2	3	Black Floor Tile Mastic	Throughout Floor	208	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	2C2	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C2	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C1	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C1	2	Joint Finishing Compound	Walls	518	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	2C1	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C1	19	12" x 12" Light Blue w/ Black Spots VFT & Mastic	Throughout-- Floor	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2C1	3	Black Floor Tile Mastic	Throughout Floor	208	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	2C1	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	227E	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	227E	2	Joint Finishing Compound	Walls	320	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	227E	19	12" x 12" Light Blue w/ Black Spots VFT & Mastic	Throughout Floor	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	227E	3	Black Floor Tile Mastic	Throughout Floor	62	SF	Good	**5% Chrysotile**

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	2nd	227E	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	227E	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	227E	16	Off-White Pipe Wrap Mastic	Around Pipes	20	LF	Good	**5% Chrysotile**
MC RC	MT	2nd	227D	N/A	No HA Materials Present	N/A	N/A	N/A	N/A	N/A
MC RC	MT	2nd	227C	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	**Presumed**
MC RC	MT	2nd	227C	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	**Presumed**
MC RC	MT	2nd	227C	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	227C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	227C	2	Joint Finishing Compound	Walls	242	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	227B	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	58	SF	Good	**Presumed**
MC RC	MT	2nd	227B	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	**Presumed**
MC RC	MT	2nd	227B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	227B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	227B	2	Joint Finishing Compound	Walls	242	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	227A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226C	2	Joint Finishing Compound	Walls	750	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	226C	4	Yellow Carpet Mastic	Under Carpet	351	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	226C	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226C	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226B	2	Joint Finishing Compound	Walls	510	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	226B	4	Yellow Carpet Mastic	Under Carpet	150	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	226B	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226B	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226A	2	Joint Finishing Compound	Walls	520	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	226A	3	Black Floor Tile Mastic	Floor	160	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	226A	4	Yellow Carpet Mastic	Floor	160	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	226A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226A	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	219 Closet	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	219 Closet	2	Joint Finishing Compound	Walls	226	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	219 Closet	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	219 Closet	19	12" x 12" Light Blue w/ Black Spots VFT & Mastic	Throughout--Floor	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	219 Closet	3	Black Floor Tile Mastic	Floor	33	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	219 Closet	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218K	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218K	2	Joint Finishing Compound	Walls	586	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218K	3	Black Floor Tile Mastic	Floor	215	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218K	4	Yellow Carpet Mastic	Floor	215	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218K	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218K	7	Tan Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218J	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218J	2	Joint Finishing Compound	Walls	318	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218J	3	Black Floor Tile Mastic	Floor	58	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218J	4	Yellow Carpet Mastic	Floor	58	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218J	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	2nd	218J	7	Tan Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218I	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218I	2	Joint Finishing Compound	Walls	450	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218I	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218I	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218I	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218I	7	Tan Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218H	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218H	2	Joint Finishing Compound	Walls	328	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218H	3	Black Floor Tile Mastic	Floor	65	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218H	4	Yellow Carpet Mastic	Floor	65	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218H	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218H	7	Tan Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218G	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218G	2	Joint Finishing Compound	Walls	328	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218G	3	Black Floor Tile Mastic	Floor	65	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218G	4	Yellow Carpet Mastic	Floor	65	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218G	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218G	7	Tan Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218F	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218F	2	Joint Finishing Compound	Walls	384	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218F	3	Black Floor Tile Mastic	Floor	90	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218F	4	Yellow Carpet Mastic	Floor	90	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218F	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218F	7	Tan Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218E	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218E	2	Joint Finishing Compound	Walls	384	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218E	3	Black Floor Tile Mastic	Floor	90	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218E	4	Yellow Carpet Mastic	Floor	90	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218E	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218E	7	Tan Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218D	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218D	2	Joint Finishing Compound	Walls	328	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218D	3	Black Floor Tile Mastic	Floor	65	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218D	4	Yellow Carpet Mastic	Floor	65	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218D	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218D	7	Tan Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218C	2	Joint Finishing Compound	Walls	328	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218C	3	Black Floor Tile Mastic	Floor	65	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218C	4	Yellow Carpet Mastic	Floor	65	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218C	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218C	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218B	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218B	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218B	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	2nd	218B	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218A	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218A	3	Black Floor Tile Mastic	Floor	76	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218A	4	Yellow Carpet Mastic	Floor	76	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218A	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	215A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214B	2	Joint Finishing Compound	Walls	350	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	214B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214B	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214B	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214B	50	12" x 12" Pink w/ Black Spots VFT & Mastic	Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214B	3	Black Floor Tile Mastic	Under Carpet	76	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	214A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214A	2	Joint Finishing Compound	Walls	360	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	214A	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214A	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214A	50	12" x 12" Pink w/ Black Spots VFT & Mastic	Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214A	3	Black Floor Tile Mastic	Under Carpet	80	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	213A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	213A	2	Joint Finishing Compound	Walls	320	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	213A	20	Maroon Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	213A	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	213A	3	Black Floor Tile Mastic	Under Carpet	60	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	213A	4	Yellow Carpet Mastic	Under Carpet	60	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	212G	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212G	2	Joint Finishing Compound	Walls	502	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	212G	3	Black Floor Tile Mastic	Floor	140	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	212G	4	Yellow Carpet Mastic	Floor	140	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	212G	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212G	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212F	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212F	2	Joint Finishing Compound	Walls	396	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	212F	3	Black Floor Tile Mastic	Floor	100	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	212F	4	Yellow Carpet Mastic	Floor	100	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	212F	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212F	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212F	20	Maroon Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212E	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212E	2	Joint Finishing Compound	Walls	412	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	212E	3	Black Floor Tile Mastic	Floor	110	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	212E	4	Yellow Carpet Mastic	Floor	110	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	212E	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212E	16	Off-White Pipe Wrap Mastic	Plenum	5	LF	Good	**5% Chrysotile**
MC RC	MT	2nd	212E	20	Maroon Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212D	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	2nd	212D	2	Joint Finishing Compound	Walls	412	SF	Good	2% Chrysotile
MC RC	MT	2nd	212D	3	Black Floor Tile Mastic	Floor	110	SF	Good	5% Chrysotile
MC RC	MT	2nd	212D	4	Yellow Carpet Mastic	Floor	110	SF	Good	2% Chrysotile
MC RC	MT	2nd	212D	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212D	20	Maroon Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212C	2	Joint Finishing Compound	Walls	412	SF	Good	2% Chrysotile
MC RC	MT	2nd	212C	3	Black Floor Tile Mastic	Floor	110	SF	Good	5% Chrysotile
MC RC	MT	2nd	212C	4	Yellow Carpet Mastic	Floor	110	SF	Good	2% Chrysotile
MC RC	MT	2nd	212C	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212C	20	Maroon Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212B	2	Joint Finishing Compound	Walls	510	SF	Good	2% Chrysotile
MC RC	MT	2nd	212B	3	Black Floor Tile Mastic	Floor	150	SF	Good	5% Chrysotile
MC RC	MT	2nd	212B	4	Yellow Carpet Mastic	Floor	150	SF	Good	2% Chrysotile
MC RC	MT	2nd	212B	20	Maroon Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212B	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212A	2	Joint Finishing Compound	Walls	566	SF	Good	2% Chrysotile
MC RC	MT	2nd	212A	3	Black Floor Tile Mastic	Floor	200	SF	Good	5% Chrysotile
MC RC	MT	2nd	212A	4	Yellow Carpet Mastic	Floor	200	SF	Good	2% Chrysotile
MC RC	MT	2nd	212A	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212A	20	Maroon Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	209C	17	Gray Metal Duct Seam Sealant	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	209C	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203B	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	147	SF	Good	Presumed
MC RC	MT	2nd	203B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203B	2	Joint Finishing Compound	Walls	416	SF	Good	2% Chrysotile
MC RC	MT	2nd	203B	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	416	SF	Good	Presumed
MC RC	MT	2nd	203B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203A	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	157	SF	Good	Presumed
MC RC	MT	2nd	203A	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	442	SF	Good	Presumed
MC RC	MT	2nd	203A	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203A	2	Joint Finishing Compound	Walls	442	SF	Good	2% Chrysotile
MC RC	MT	2nd	202E	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202E	2	Joint Finishing Compound	Walls	260	SF	Good	2% Chrysotile
MC RC	MT	2nd	202E	4	Yellow Carpet Mastic	Under Carpet	47	SF	Good	2% Chrysotile
MC RC	MT	2nd	202E	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202E	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202D	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202D	2	Joint Finishing Compound	Walls	260	SF	Good	2% Chrysotile
MC RC	MT	2nd	202D	4	Yellow Carpet Mastic	Under Carpet	47	SF	Good	2% Chrysotile
MC RC	MT	2nd	202D	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202D	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202C	2	Joint Finishing Compound	Walls	310	SF	Good	2% Chrysotile

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	2nd	202C	4	Yellow Carpet Mastic	Under Carpet	50	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	202C	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202C	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202B	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202A	36	White Interior Duct Insulation	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202A	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202A	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	201A	P3	1" x 1" Brown Ceramic Floor Tile Grout & Thinset	Floor	48	SF	Good	**Presumed**
MC RC	MT	2nd	201A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226	2	Joint Finishing Compound	Walls	716	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	226	3	Black Floor Tile Mastic	Floor	315	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	226	4	Yellow Carpet Mastic	Floor	315	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	226	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	226	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	225	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	225	2	Joint Finishing Compound	Walls	352	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	225	3	Black Floor Tile Mastic	Floor	75	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	225	4	Yellow Carpet Mastic	Floor	75	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	225	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	225	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	224	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	224	2	Joint Finishing Compound	Walls	340	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	224	3	Black Floor Tile Mastic	Floor	70	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	224	4	Yellow Carpet Mastic	Floor	70	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	224	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	224	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	223	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	223	2	Joint Finishing Compound	Walls	352	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	223	3	Black Floor Tile Mastic	Floor	75	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	223	4	Yellow Carpet Mastic	Floor	75	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	223	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	223	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	222	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	222	2	Joint Finishing Compound	Walls	346	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	222	3	Black Floor Tile Mastic	Floor	72	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	222	4	Yellow Carpet Mastic	Floor	72	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	222	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	222	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	221	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	221	2	Joint Finishing Compound	Walls	346	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	221	3	Black Floor Tile Mastic	Floor	72	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	221	4	Yellow Carpet Mastic	Floor	72	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	221	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	221	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	220	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	220	2	Joint Finishing Compound	Walls	346	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	220	3	Black Floor Tile Mastic	Floor	72	SF	Good	**5% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	2nd	220	4	Yellow Carpet Mastic	Floor	72	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	220	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	220	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	219	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	219	2	Joint Finishing Compound	Walls	346	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	219	3	Black Floor Tile Mastic	Floor	72	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	219	4	Yellow Carpet Mastic	Floor	72	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	219	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	219	7	Tan Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218	2	Joint Finishing Compound	Walls	928	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218	3	Black Floor Tile Mastic	Floor	500	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	218	4	Yellow Carpet Mastic	Floor	500	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	218	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	218	7	Tan Vinyl Cove Base w/ Mastic	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214	2	Joint Finishing Compound	Walls	896	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	214	50	12" x 12" Pink w/ Black Spots VFT & Mastic	Under Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214	3	Black Floor Tile Mastic	Floor	483	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	214	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	214	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	213	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	213	2	Joint Finishing Compound	Walls	818	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	213	20	Maroon Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	213	8	2' x 2' White Textured ACT	Ceiling--Center of Room	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	213	21	2' x 4' White Small & Large Pinhole ACT	Ceiling--Western Corner of Room	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	213	3	Black Floor Tile Mastic	Under Carpet	436	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	213	4	Yellow Carpet Mastic	Under Carpet	436	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	213	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212	2	Joint Finishing Compound	Walls	1060	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	212	3	Black Floor Tile Mastic	Floor	720	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	212	4	Yellow Carpet Mastic	Floor	720	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	212G	52	12" x 12" Black w/ White Spots VFT & Mastic	Kitchenette	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212	5	2' x 4' White Pinhole & Puncture ACT	SE corner--Kitchenette	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212	8	2' x 2' White Textured ACT	Ceiling--Hallway	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212	16	Off-White Pipe Wrap Mastic	Plenum--Hallway	15	LF	Good	**5% Chrysotile**
MC RC	MT	2nd	212	20	Maroon Vinyl Cove Base w/ Mastic	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	212	32	Finished Plaster	Ceiling--Main Office Area	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	206	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	206	2	Joint Finishing Compound	Walls	1442	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	206	4	Yellow Carpet Mastic	Floor	1265	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	206	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	206	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	205	1	Gypsum Board Sheeting	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	205	2	Joint Finishing Compound	Walls	1440	SF	Good	**2% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	2nd	205	4	Yellow Carpet Mastic	Floor	1260	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	205	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	205	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	204	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	204	2	Joint Finishing Compound	Walls	1280	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	204	4	Yellow Carpet Mastic	Under Carpet	1685	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	204	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	NW corner--Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	204	29	2' x 2' White Pinhole & Fissure ACT	Throughout--Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	204	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203	2	Joint Finishing Compound	Walls	1700	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	203	4	Yellow Carpet Mastic	Under Carpet	3664	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	203	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203	32	Finished Plaster	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	203	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202	2	Joint Finishing Compound	Walls	1665	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	202	4	Yellow Carpet Mastic	Under Carpet	3378	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	202	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	202	29	2' x 2' White Pinhole & Fissure ACT	Ceiling--Wrapped around Interior Rooms	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	201	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	201	2	Joint Finishing Compound	Walls	362	SF	Good	**2% Chrysotile**
MC RC	MT	2nd	201	25	12" x 12" Light Blue w/ Blue Specks VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	201	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	201	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	201	4	Yellow Carpet Mastic	South West Edge of Hall, Under Carpet	100	SF	Good	**2% Chrysotile**
MC RC	MT	1st	109	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	109	2	Joint Finishing Compound	Walls	615	SF	Good	**2% Chrysotile**
MC RC	MT	1st	109	3	Black Floor Tile Mastic	Floor	282	SF	Good	**5% Chrysotile**
MC RC	MT	1st	109	34	12" x 12" Tan w/ Brown Specks VFT	Floor	282	SF	Good	**10% Chrysotile**
MC RC	MT	1st	109	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	109	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	108	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	108	2	Joint Finishing Compound	Walls	405	SF	Good	**2% Chrysotile**
MC RC	MT	1st	108	3	Black Floor Tile Mastic	Floor	125	SF	Good	**5% Chrysotile**
MC RC	MT	1st	108	4	Yellow Carpet Mastic	Floor	125	SF	Good	**2% Chrysotile**
MC RC	MT	1st	108	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	108	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	107A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	1st	107A	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	1st	107	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	107	2	Joint Finishing Compound	Walls	600	SF	Good	**2% Chrysotile**
MC RC	MT	1st	107	3	Black Floor Tile Mastic	Floor	275	SF	Good	**5% Chrysotile**
MC RC	MT	1st	107	4	Yellow Carpet Mastic	Floor	275	SF	Good	**2% Chrysotile**

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	1st	107	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	107	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	110	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	110	2	Joint Finishing Compound	Walls	1195	SF	Good	**2% Chrysotile**
MC RC	MT	1st	110	3	Black Floor Tile Mastic	Floor	1133	SF	Good	**5% Chrysotile**
MC RC	MT	1st	110	4	Yellow Carpet Mastic	Floor	1133	SF	Good	**2% Chrysotile**
MC RC	MT	1st	110	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	110	25	12" x 12" Light Blue w/ Blue Specks VFT & Mastic	Under Bookcases	N/A	N/A	N/A	None Detected
MC RC	MT	1st	110	33	12" x 12" Tan w/ Brown & Green Specks VFT	Under Bookcases	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112	33	12" x 12" Tan w/ Brown & Green Specks VFT	Near Corridor 190 Entrance	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112	3	Black Floor Tile Mastic	Floor	5025	SF	Good	**5% Chrysotile**
MC RC	MT	1st	112	4	Yellow Carpet Mastic	Floor	4620	SF	Good	**2% Chrysotile**
MC RC	MT	1st	112	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112	2	Joint Finishing Compound	Walls	3400	SF	Good	**2% Chrysotile**
MC RC	MT	1st	112	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112D	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112D	2	Joint Finishing Compound	Walls	450	SF	Good	**2% Chrysotile**
MC RC	MT	1st	112D	3	Black Floor Tile Mastic	Floor	149	SF	Good	**5% Chrysotile**
MC RC	MT	1st	112D	4	Yellow Carpet Mastic	Floor	149	SF	Good	**2% Chrysotile**
MC RC	MT	1st	112D	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112D	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112C	2	Joint Finishing Compound	Walls	510	SF	Good	**2% Chrysotile**
MC RC	MT	1st	112C	3	Black Floor Tile Mastic	Floor	201	SF	Good	**5% Chrysotile**
MC RC	MT	1st	112C	4	Yellow Carpet Mastic	Floor	201	SF	Good	**2% Chrysotile**
MC RC	MT	1st	112C	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112C	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	111B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	111B	2	Joint Finishing Compound	Walls	702	SF	Good	**2% Chrysotile**
MC RC	MT	1st	111B	3	Black Floor Tile Mastic	Floor	348	SF	Good	**5% Chrysotile**
MC RC	MT	1st	111B	4	Yellow Carpet Mastic	Floor	348	SF	Good	**2% Chrysotile**
MC RC	MT	1st	111B	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	111B	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	111A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	111A	2	Joint Finishing Compound	Walls	480	SF	Good	**2% Chrysotile**
MC RC	MT	1st	111A	3	Black Floor Tile Mastic	Floor	175	SF	Good	**5% Chrysotile**
MC RC	MT	1st	111A	4	Yellow Carpet Mastic	Floor	175	SF	Good	**2% Chrysotile**
MC RC	MT	1st	111A	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	111A	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	111	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	111	2	Joint Finishing Compound	Walls	504	SF	Good	**2% Chrysotile**
MC RC	MT	1st	111	3	Black Floor Tile Mastic	Floor	195	SF	Good	**5% Chrysotile**
MC RC	MT	1st	111	4	Yellow Carpet Mastic	Floor	195	SF	Good	**2% Chrysotile**
MC RC	MT	1st	111	21	2' x 4' White Small & Large Pinhole ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	111	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	1st	112A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	1st	110A	P3	1" x 1" Brown Ceramic Floor Tile Grout & Thinset	Floor	48	SF	Good	**Presumed**
MC RC	MT	1st	110A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112B	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112B	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112B	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	1st	112B	36	White Interior Duct Insulation	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	113A	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	150	SF	Good	**Presumed**
MC RC	MT	1st	113A	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	435	SF	Good	**Presumed**
MC RC	MT	1st	113A	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	113B	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	145	SF	Good	**Presumed**
MC RC	MT	1st	113B	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	420	SF	Good	**Presumed**
MC RC	MT	1st	113B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	1 SE Stair 5	26	Navy Blue Vinyl Stair Tread w/ Mastic	Stairs	N/A	N/A	N/A	None Detected
MC RC	MT	1st	1 SE Stair 5	25	12" x 12" Light Blue w/ Blue Specks VFT & Mastic	On Landings	N/A	N/A	N/A	None Detected
MC RC	MT	1st	1 SE Stair 5	3	Black Floor Tile Mastic	Below Stairs, under carpet in storage space	300	SF	Good	**5% Chrysotile**
MC RC	MT	1st	115	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	115	3	Black Floor Tile Mastic	Floor	154	SF	Good	**5% Chrysotile**
MC RC	MT	1st	115	4	Yellow Carpet Mastic	Floor	154	SF	Good	**2% Chrysotile**
MC RC	MT	1st	115	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	115	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	115	2	Joint Finishing Compound	Walls	320	SF	Good	**2% Chrysotile**
MC RC	MT	1st	114	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	114	2	Joint Finishing Compound	Walls	425	SF	Good	**2% Chrysotile**
MC RC	MT	1st	114	3	Black Floor Tile Mastic	Floor	135	SF	Good	**5% Chrysotile**
MC RC	MT	1st	114	4	Yellow Carpet Mastic	Floor	135	SF	Good	**2% Chrysotile**
MC RC	MT	1st	114	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	114	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	114A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	114A	2	Joint Finishing Compound	Walls	515	SF	Good	**2% Chrysotile**
MC RC	MT	1st	114A	3	Black Floor Tile Mastic	Floor	205	SF	Good	**5% Chrysotile**
MC RC	MT	1st	114A	4	Yellow Carpet Mastic	Floor	205	SF	Good	**2% Chrysotile**
MC RC	MT	1st	114A	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	114A	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	104D	N/A	No HA Materials Present	N/A	N/A	N/A	N/A	N/A
MC RC	MT	1st	104A	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	1st	102	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
~~MC RC~~	~~MT~~	~~1st~~	~~102~~	~~2~~	~~Joint Finishing Compound~~	~~Walls~~	~~200~~	~~SF~~	~~Good~~	~~**2% Chrysotile**~~
MC RC	MT	1st	102	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	102	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	102	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	101	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
~~MC RC~~	~~MT~~	~~1st~~	~~101~~	~~2~~	~~Joint Finishing Compound~~	~~Walls~~	~~740~~	~~SF~~	~~Good~~	~~**2% Chrysotile**~~
MC RC	MT	1st	101	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	101	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	101A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
~~MC RC~~	~~MT~~	~~1st~~	~~101A~~	~~2~~	~~Joint Finishing Compound~~	~~Walls~~	~~190~~	~~SF~~	~~Good~~	~~**2% Chrysotile**~~

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	1st	101A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	101A	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	101B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
~~MC RC~~	~~MT~~	~~1st~~	~~101B~~	~~2~~	~~Joint Finishing Compound~~	~~Walls~~	~~380~~	~~SF~~	~~Good~~	**~~2% Chrysotile~~**
MC RC	MT	1st	101B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	101B	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	101C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
~~MC RC~~	~~MT~~	~~1st~~	~~101C~~	~~2~~	~~Joint Finishing Compound~~	~~Walls~~	~~350~~	~~SF~~	~~Good~~	**~~2% Chrysotile~~**
MC RC	MT	1st	101C	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	101C	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	113	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	113	2	Joint Finishing Compound	Walls	2765	SF	Good	**2% Chrysotile**
MC RC	MT	1st	113	3	Black Floor Tile Mastic	Floor	3438	SF	Good	**5% Chrysotile**
MC RC	MT	1st	113	4	Yellow Carpet Mastic	Floor	3438	SF	Good	**2% Chrysotile**
MC RC	MT	1st	113	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	113	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	113	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	113	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	116	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	116	2	Joint Finishing Compound	Walls	3945	SF	Good	**2% Chrysotile**
MC RC	MT	1st	116	3	Black Floor Tile Mastic	Floor	3897	SF	Good	**5% Chrysotile**
MC RC	MT	1st	116	4	Yellow Carpet Mastic	Floor	3897	SF	Good	**2% Chrysotile**
MC RC	MT	1st	116	24	Black Vinyl Cove Base w/ Mastic	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	116	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	116	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	116	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	116	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	190	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	1st	190	2	Joint Finishing Compound	Walls	1200	SF	Good	**2% Chrysotile**
MC RC	MT	1st	190	45	18" x 18" Orange VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	1st	190	46	18" x 18" Marble Pattern VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	1st	190	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	1st	190	14	White Pipe Insulation Mastic	Plenum	N/A	N/A	N/A	None Detected
MC RC	MT	1st	190	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	104C	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	60	SF	Good	**Presumed**
MC RC	MT	1st	104C	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	270	SF	Good	**Presumed**
MC RC	MT	1st	104C	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	1st	104B	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	60	SF	Good	**Presumed**
MC RC	MT	1st	104B	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	270	SF	Good	**Presumed**
MC RC	MT	1st	104B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002	23	Navy Blue Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002	3	Black Floor Tile Mastic	Floor	3600	SF	Good	**5% Chrysotile**
MC RC	MT	Ground	002	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002	2	Joint Finishing Compound	Walls	2900	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	002C	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	Ground	002R	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002R	2	Joint Finishing Compound	Walls	615	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	002R	3	Black Floor Tile Mastic	Floor	218	SF	Good	**5% Chrysotile**
MC RC	MT	Ground	002R	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002R	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001D	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	60	SF	Good	**Presumed**
MC RC	MT	Ground	001D	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	**Presumed**
MC RC	MT	Ground	001D	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001E	P1	12" x 12" Gray Ceramic Floor Tile Grout & Thinset	Floor	60	SF	Good	**Presumed**
MC RC	MT	Ground	001E	P2	12" x 12" Tan Ceramic Wall Tile Grout & Adhesive	Walls	240	SF	Good	**Presumed**
MC RC	MT	Ground	001E	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	090	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	090	2	Joint Finishing Compound	Walls	1185	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	090	43	18" x 18" Gray/Red w/ Black Spots VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	090	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	090	42	Brown Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001	2	Joint Finishing Compound	Walls	620	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	001	43	18" x 18" Gray/Red w/ Black Spots VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001	38	12" x 12" Gray/Orange w/ Black Spots VFT	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001	42	Brown Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001	44	Black Vinyl Threshold Strip	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001	P7	Multicolor Ceramic Wall Tile Grout & Adhesive	Wall	120	SF	Good	**Presumed**
MC RC	MT	Ground	001A	43	18" x 18" Gray/Red w/ Black Spots VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001A	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001A	2	Joint Finishing Compound	Walls	252	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	001A	42	Brown Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002B	19	12" x 12" Light Blue w/ Black Spots VFT & Mastic	Throughout--Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002B	2	Joint Finishing Compound	Walls	400	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	002B	41	Dark Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	002B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001B	2	Joint Finishing Compound	Walls	400	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	001B	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001B	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	001C	N/A	No HA Materials Present	N/A	N/A	N/A	N/A	N/A
MC RC	MT	Ground	020	32	Finished Plaster	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020	2	Joint Finishing Compound	Walls	1665	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	020	3	Black Floor Tile Mastic	Floor	355	SF	Good	**5% Chrysotile**
MC RC	MT	Ground	020	35	12" x 12" Off-White w/ Tan Specks VFT	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020	4	Yellow Carpet Mastic	Floor	3200	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	020	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	Ground	020	16	Off-White Pipe Wrap Mastic	Plenum-Near Mech Room and Along Exterior Wall	215	LF	Good	**5% Chrysotile**
MC RC	MT	Ground	020E	16	Off-White Pipe Wrap Mastic	Ceiling	172	LF	Good	**5% Chrysotile**
MC RC	MT	Ground	020E	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020E	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020F	22	12" x 12" Navy Blue w/ Light Blue Specks VFT	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020F	3	Black Floor Tile Mastic	Floor	110	SF	Good	**5% Chrysotile**
MC RC	MT	Ground	020F	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020F	2	Joint Finishing Compound	Walls	374	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	020F	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020F	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020G	3	Black Floor Tile Mastic	Below Carpet	840	SF	Good	**5% Chrysotile**
MC RC	MT	Ground	020G	35	12" x 12" Off-White w/ Tan Specks VFT	Below Carpet	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020G	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020G	2	Joint Finishing Compound	Walls	1044	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	020G	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020G	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024A	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024A	40	Gray Spray Applied Fireproofing	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	020G	16	Off-White Pipe Wrap Mastic	Plenum	80	LF	Good	**5% Chrysotile**
MC RC	MT	Ground	024B	2	Joint Finishing Compound	Walls	420	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	024B	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024B	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	021	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	021	2	Joint Finishing Compound	Walls	430	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	021	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	021	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	021	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024C	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024C	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	024C	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	019	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	019	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	019	2	Joint Finishing Compound	Walls	120	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	019	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	019	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	018	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	018	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	018	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	018	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	018	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	018	2	Joint Finishing Compound	Walls	1080	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	022	P6	Gray Ceramic Floor & Wall Tile Grout & Adhesive	Floors & Wall	127	SF	Good	~~**Presumed**~~
MC RC	MT	Ground	022	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	Ground	022	2	Joint Finishing Compound	Walls	192	SF	Good	2% Chrysotile
MC RC	MT	Ground	022	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	023	P6	Gray Ceramic Floor & Wall Tile Grout & Adhesive	Floors & Wall	265	SF	Good	~~Presumed~~
MC RC	MT	Ground	023	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	023	2	Joint Finishing Compound	Walls	450	SF	Good	2% Chrysotile
MC RC	MT	Ground	023	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	025	P6	Gray Ceramic Floor & Wall Tile Grout & Adhesive	Floors & Wall	253	SF	Good	~~Presumed~~
MC RC	MT	Ground	025	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	025	2	Joint Finishing Compound	Walls	450	SF	Good	2% Chrysotile
MC RC	MT	Ground	025	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026	2	Joint Finishing Compound	Walls	315	SF	Good	2% Chrysotile
MC RC	MT	Ground	026	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026D	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026D	2	Joint Finishing Compound	Walls	115	SF	Good	2% Chrysotile
MC RC	MT	Ground	026A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026A	2	Joint Finishing Compound	Walls	315	SF	Good	2% Chrysotile
MC RC	MT	Ground	026A	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026A	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026B	2	Joint Finishing Compound	Walls	395	SF	Good	2% Chrysotile
MC RC	MT	Ground	026B	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026B	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026C	2	Joint Finishing Compound	Walls	240	SF	Good	2% Chrysotile
MC RC	MT	Ground	026C	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026C	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	026C	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	004	3	Black Floor Tile Mastic	Floor	57	SF	Good	5% Chrysotile
MC RC	MT	Ground	004	37	12" x 12" White w/ Black Specks VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	004	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	004	2	Joint Finishing Compound	Walls	384	SF	Good	2% Chrysotile
MC RC	MT	Ground	004	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	004	15	Red Fire Stop	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	005	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	005	2	Joint Finishing Compound	Walls	432	SF	Good	2% Chrysotile
MC RC	MT	Ground	005	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	005	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	005	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	005	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	006	P3	1" x 1" Brown Ceramic Floor Tile Grout & Thinset	Floor	50	SF	Good	Presumed
MC RC	MT	Ground	006	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	006	16	Off-White Pipe Wrap Mastic	Plenum	25	LF	Good	5% Chrysotile
MC RC	MT	Ground	008	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	008	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	008	2	Joint Finishing Compound	Walls	400	SF	Good	2% Chrysotile

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	Ground	008	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	015	54	Wood Pattern VSG & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	015	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	015	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	015	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	015	2	Joint Finishing Compound	Walls	535	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	016	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	016	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	016	2	Joint Finishing Compound	Walls	900	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	016	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	013	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	013	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	013	2	Joint Finishing Compound	Walls	414	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	013	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	017	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	017	41	Dark Gray Vinyl Cove Base w/ Mastic	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	017	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	017	2	Joint Finishing Compound	Walls	792	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	017	5	2' x 4' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	093	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	093	2	Joint Finishing Compound	Walls	936	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	093	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	093	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	093	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	094	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	094	2	Joint Finishing Compound	Walls	1440	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	094	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	094	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	094	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	092	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	092	41	Dark Gray Vinyl Cove Base w/ Mastic	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	095	41	Dark Gray Vinyl Cove Base w/ Mastic	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	095	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	095	2	Joint Finishing Compound	Walls	740	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	095	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	095	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	095	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	096	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	096	2	Joint Finishing Compound	Walls	624	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	096	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	096	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	096	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	097	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	097	2	Joint Finishing Compound	Walls	756	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	097	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	097	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	097	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	012	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected

BUILDING CONSTRUCTION MATERIALS

Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	Ground	012	2	Joint Finishing Compound	Walls	480	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	012	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	012	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	011	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	011	2	Joint Finishing Compound	Walls	396	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	011	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	011	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	098	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	098	2	Joint Finishing Compound	Walls	252	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	098	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	098	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	098	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	098	P5	Fire Door	Walls	2	Door	Good	**Presumed**
MC RC	MT	Ground	010	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	010	2	Joint Finishing Compound	Walls	1296	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	010	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	010	39	18" x 18" Gray VFT & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	010	P4	Vibration Dampening Cloth	HVAC Ductwork	5	SF	Good	**Presumed**
MC RC	MT	Ground	010	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	010	P5	Fire Door	Walls	2	Door	Good	**Presumed**
MC RC	MT	Ground	010	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009P	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009P	2	Joint Finishing Compound	Walls	460	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009P	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009P	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009N	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009N	2	Joint Finishing Compound	Walls	415	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009N	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009N	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009M	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009M	2	Joint Finishing Compound	Walls	415	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009M	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009M	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009L	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009L	2	Joint Finishing Compound	Walls	425	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009L	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009L	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009K	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009K	2	Joint Finishing Compound	Walls	425	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009K	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009K	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009	2	Joint Finishing Compound	Walls	1800	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009	6	2' x 2' White Pinhole & Puncture ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009A	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009A	2	Joint Finishing Compound	Walls	465	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009A	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected

BOGGS ENVIRONMENTAL CONSULTANTS

BUILDING CONSTRUCTION MATERIALS

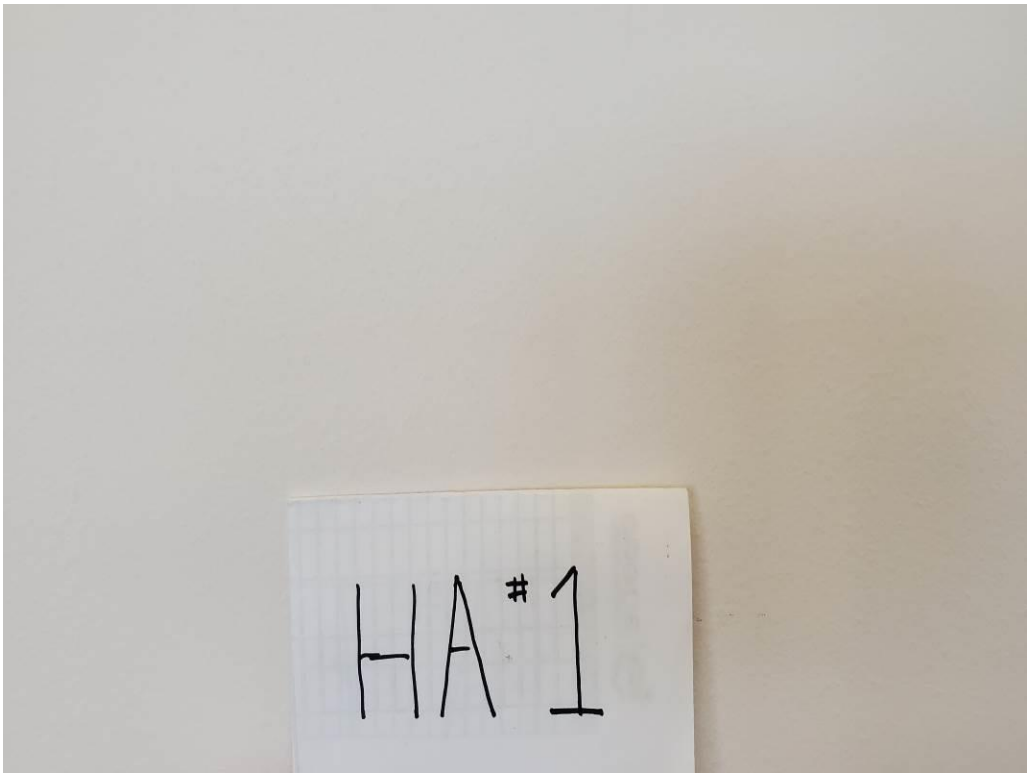
Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	Ground	009A	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009B	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009B	2	Joint Finishing Compound	Walls	374	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009B	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009B	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009C	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009C	2	Joint Finishing Compound	Walls	408	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009C	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009C	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009D	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009D	2	Joint Finishing Compound	Walls	238	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009D	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009D	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009E	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009E	2	Joint Finishing Compound	Walls	442	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009E	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009E	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009J	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009J	2	Joint Finishing Compound	Walls	400	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009J	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009J	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009H	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009H	2	Joint Finishing Compound	Walls	435	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009H	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009H	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009F	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009F	2	Joint Finishing Compound	Walls	395	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009F	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009F	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009G	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009G	2	Joint Finishing Compound	Walls	408	SF	Good	**2% Chrysotile**
MC RC	MT	Ground	009G	18	Gray Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Ground	009G	8	2' x 2' White Textured ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	Stairs	Stair 3	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Stairs	Stair 3	2	Joint Finishing Compound	Walls	740	SF	Good	**2% Chrysotile**
MC RC	MT	Stairs	Stair 3	P5	Fire Door	Walls	3	Door	Good	**Presumed**
MC RC	MT	Stairs	Stair 4	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Stairs	Stair 4	2	Joint Finishing Compound	Walls	740	SF	Good	**2% Chrysotile**
MC RC	MT	Stairs	Stair 4	P5	Fire Door	Walls	10	Door	Good	**Presumed**
MC RC	MT	Stairs	Stair 2	24	Black Vinyl Cove Base w/ Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Stairs	Stair 2	31	12" x 12" Marble Pattern Flooring VFT & Mastic	Throughout	N/A	N/A	N/A	None Detected
MC RC	MT	Stairs	Stair 2	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	Stairs	Stair 2	2	Joint Finishing Compound	Walls	324	SF	Good	**2% Chrysotile**
MC RC	MT	Stairs	Stair 2	29	2' x 2' White Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2SE S5	25	12" x 12" Light Blue w/ Blue Specks VFT & Mastic	On Landings	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2SE S5	3	Black Floor Tile Mastic	Floor	220	SF	Good	**5% Chrysotile**
MC RC	MT	2nd	2SE S5	26	Navy Blue Vinyl Stair Tread w/ Mastic	Stairs	N/A	N/A	N/A	None Detected
MC RC	MT	2nd	2SE S5	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected

BUILDING CONSTRUCTION MATERIALS

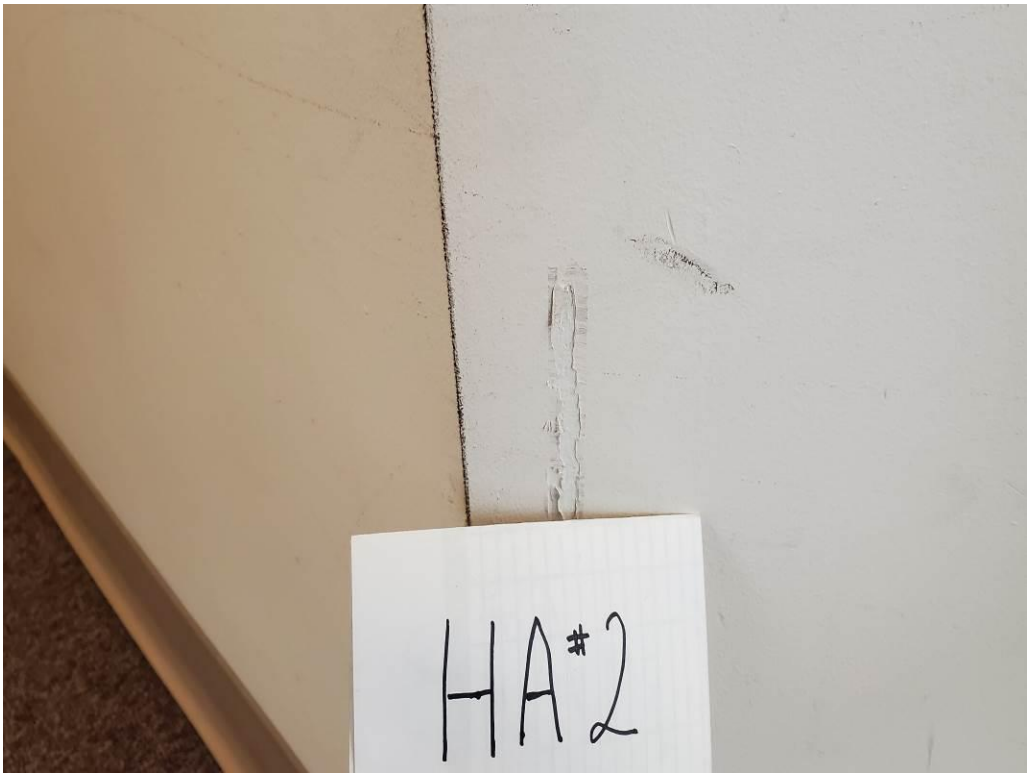
Facility	Bldg #	Floor	Room #	HA #	Material Description	Material Location w/in area	Quantity	Unit	Condition	Asbestos %
MC RC	MT	2nd	2SE S5	2	Joint Finishing Compound	Walls	155	SF	Good	**2% Chrysotile**
MC RC	MT	3rd	3SE S5	25	12" x 12" Light Blue w/ Blue Specks VFT & Mastic	On Landings	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	3SE S5	3	Black Floor Tile Mastic	Stair Landing	395	SF	Good	**5% Chrysotile**
MC RC	MT	3rd	3SE S5	26	Navy Blue Vinyl Stair Tread w/ Mastic	Stairs	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	3SE S5	28	2' x 2' Off-White Inset Pinhole & Fissure ACT	Ceiling	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	3SE S5	1	Gypsum Board Sheeting	Walls	N/A	N/A	N/A	None Detected
MC RC	MT	3rd	3SE S5	2	Joint Finishing Compound	Walls	55	SF	Good	**2% Chrysotile**
MC RC	MT	Elv	Elev 3	53	Wood Pattern VSG & Mastic	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Elv	Elev 1	47	Yellow Textured VFT	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Elv	Elev 1	3	Black Floor Tile Mastic	Floor	20	SF	Good	**5% Chrysotile**
MC RC	MT	Elv	Elev 2	47	Yellow Textured VFT	Floor	N/A	N/A	N/A	None Detected
MC RC	MT	Elv	Elev 2	3	Black Floor Tile Mastic	Floor	20	SF	Good	**5% Chrysotile**
MC RC	MT	Bsmt	B1	49	Tan Pin Mastic	Ceiling	2235	SF	Good	**5% Chrysotile**
MC RC	MT	Bsmt	B2	49	Tan Pin Mastic	Ceiling	480	SF	Good	**5% Chrysotile**
MC RC	MT	Bsmt	B1	14	White Pipe Insulation Mastic	Around Pipes	N/A	N/A	N/A	None Detected
MC RC	MT	Bsmt	B1	17	Gray Metal Duct Seam Sealant	Around Ducts	N/A	N/A	N/A	None Detected

APPENDIX D

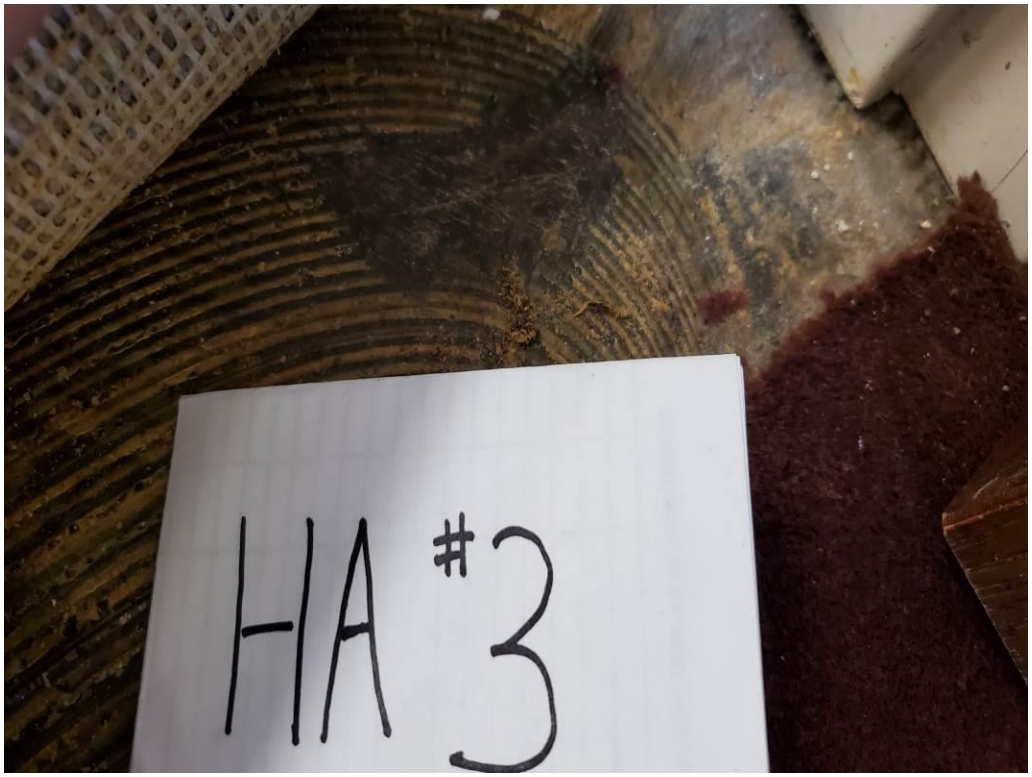
HOMOGENEOUS AREA PHOTO SHEET



HA #1 – Gypsum Board Sheeting

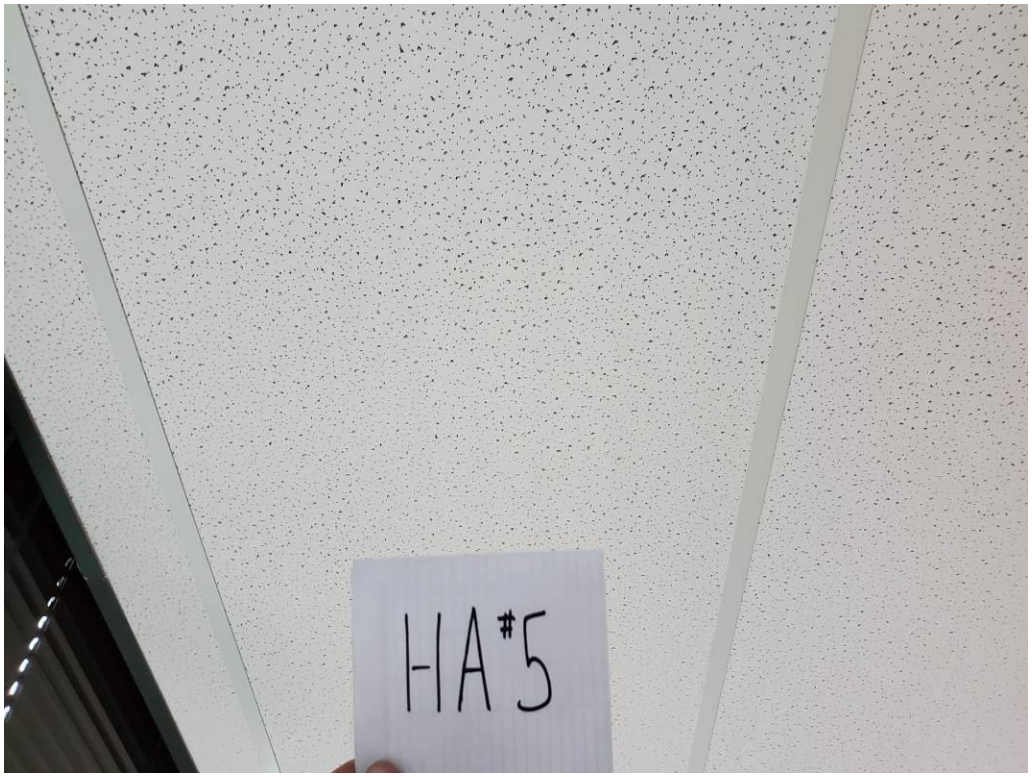


HA #2 – Joint Finishing Compound

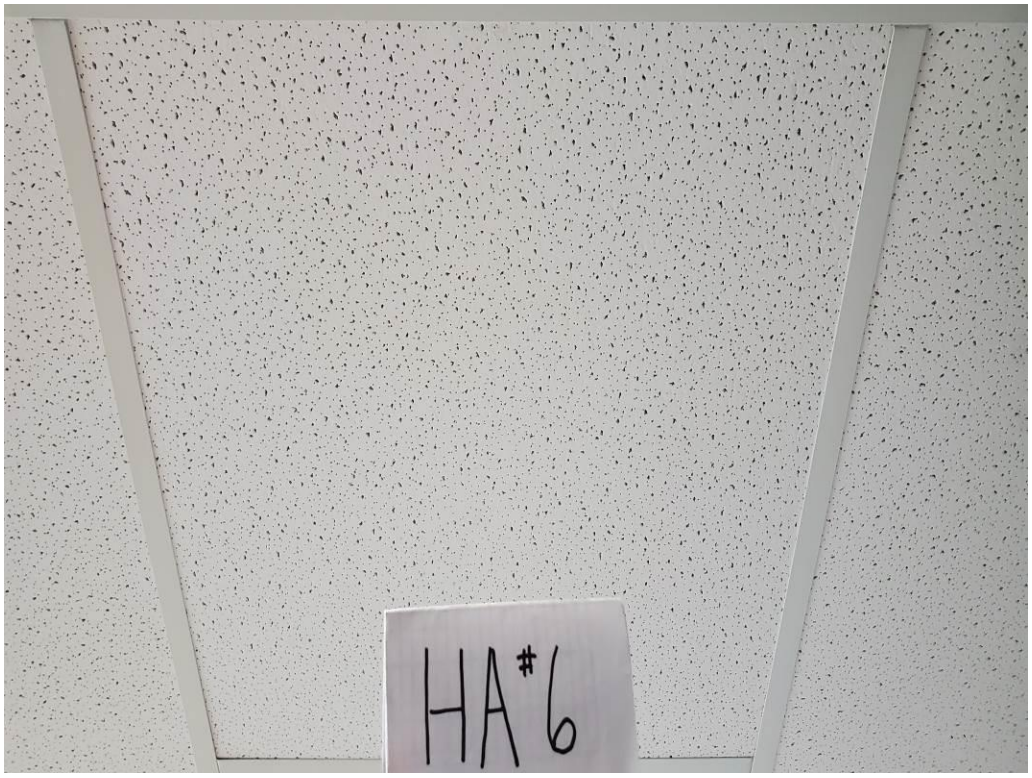


HA #3 – Black Floor Tile Mastic

HA #4 – Yellow Carpet Mastic

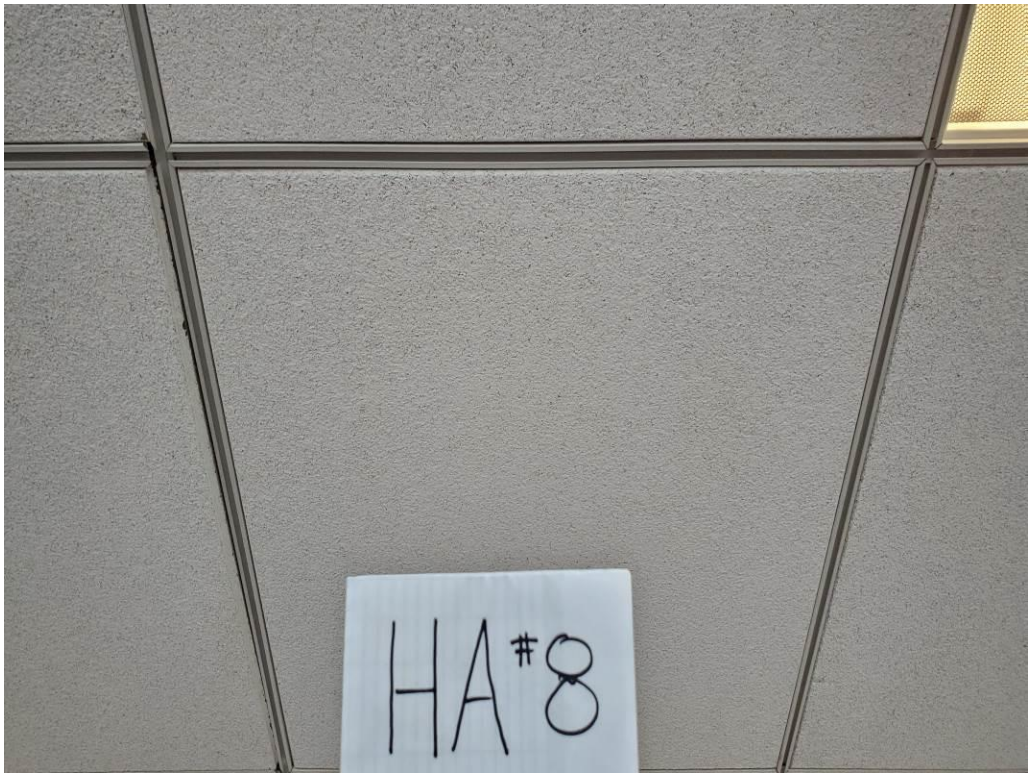


HA #5 – 2’x4’ White Pinhole & Puncture ACT

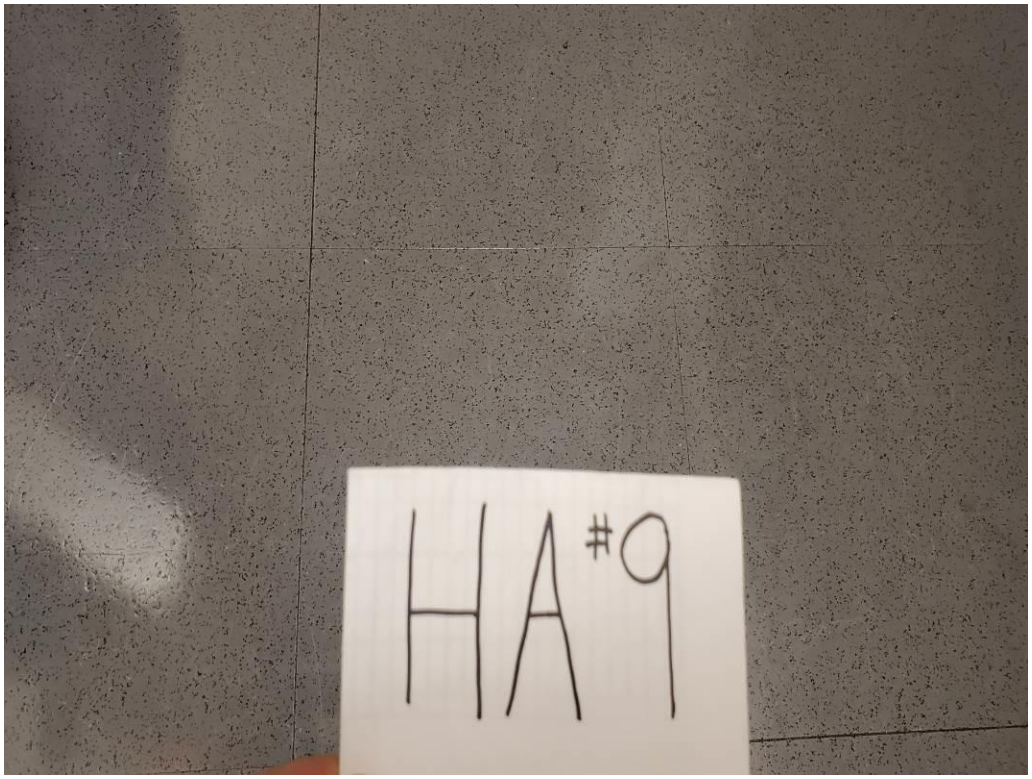


HA #6 – 2’x2’ White Pinhole & Puncture ACT

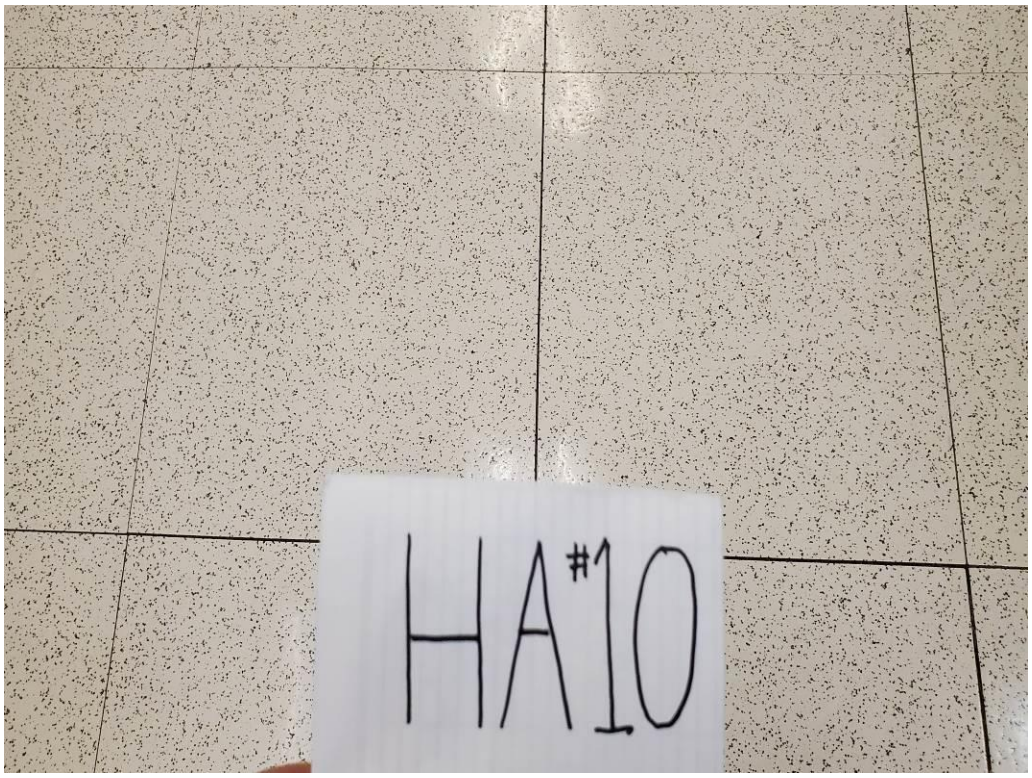
HA #7 – Tan Vinyl Cove Base w/ Mastic



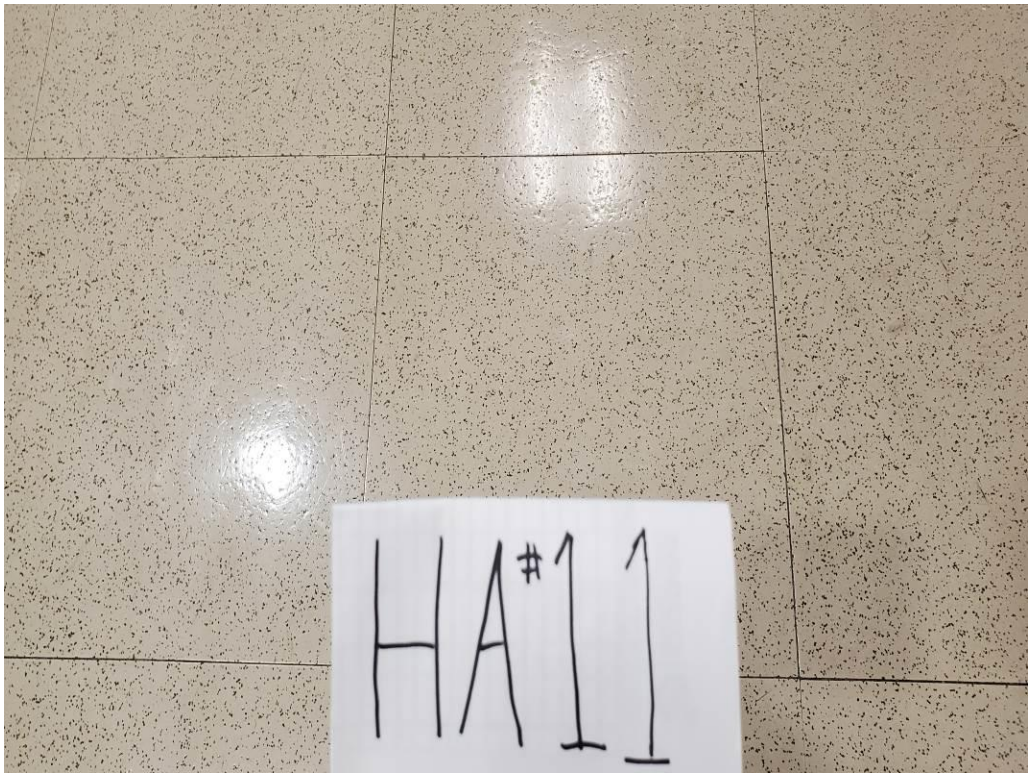
HA #8 – 2'x2' White Textured ACT



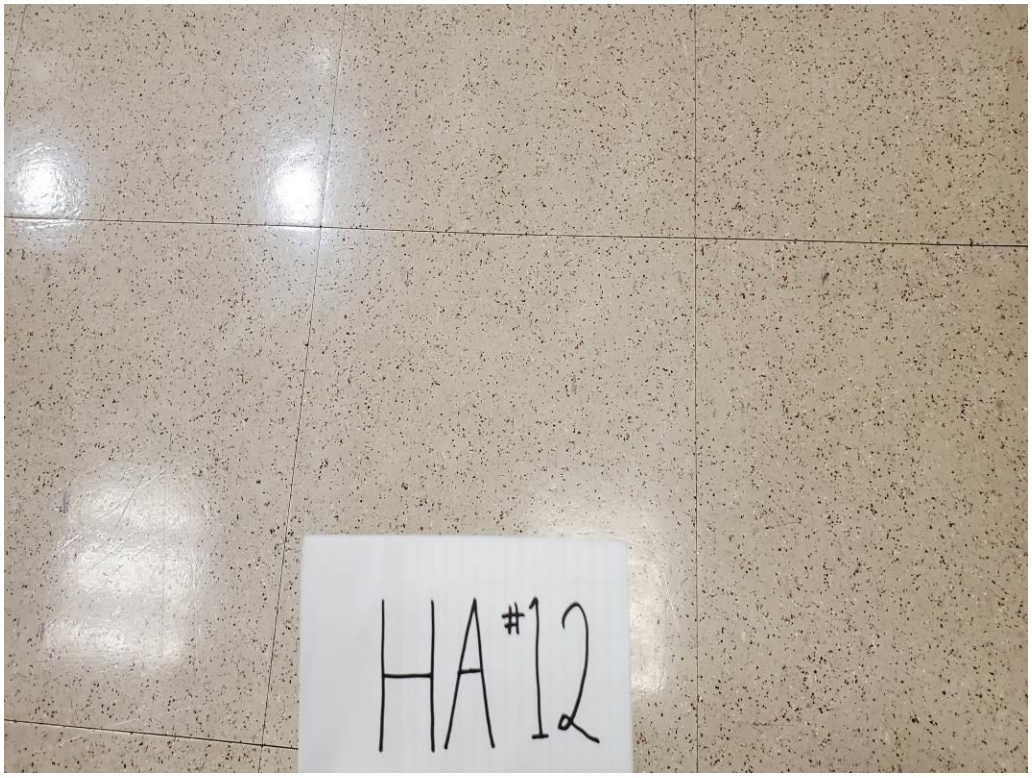
HA #9 – 12”x12” Dark Blue w/ Black Spots VFT & Mastic



HA #10 – 12”x12” Off-White w/ Black Spots VFT & Mastic



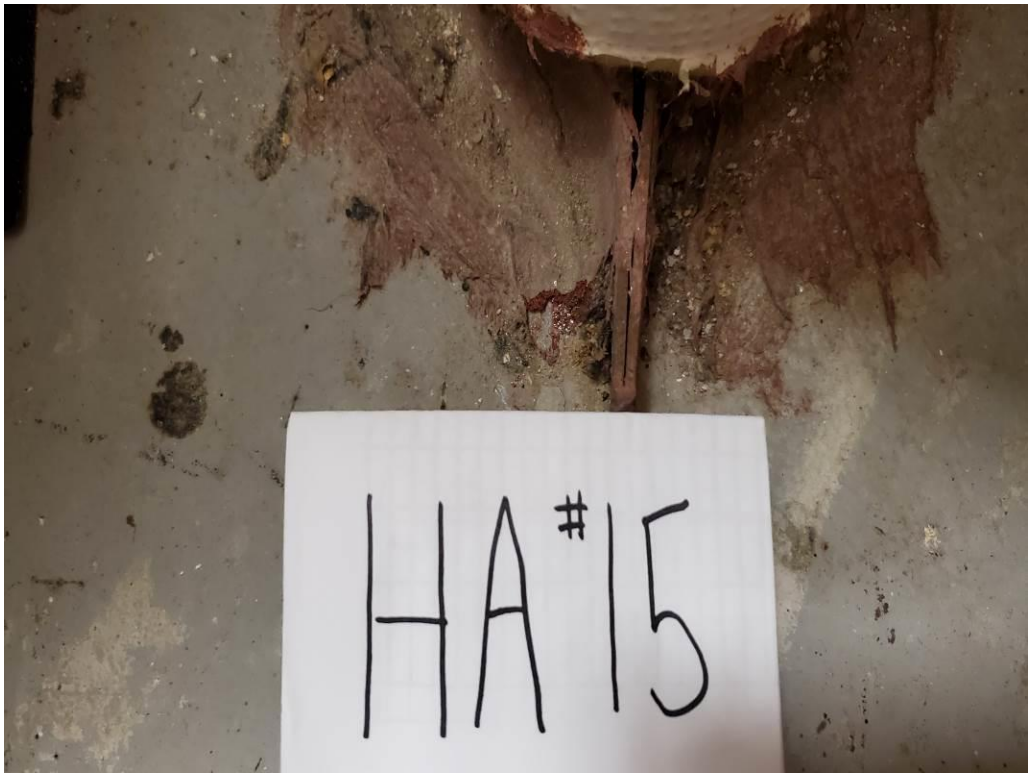
HA #11 – 12”x12” Brown w/ Black Spots VFT & Mastic



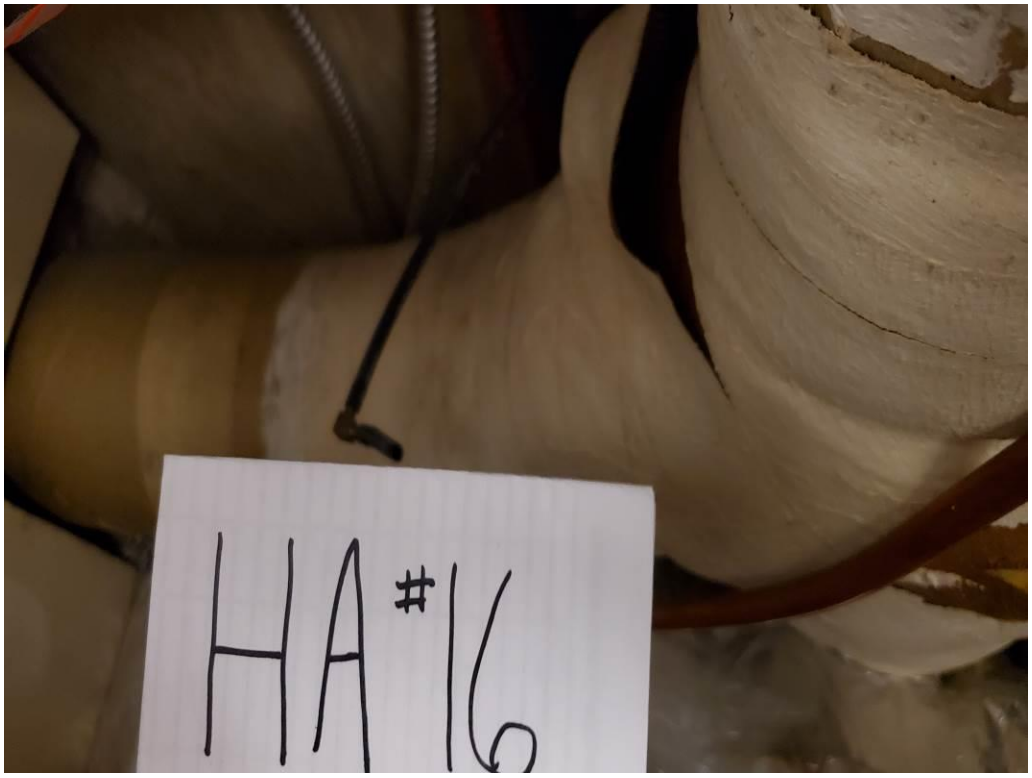
HA #12 – 12”x12” Pink w/ Multicolored Spots VFT & Mastic

HA #13 – Brown Metal Duct Seam Sealant

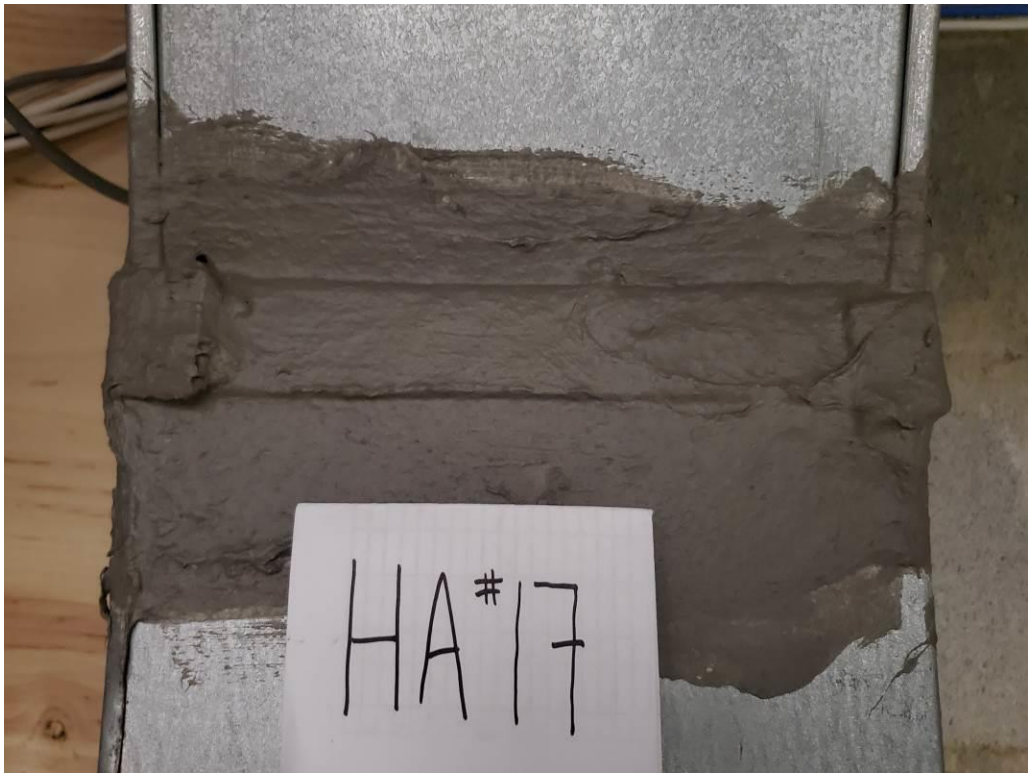
HA #14 – White Pipe Insulation Mastic



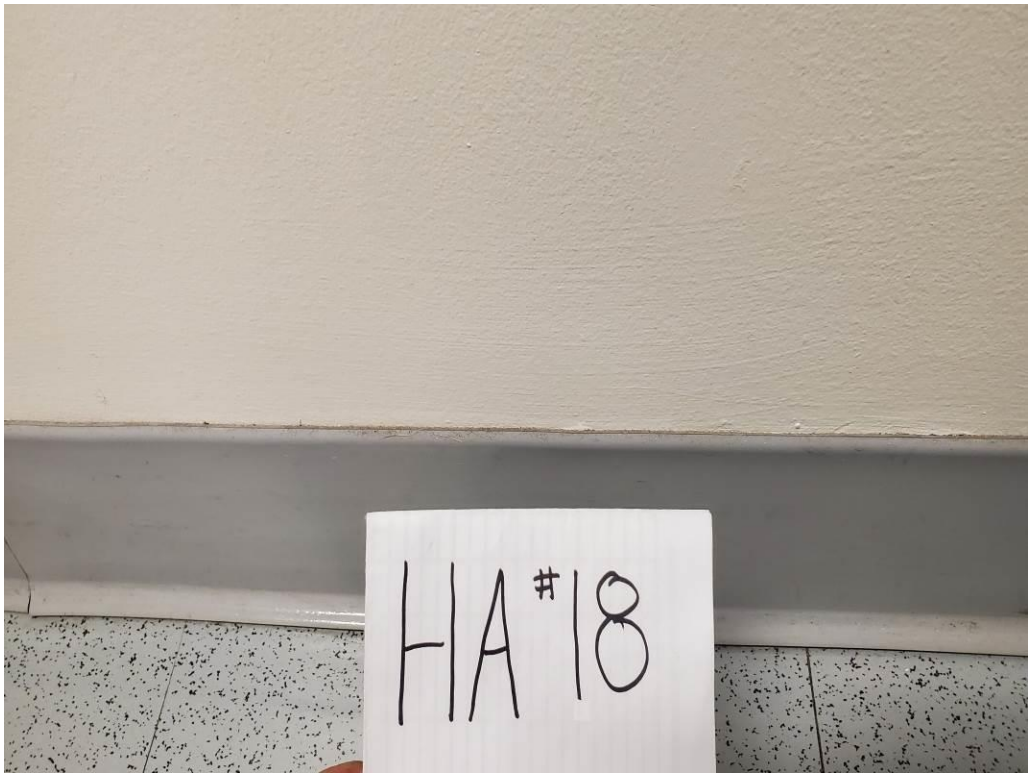
HA #15 – Red Fire Stop



HA #16 – Off-White Pipe Wrap Mastic

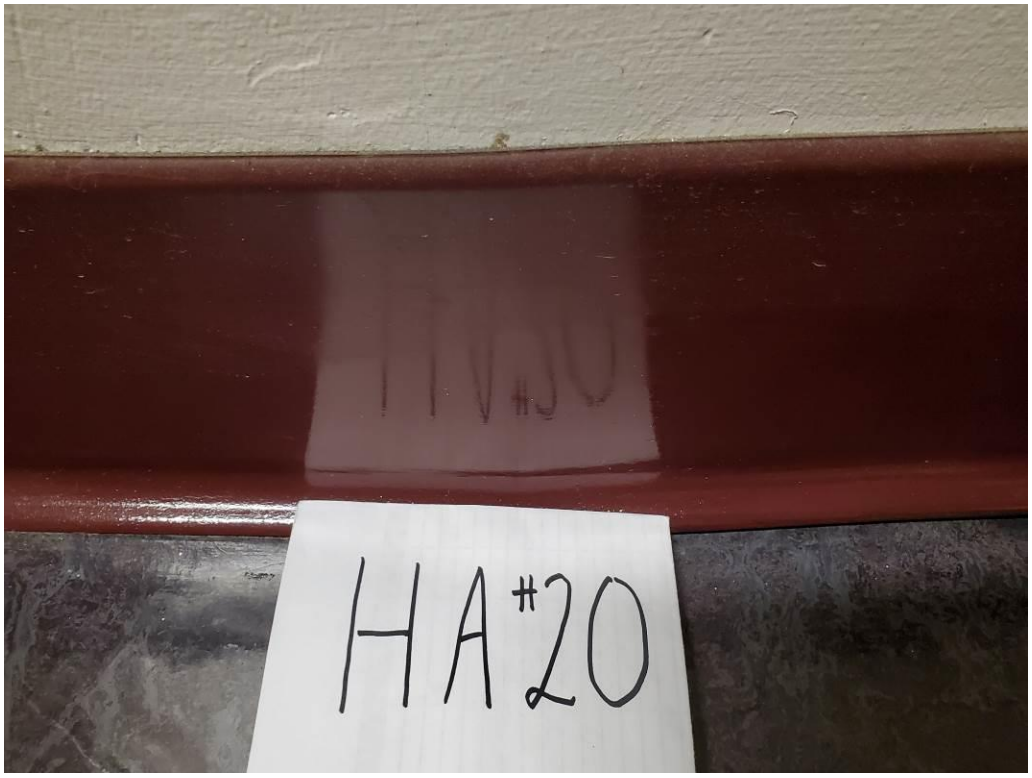


HA #17 – Gray Metal Duct Seam Sealant

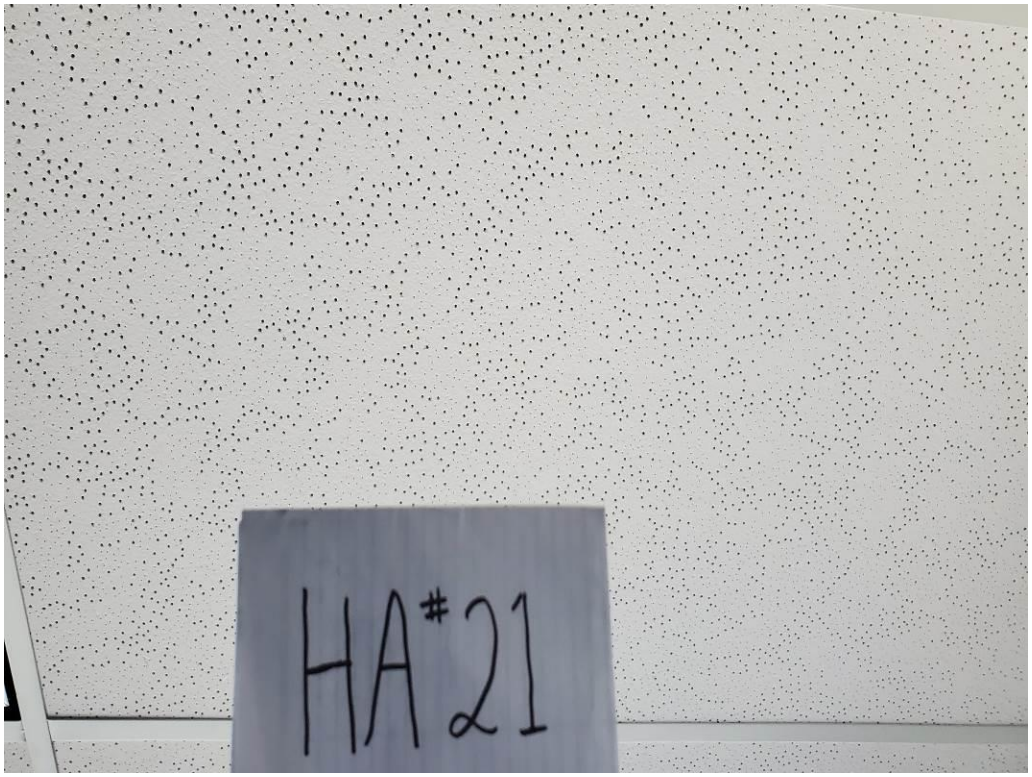


HA #18 – Gray Vinyl Cove Base w/ Mastic

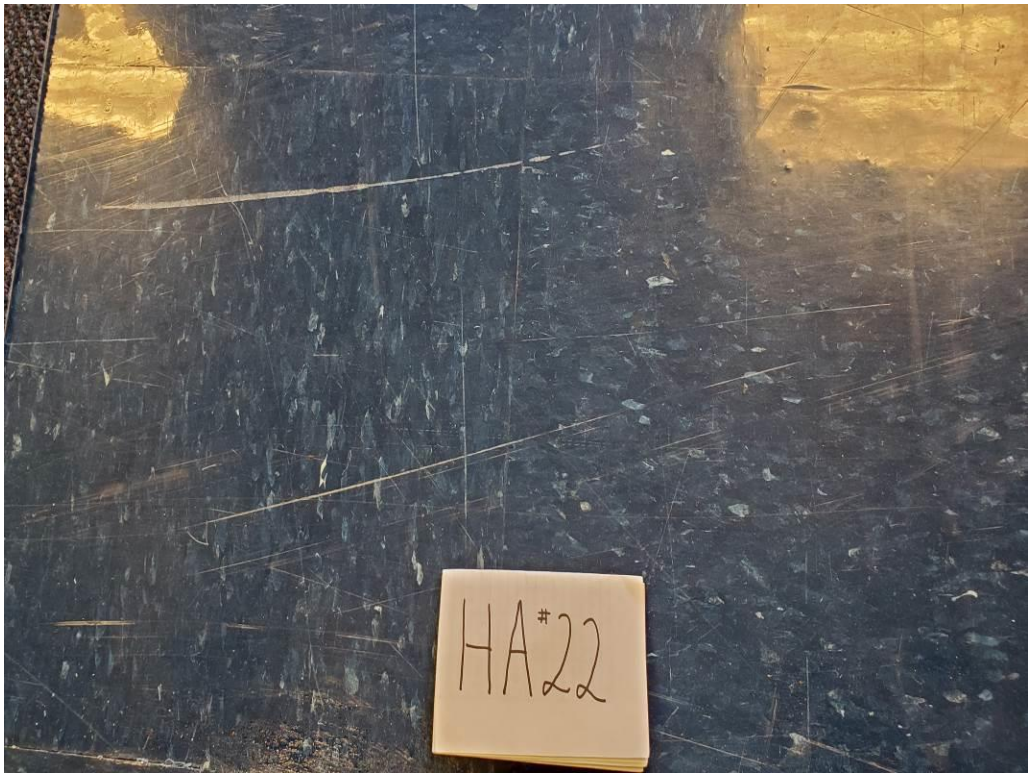
HA #19 – 12”x12” Light Blue w/ Black Spots VFT & Mastic



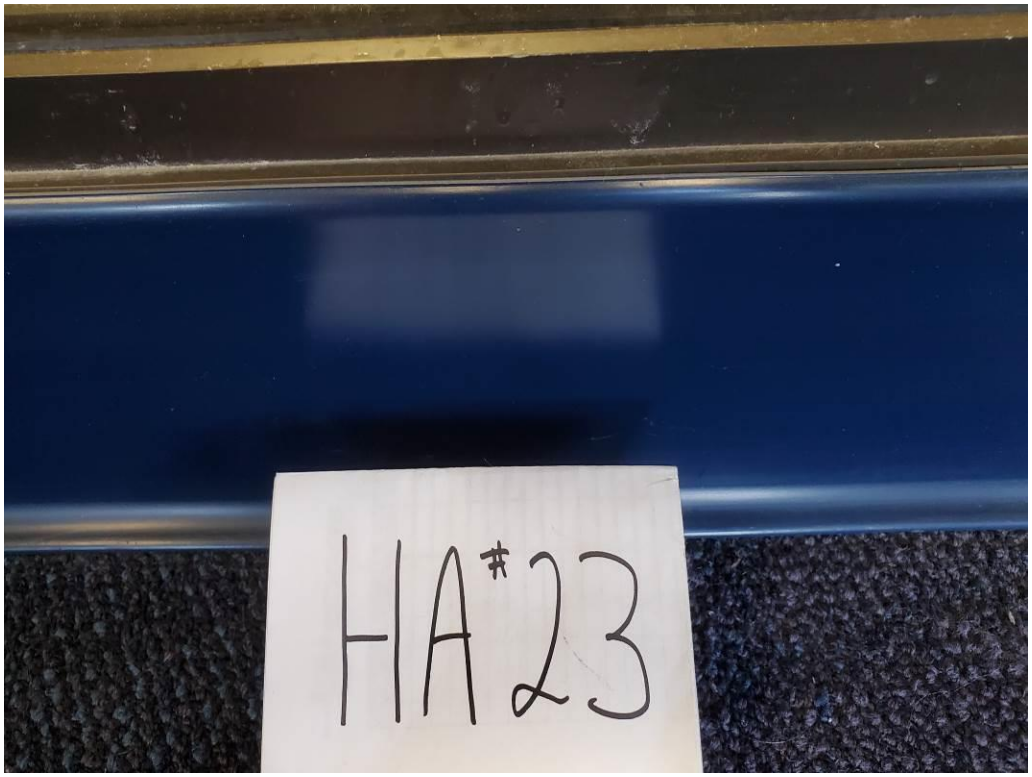
HA #20 – Maroon Vinyl Cove Base w/ Mastic



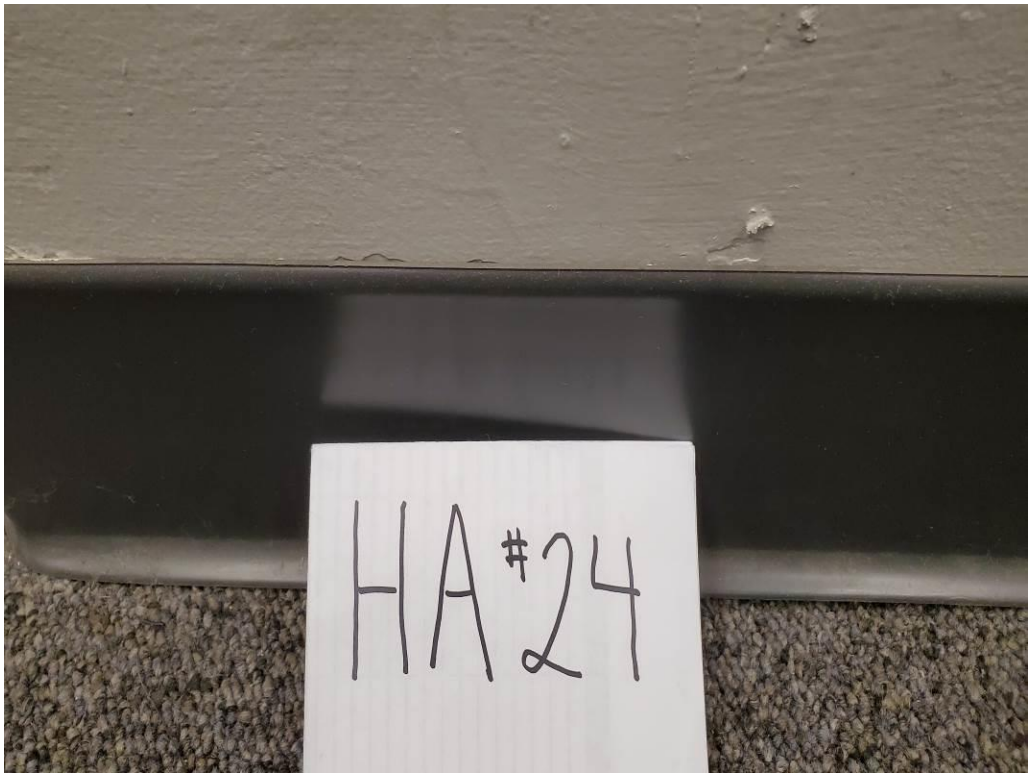
HA #21 – 2’x4’ White Small & Large Pinhole ACT



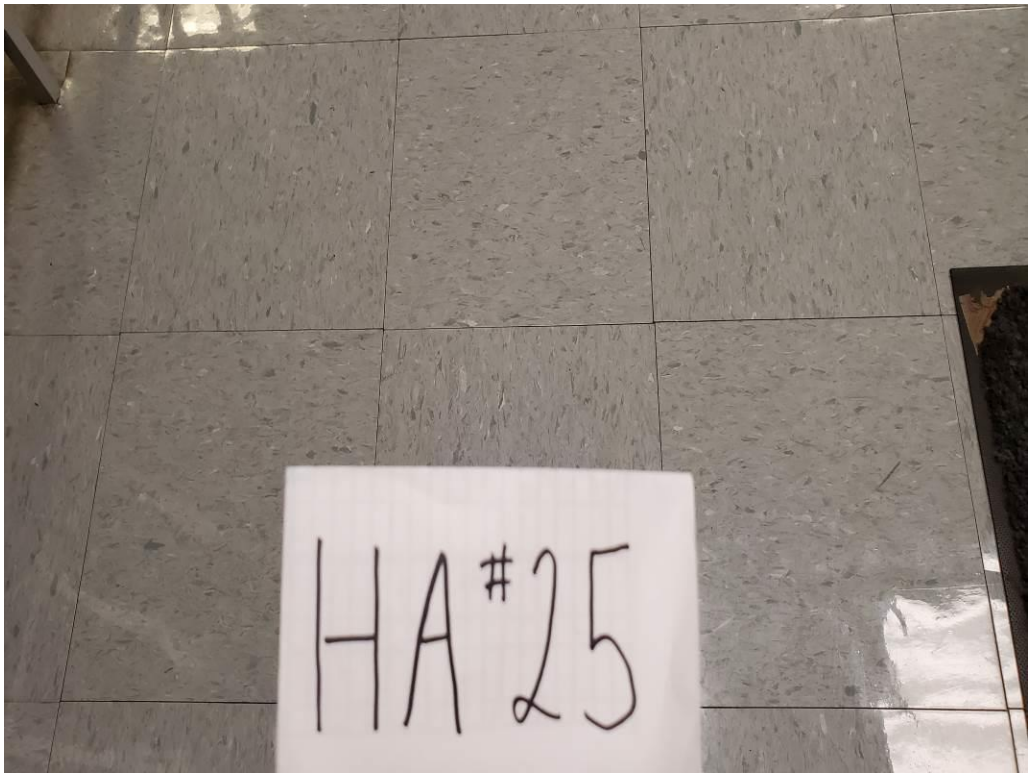
HA #22 – 12”x12” Navy Blue w/ Light Blue Specks VFT & Mastic



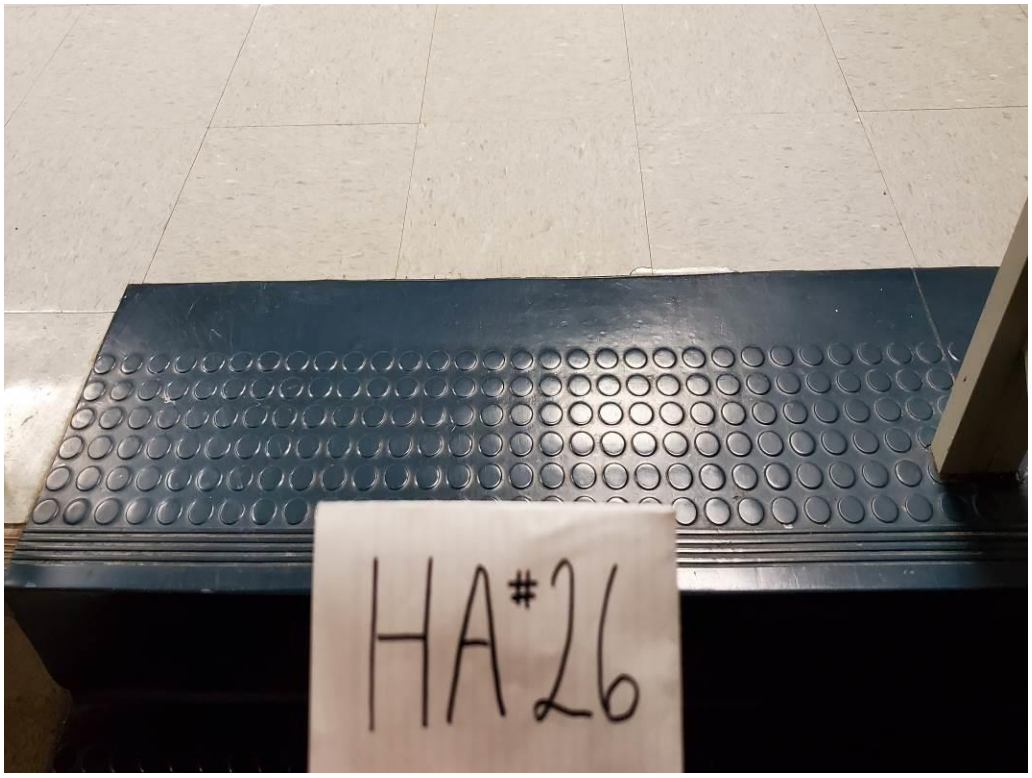
HA #23 – Navy Blue Vinyl Cove Base w/ Mastic



HA #24 – Black Vinyl Cove Base w/ Mastic

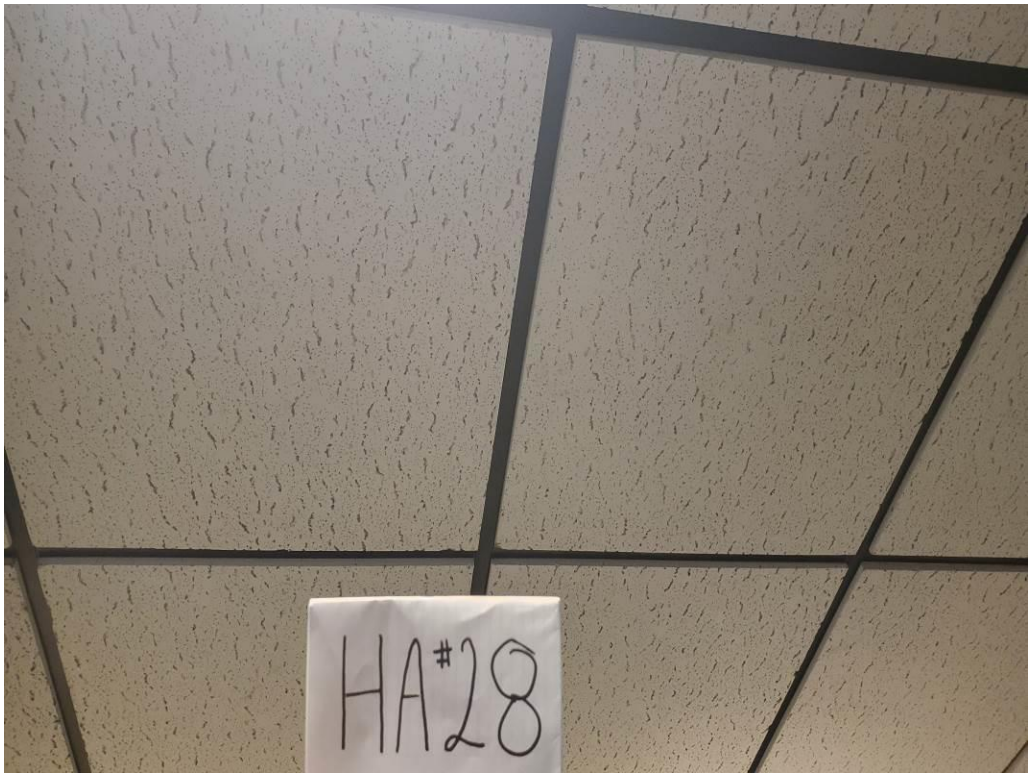


HA #25 – 12”x12” Light Blue w/ Blue Specks VFT & Mastic

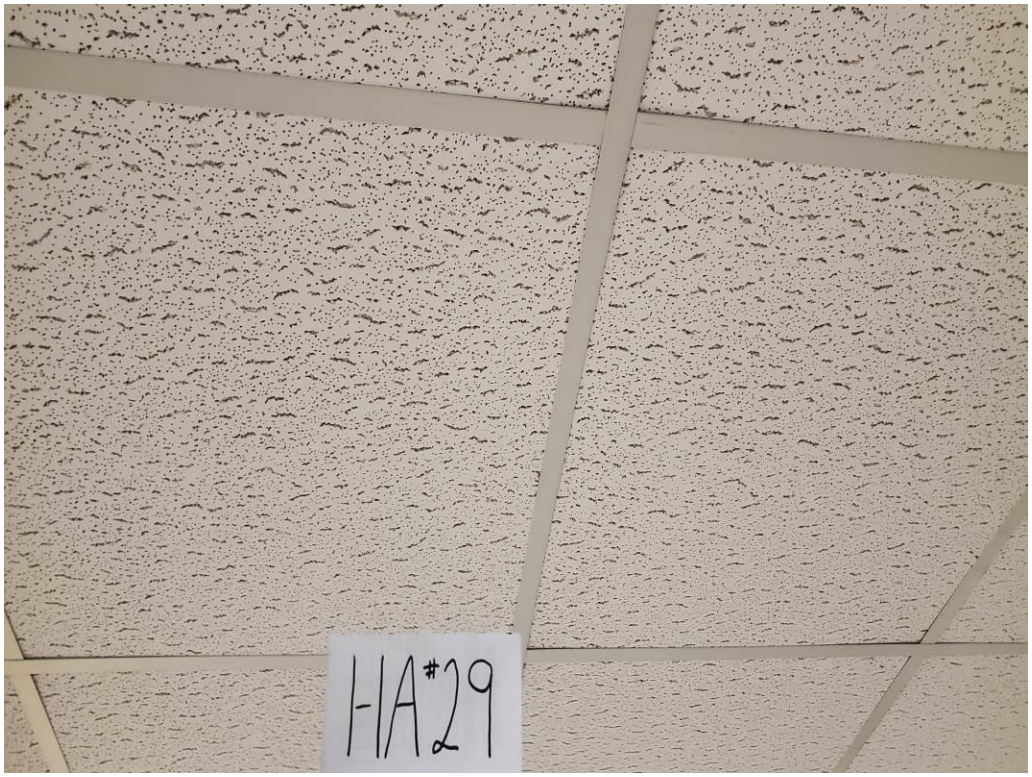


HA #26 – Navy Blue Vinyl Stair Tread w/ Mastic

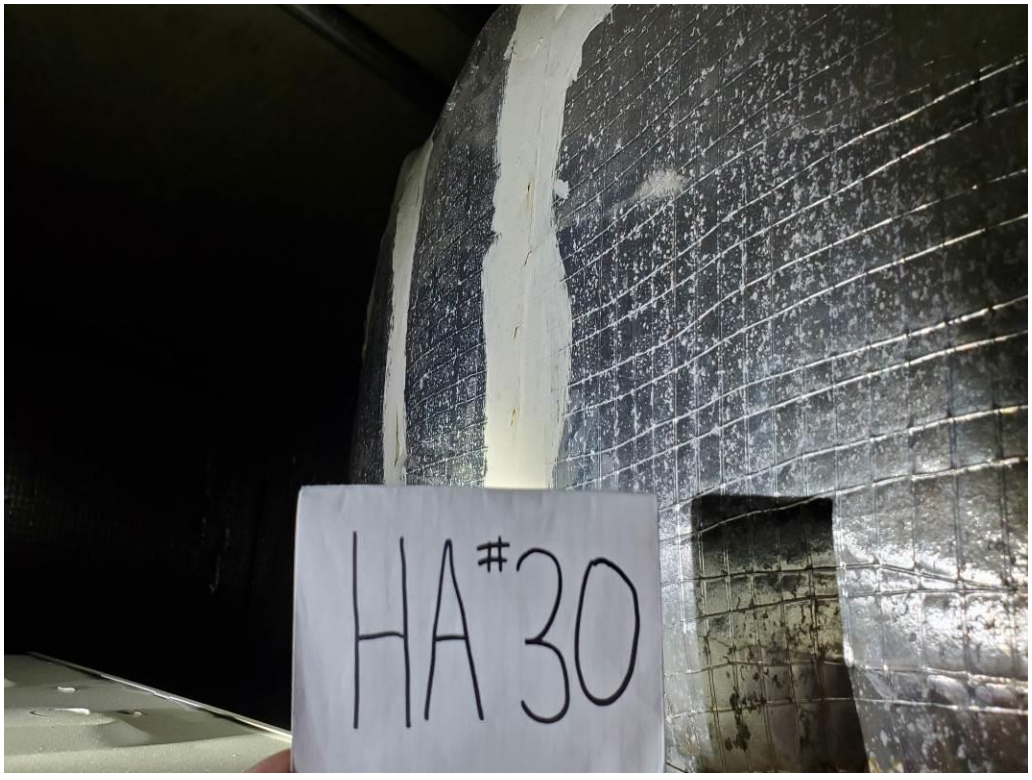
HA #27 – Beige VFT Under Carpet



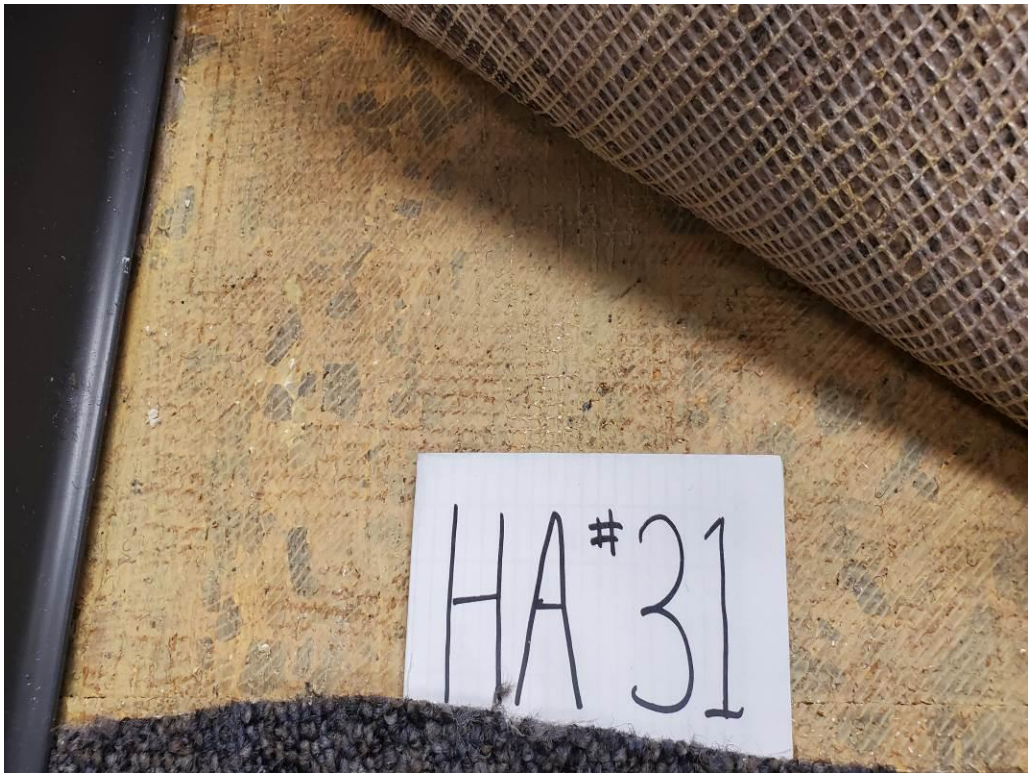
HA #28 – 2'x2' Off-White Inset Pinhole & Fissure ACT



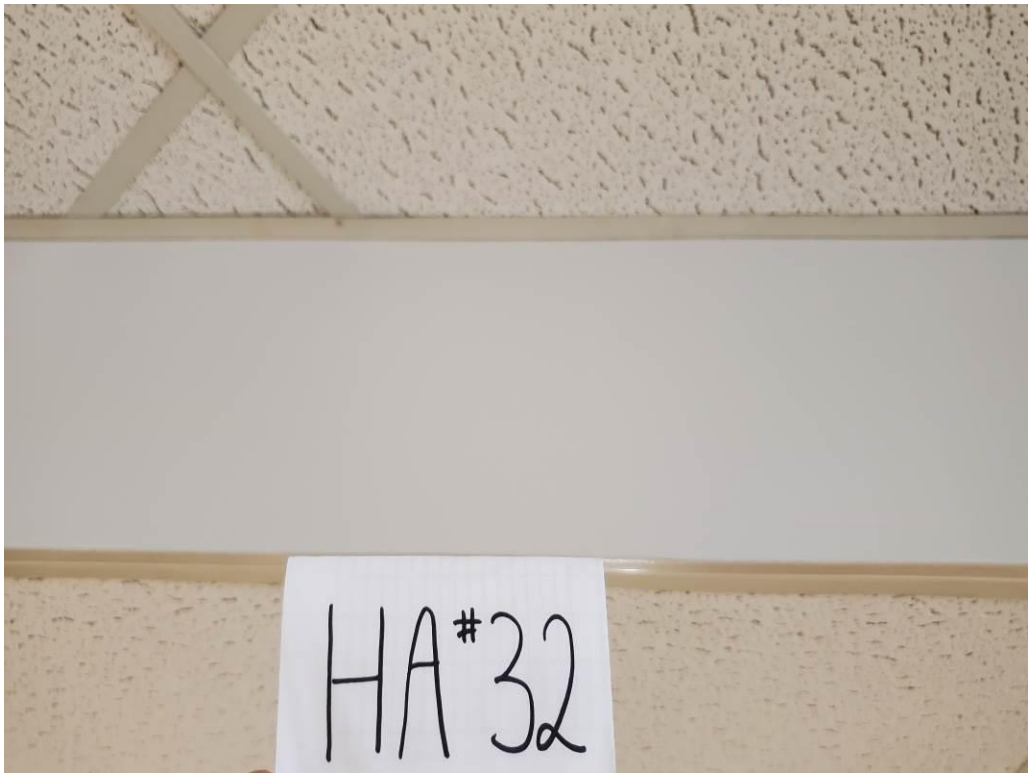
HA #29 – 2'x2' White Pinhole & Fissure ACT



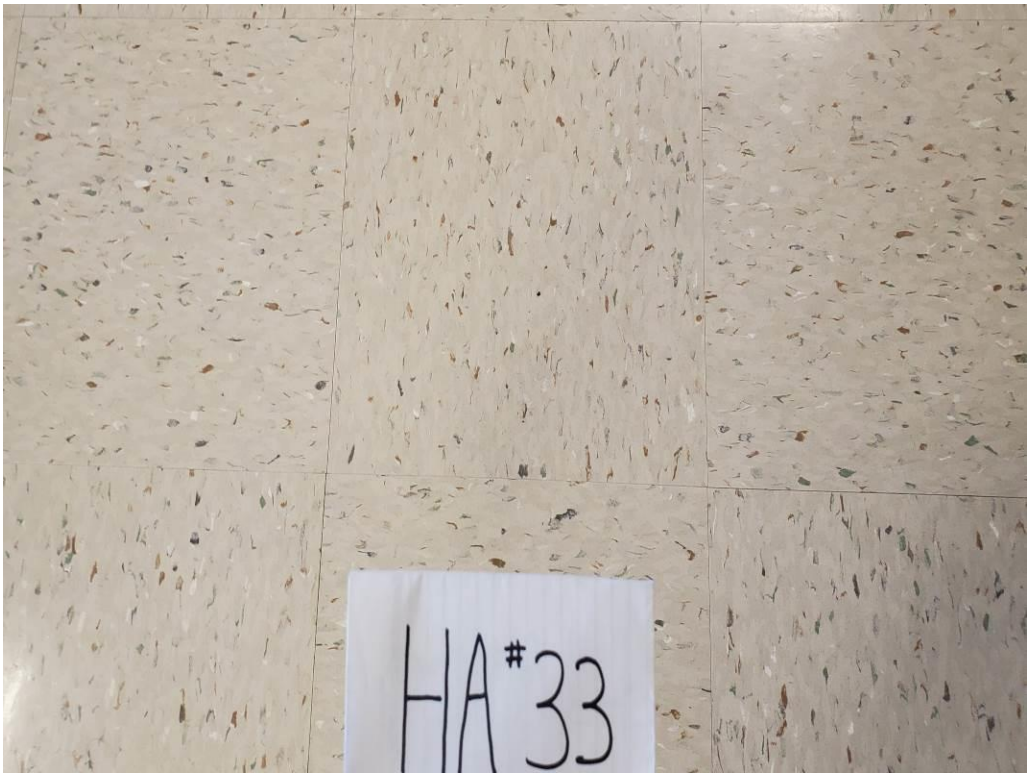
HA #30 – White Duct Insulation Mastic



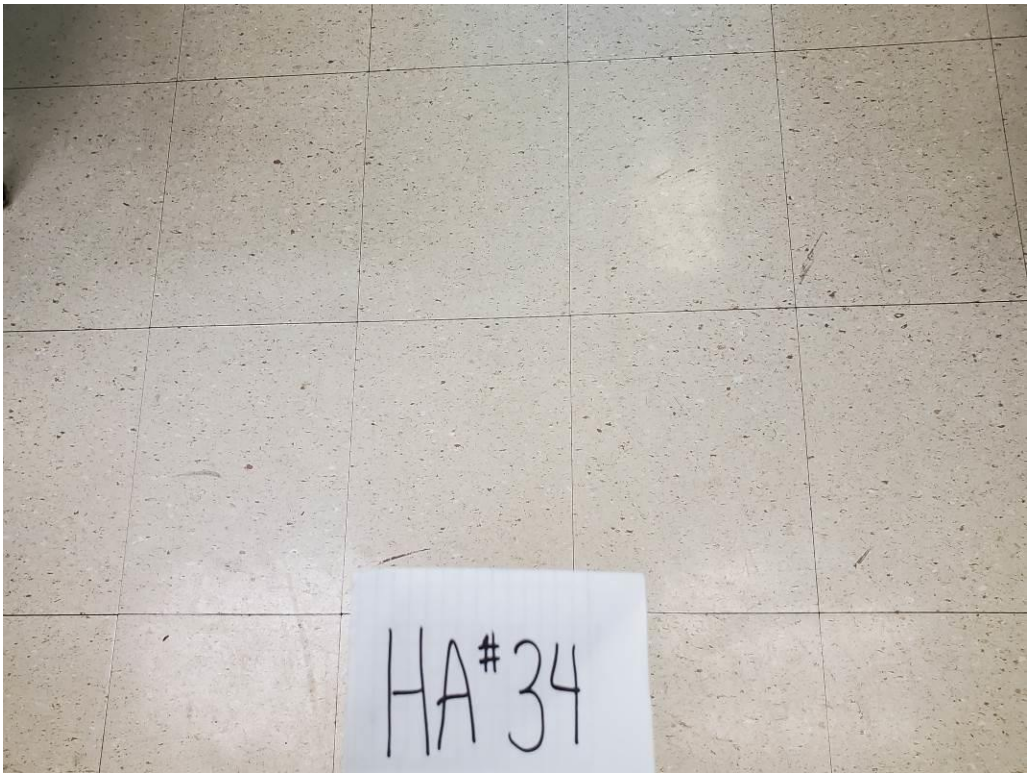
HA #31 – 12”x12” Marble Pattern Flooring VFT & Mastic



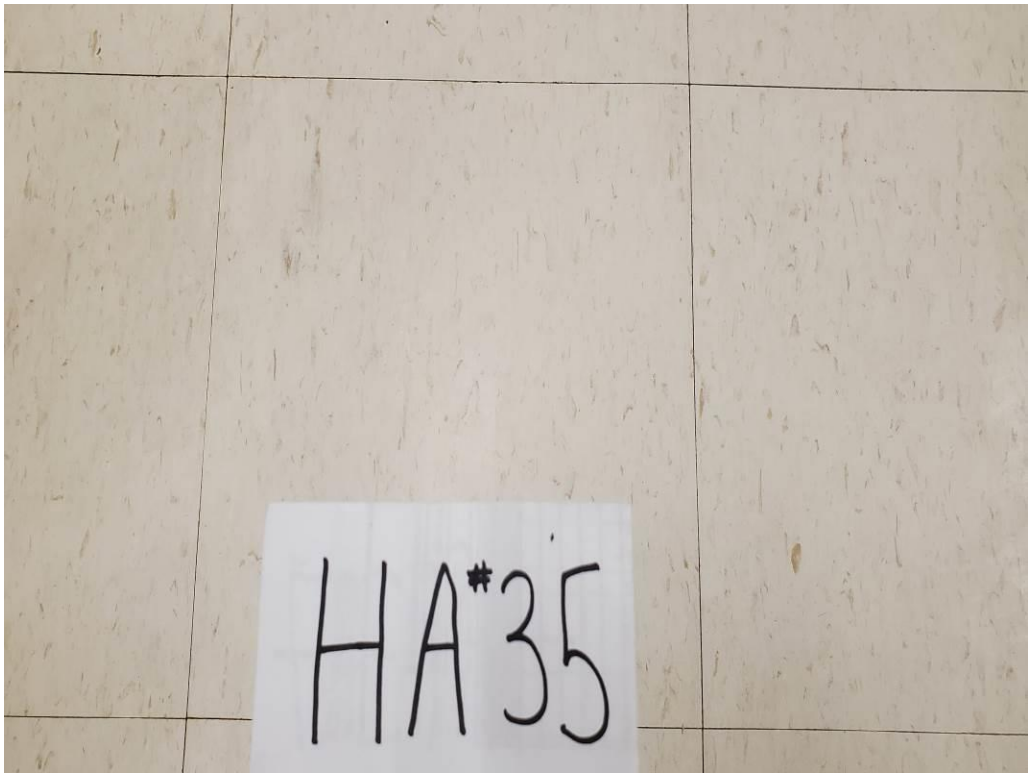
HA #32 – Finished Plaster



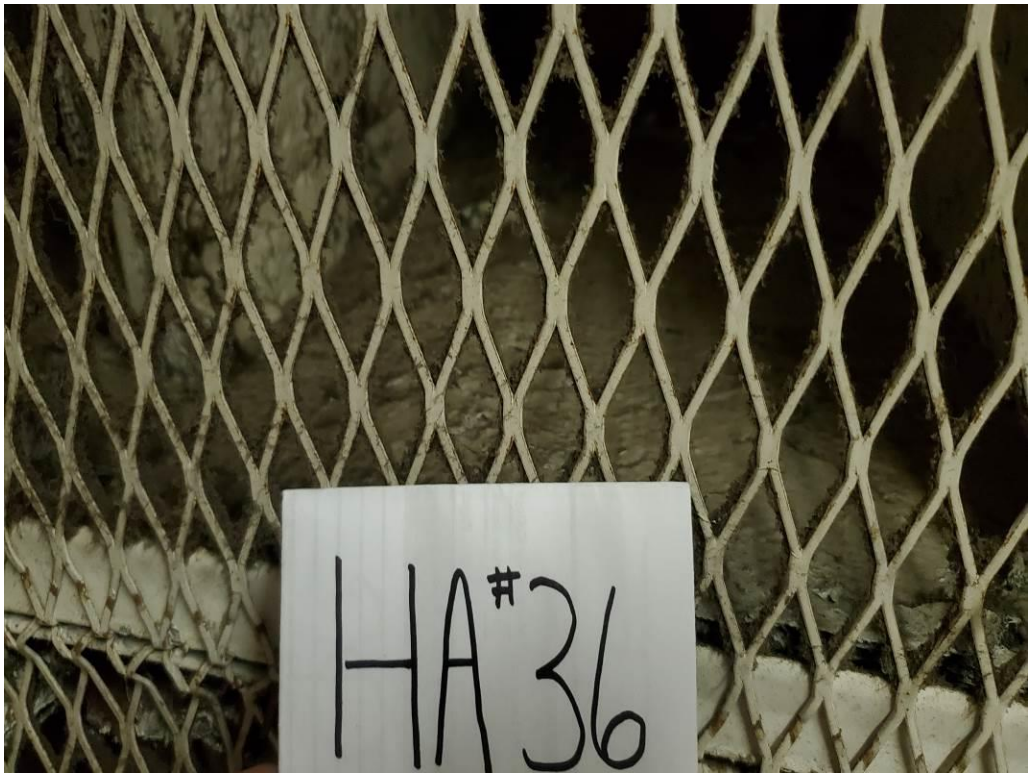
HA #33 – 12”x12” Tan w/ Brown & Green Specks VFT & Mastic



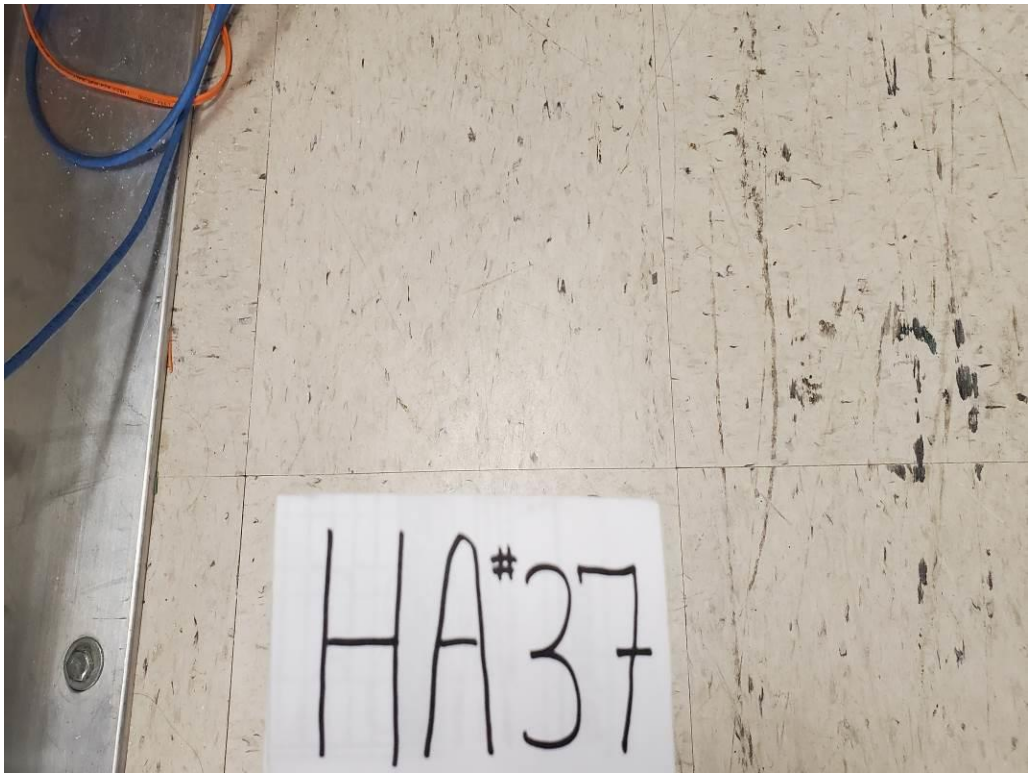
HA #34 – 12”x12” Tan w/ Brow & Green Specks VFT & Mastic



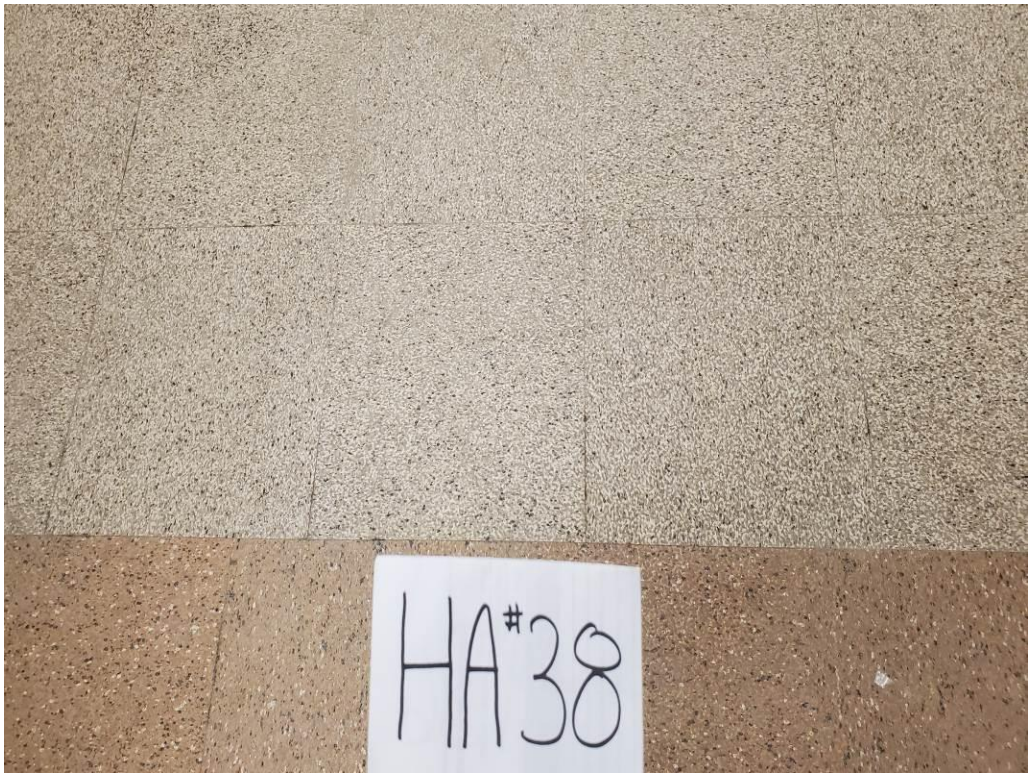
HA #35 – 12”x12” Off-White w/ Tan Specks VFT & Mastic



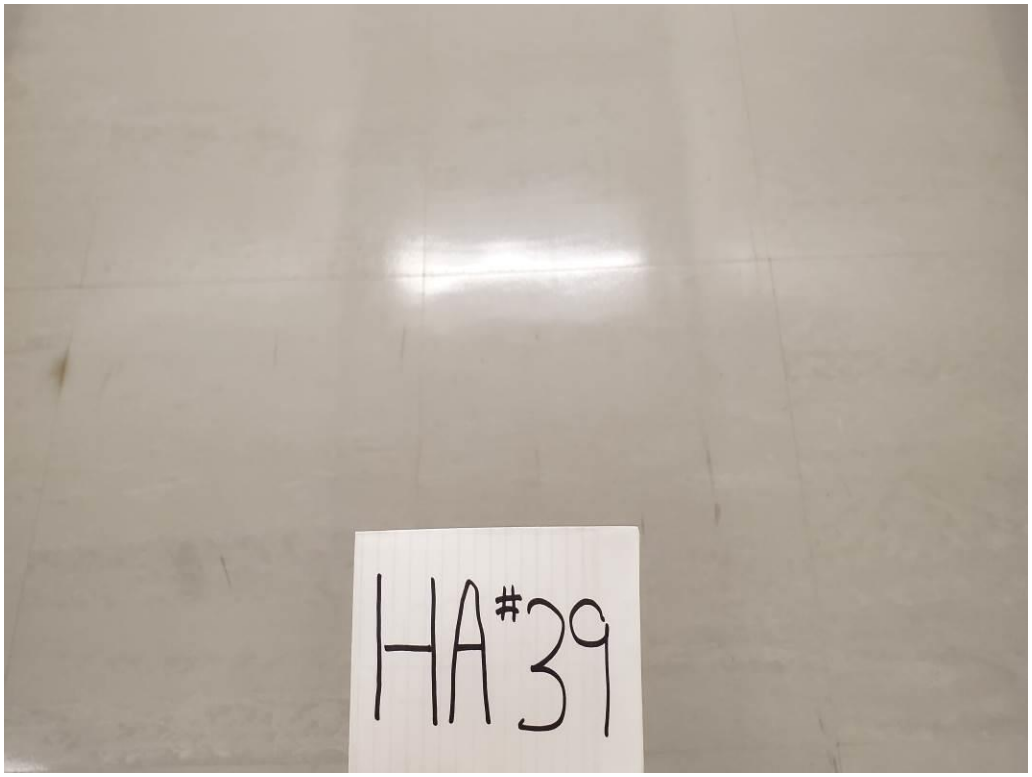
HA #36 – White Interior Duct Insulation



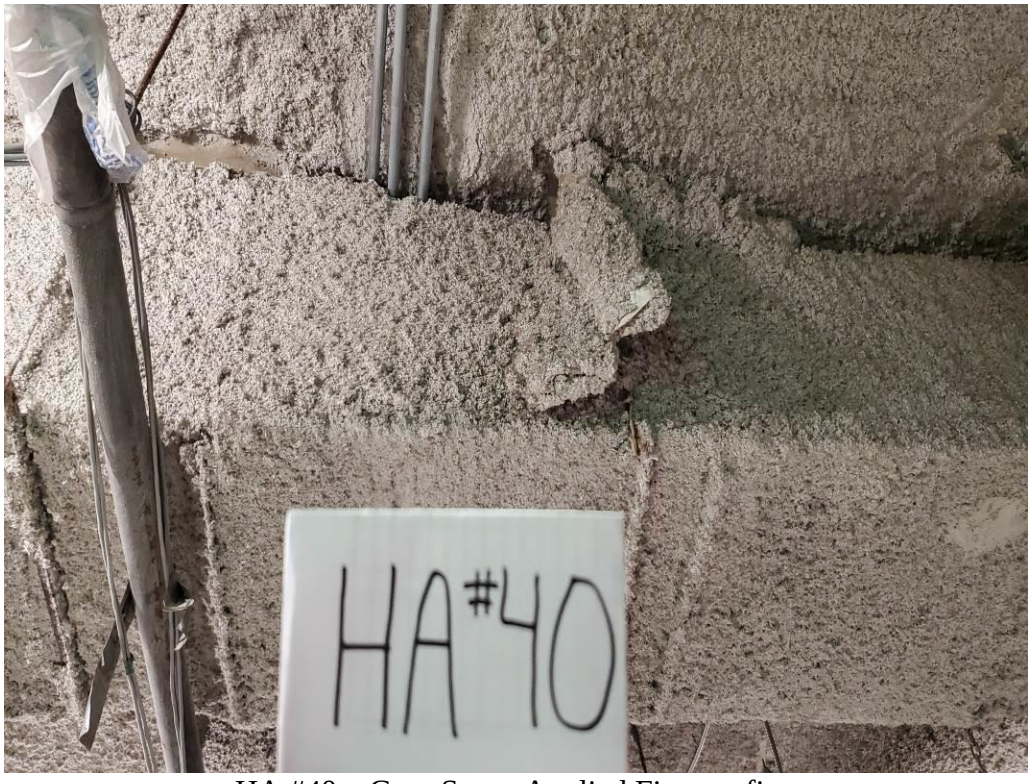
HA #37 – 12”x12” White w/ Black Specks VFT & Mastic



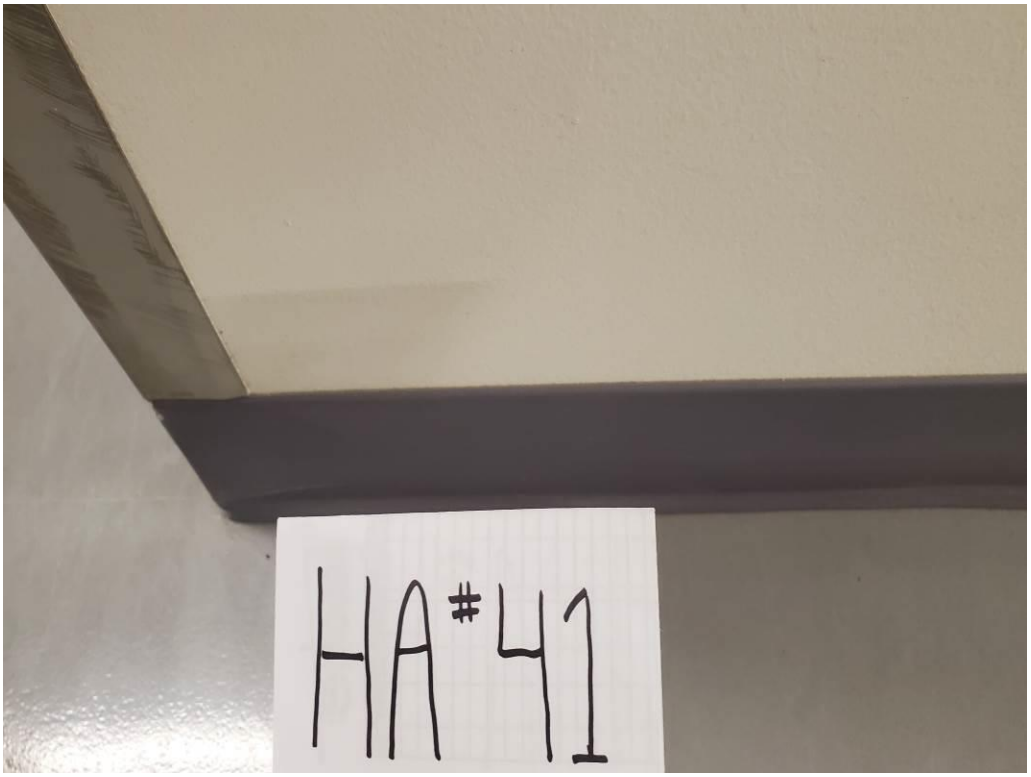
HA # 38 – 12”x12” Gray/ Orange w/ Black Spots VFT & Mastic



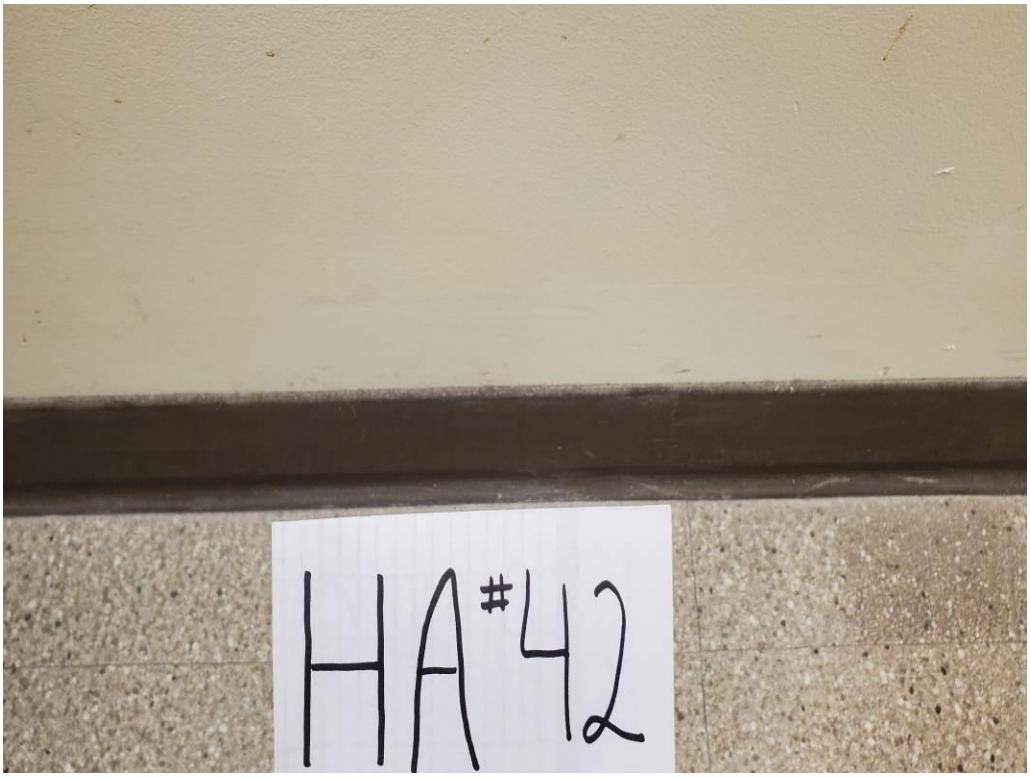
HA #39 – 18”x18” Gray VFT & Mastic



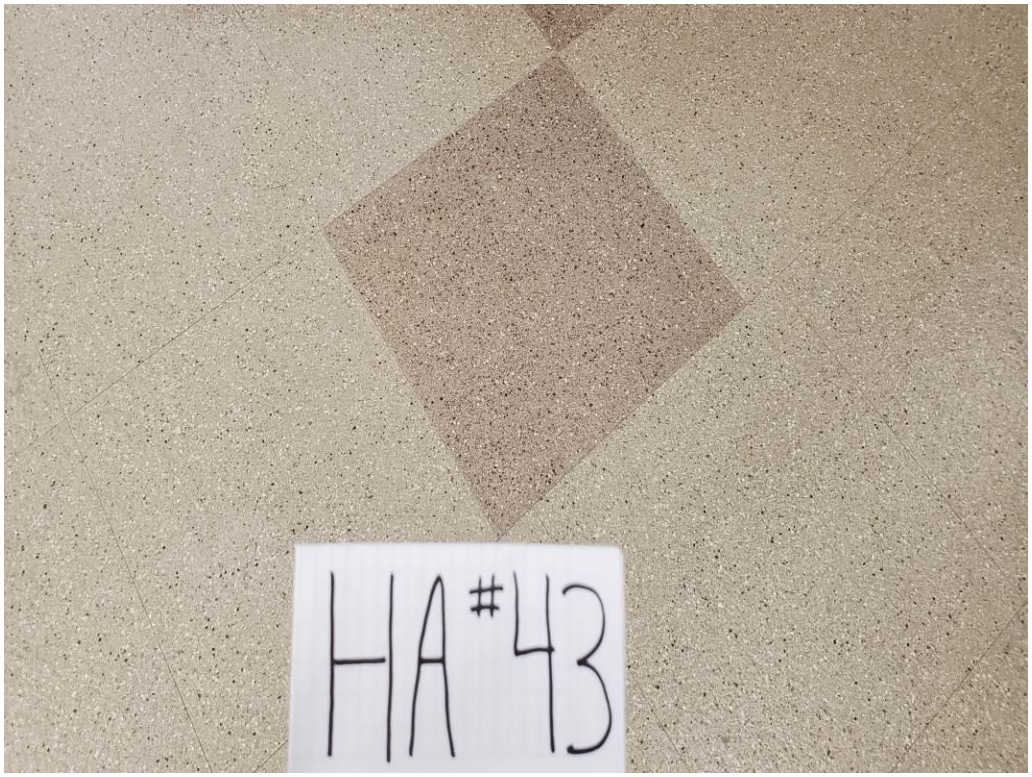
HA #40 – Gray Spray Applied Fireproofing



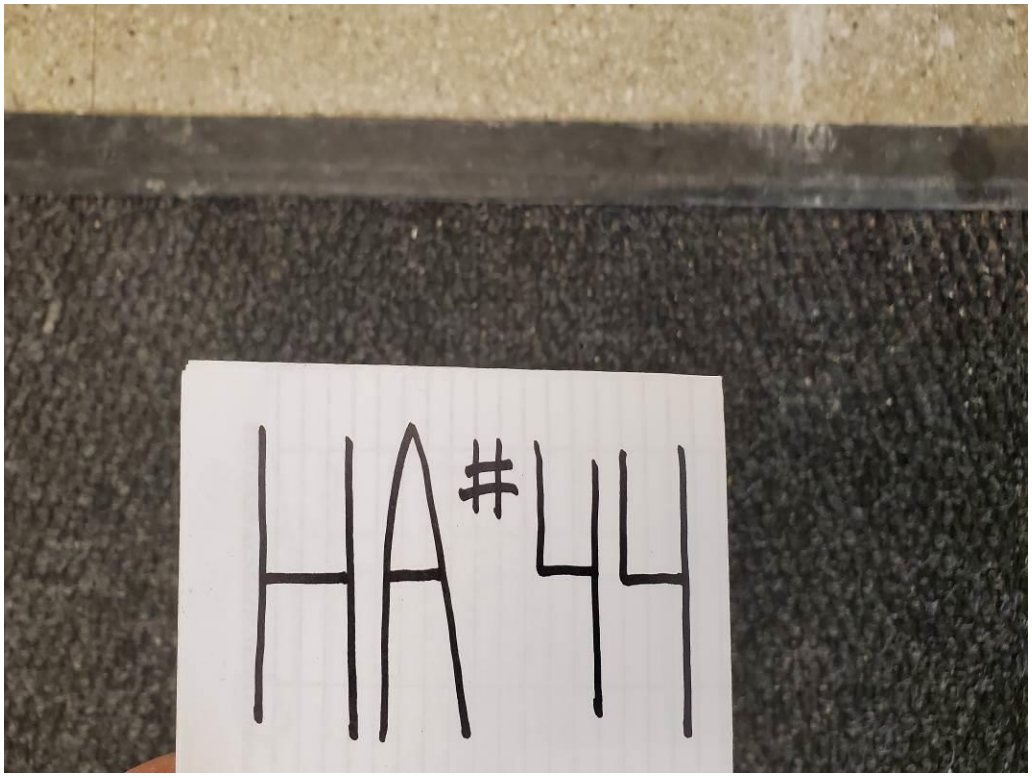
HA #41 – Dark Gray Vinyl Cove Base w/ Mastic



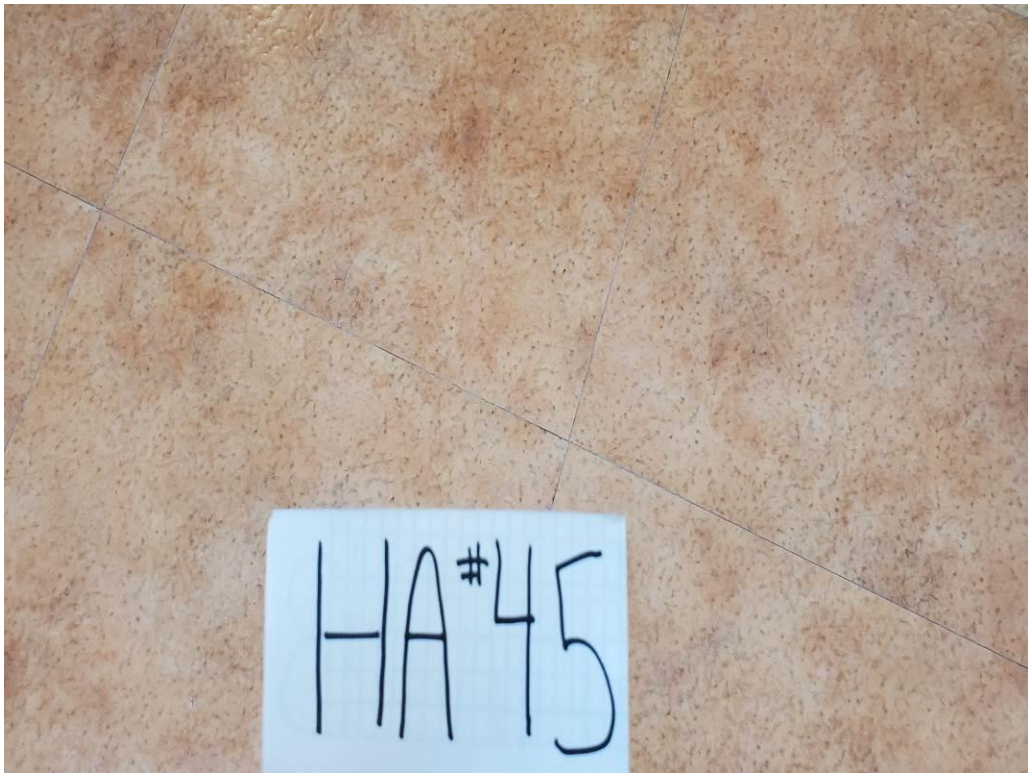
HA #42 – Brown Vinyl Cove Base w/ Mastic



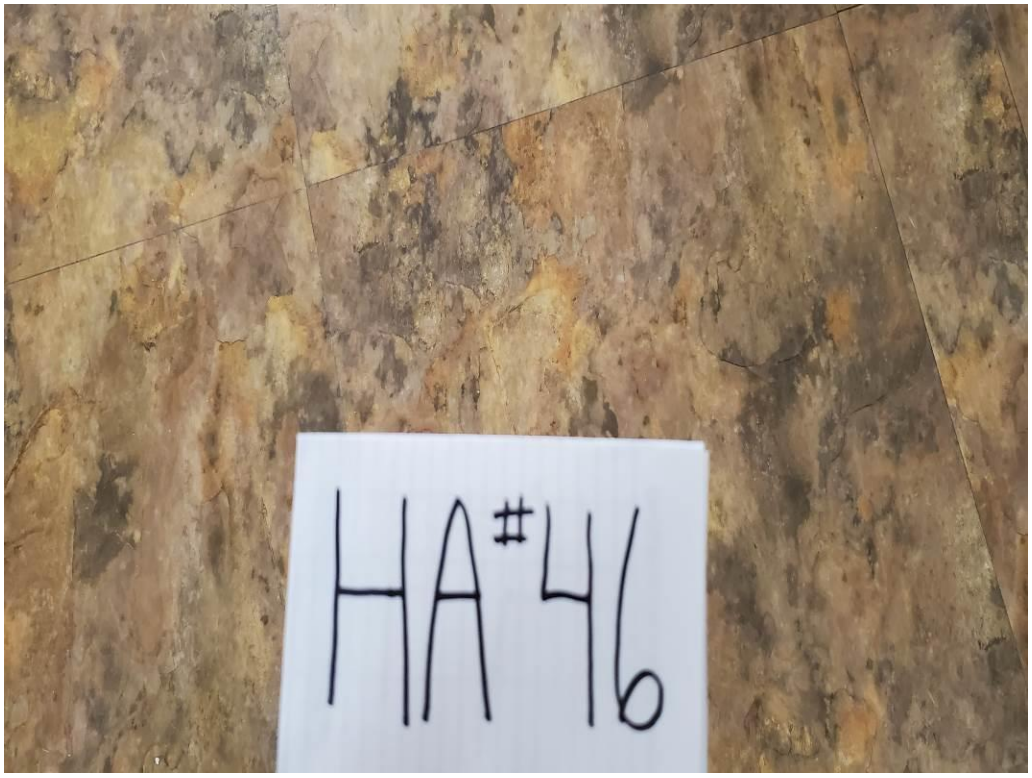
HA #43 – 18”x18” Gray/ Red w/ Black Spots VFT & Mastic



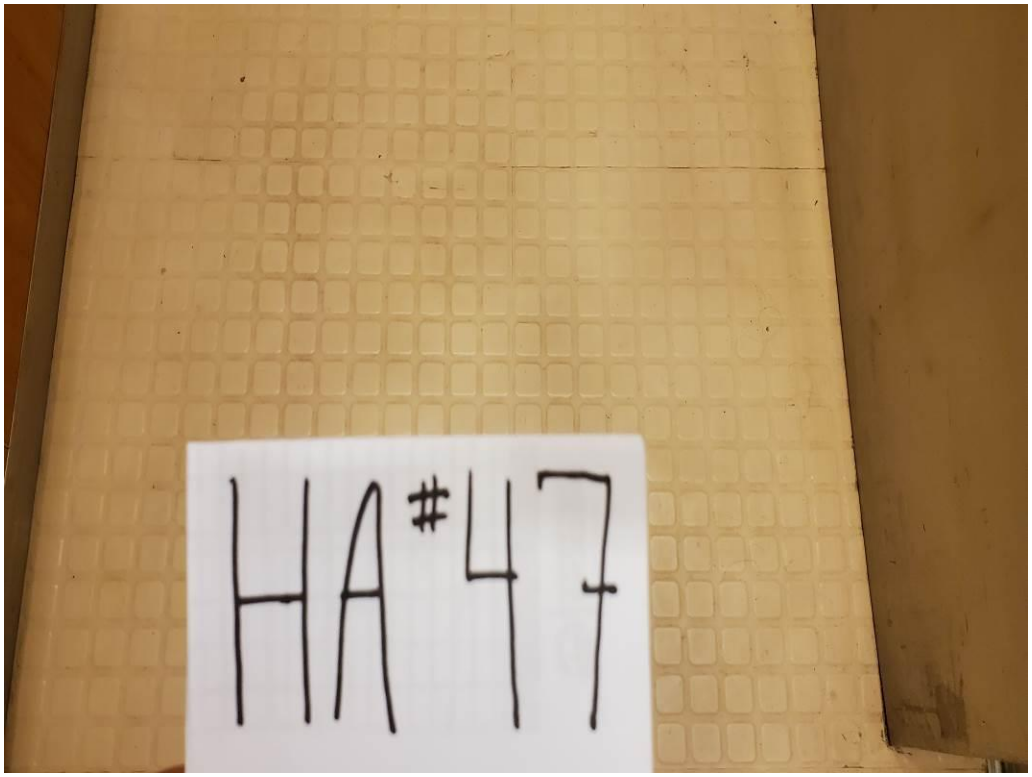
HA #44 – Black Vinyl Threshold Strip



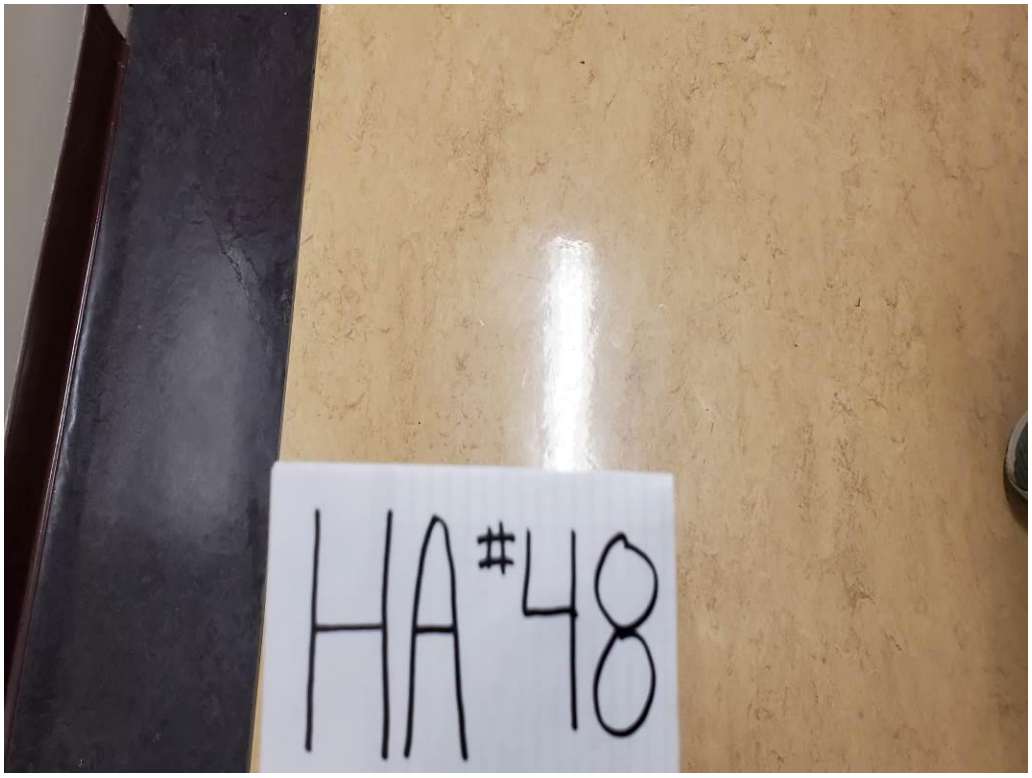
HA #45 – 18”x18” – Orange VFT & Mastic



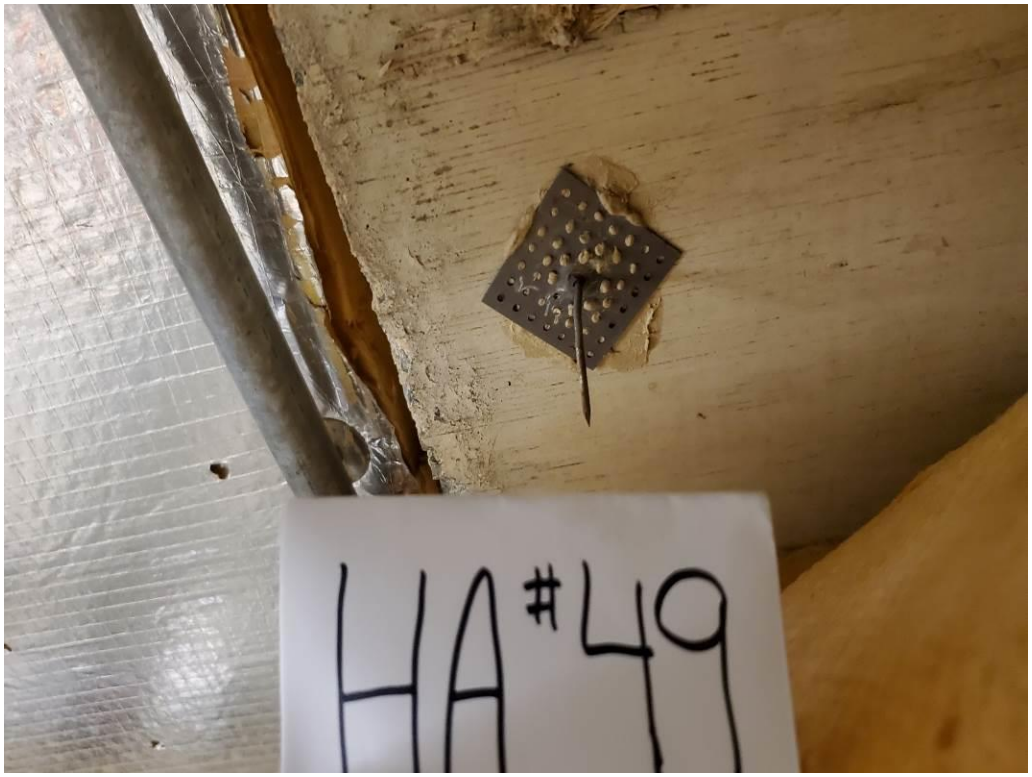
HA #46 – 18”x18” Marble Pattern VFT & Mastic



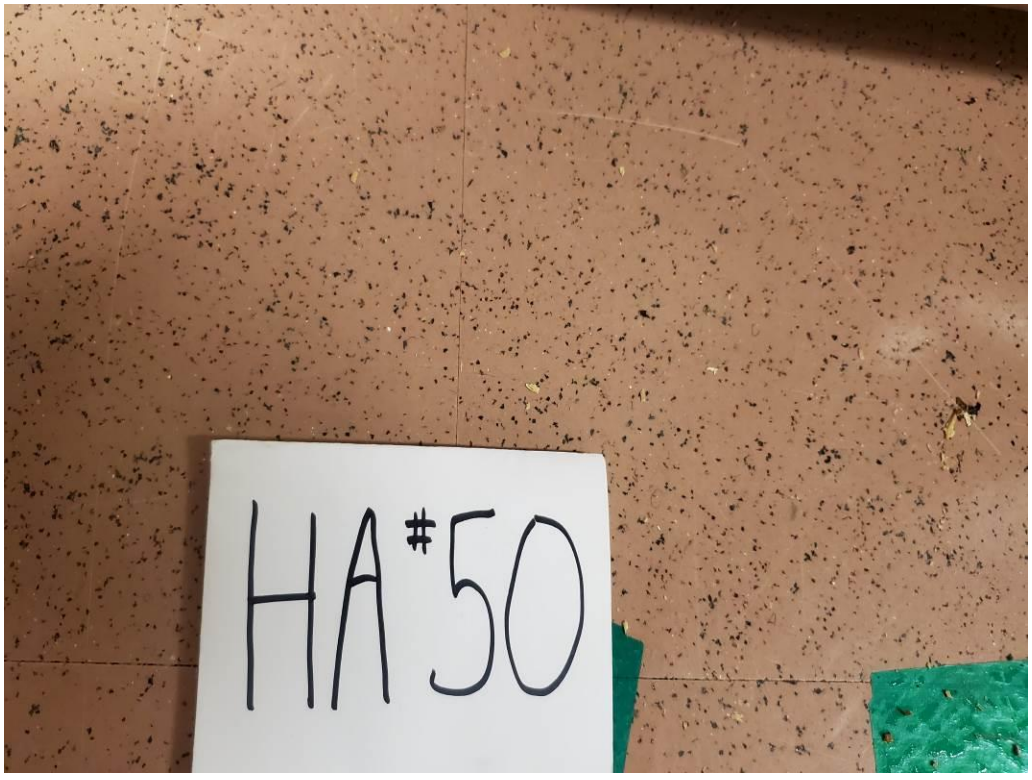
HA #47 – Yellow Textured VFT & Mastic



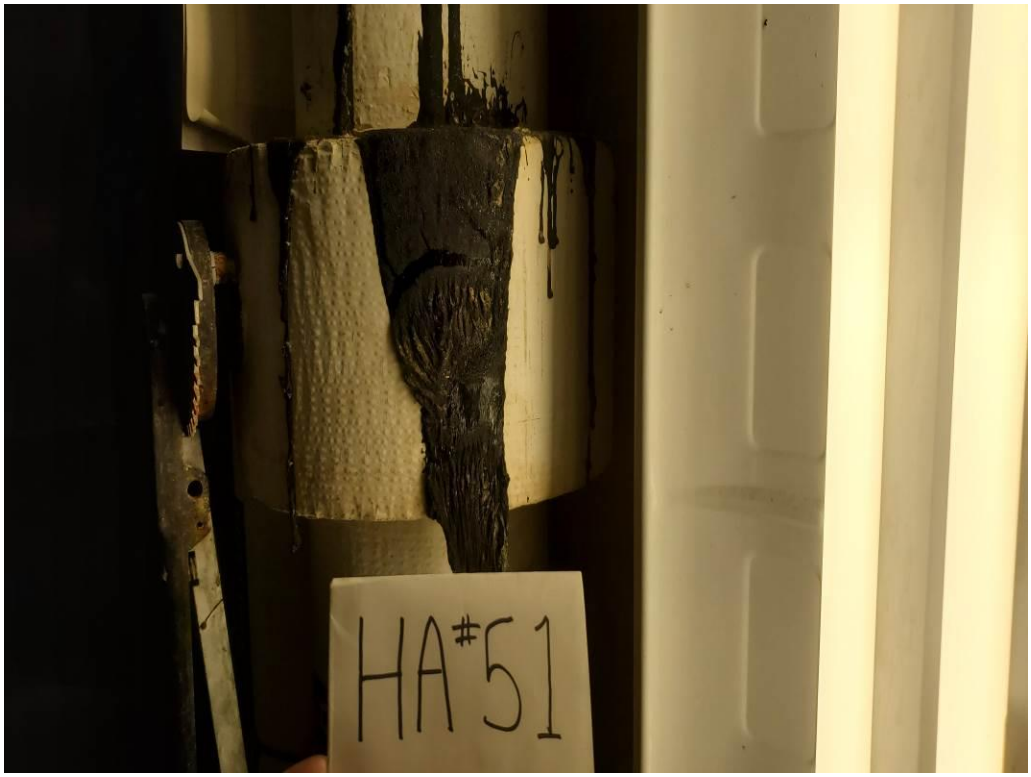
HA #48 – Purple & Orange VSG & Mastic



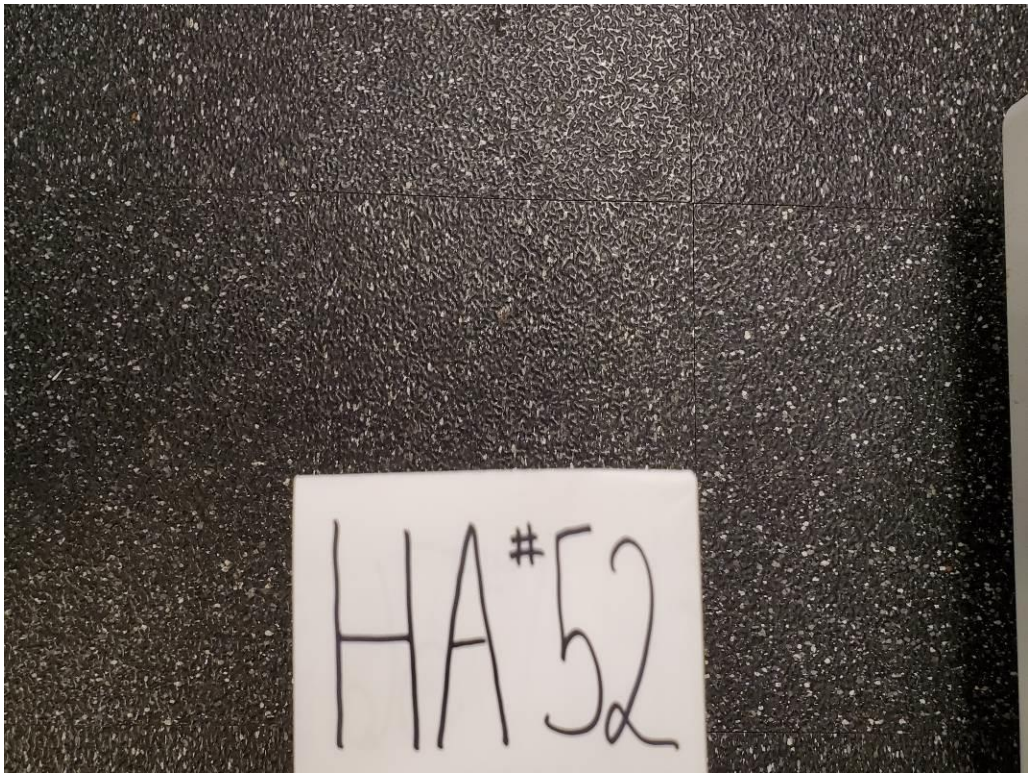
HA #49 – Tan Ceiling Insulation Pin Mastic



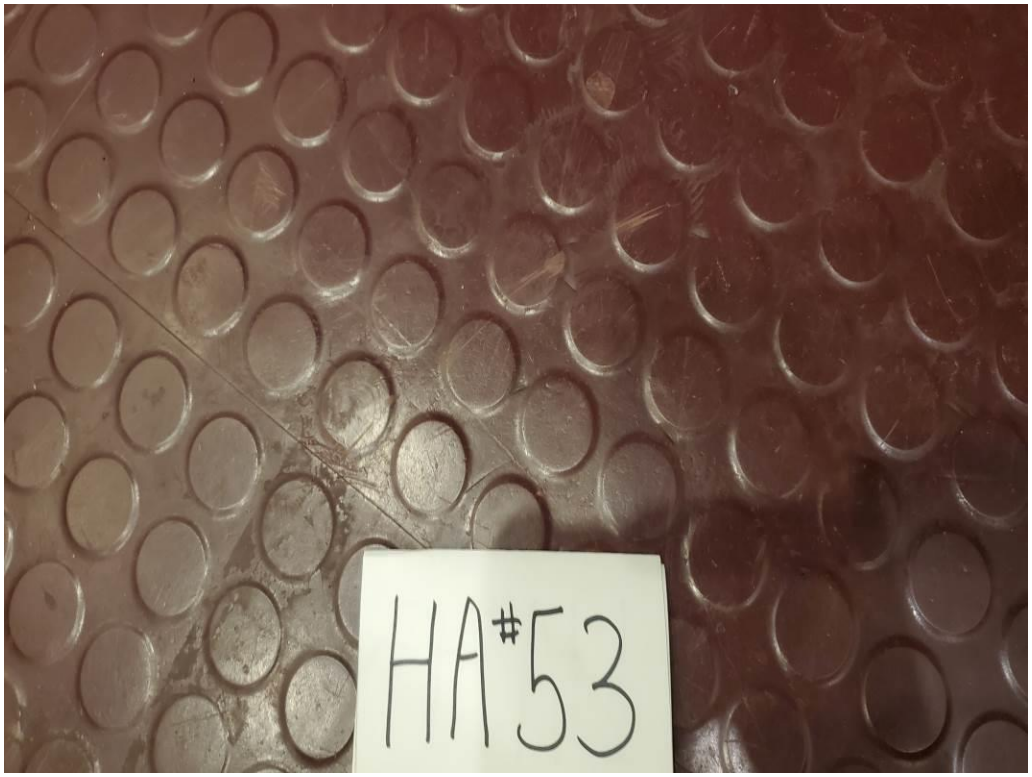
HA #50 – 12”x12” Pink w/ Black Spots VFt & Mastic



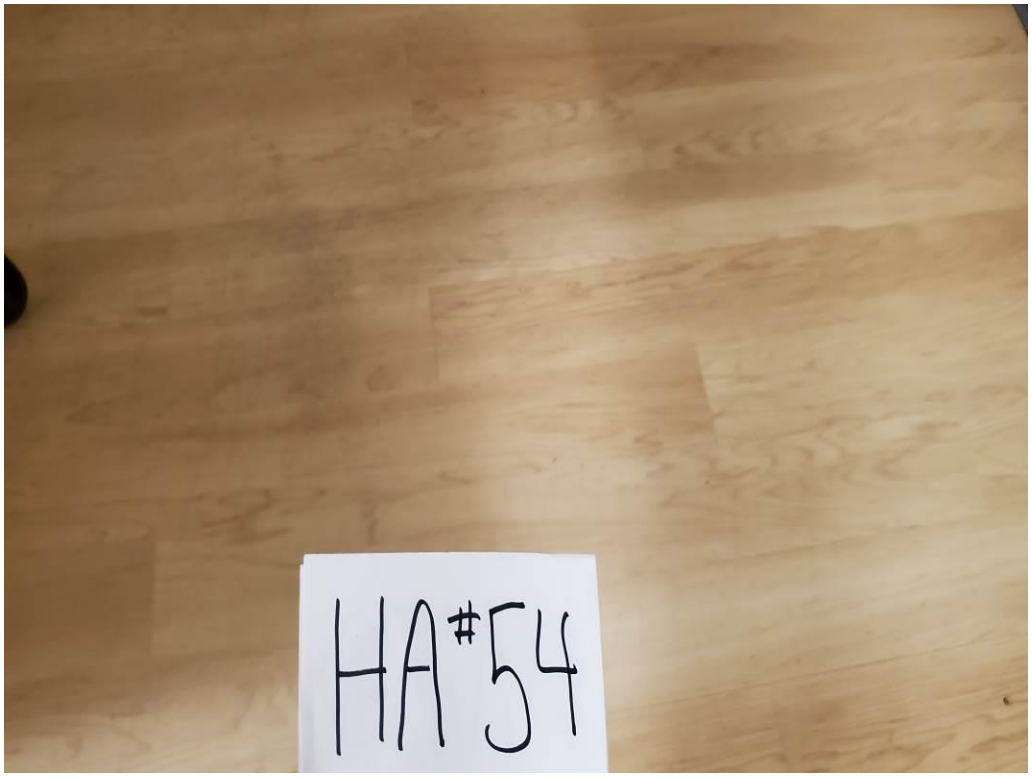
HA #51 – Black Tar Sealant



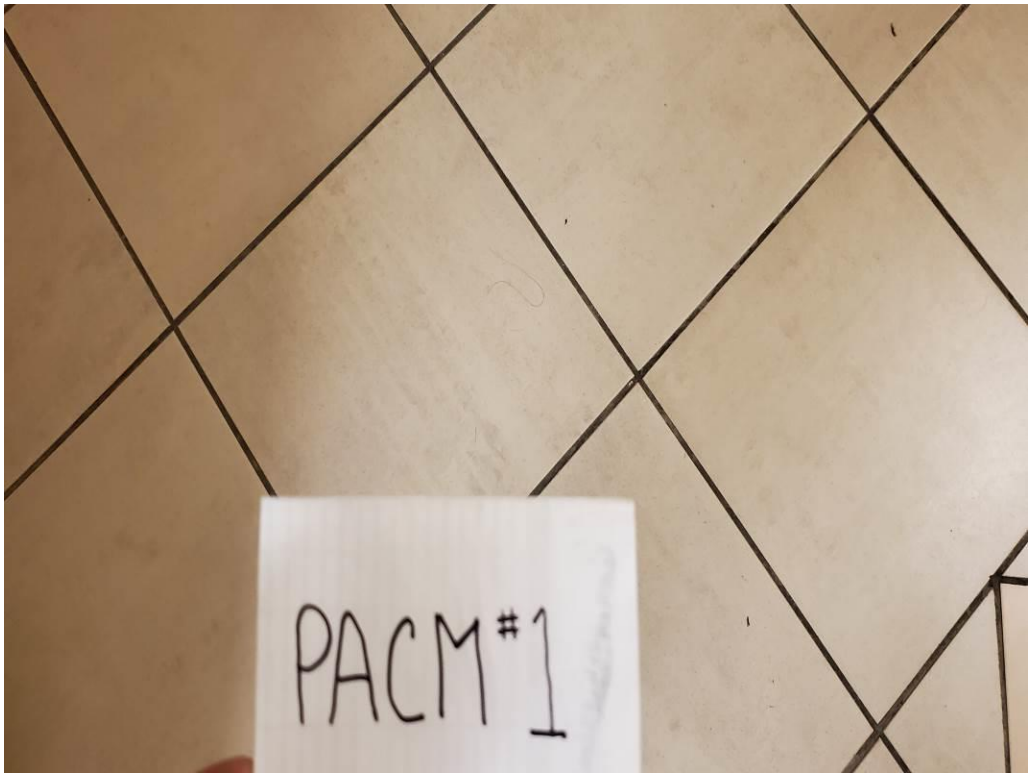
HA #52 – 12”x12” Black w/ White Spots VFT & Mastic



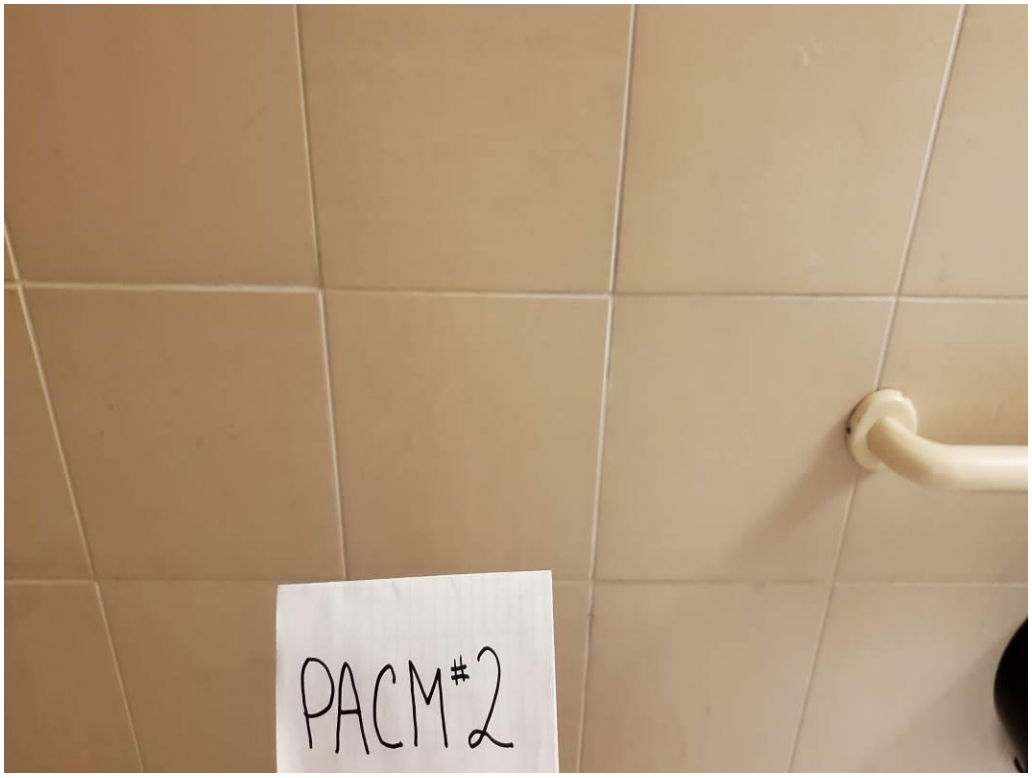
HA #53 – Red Textured VFT & Mastic



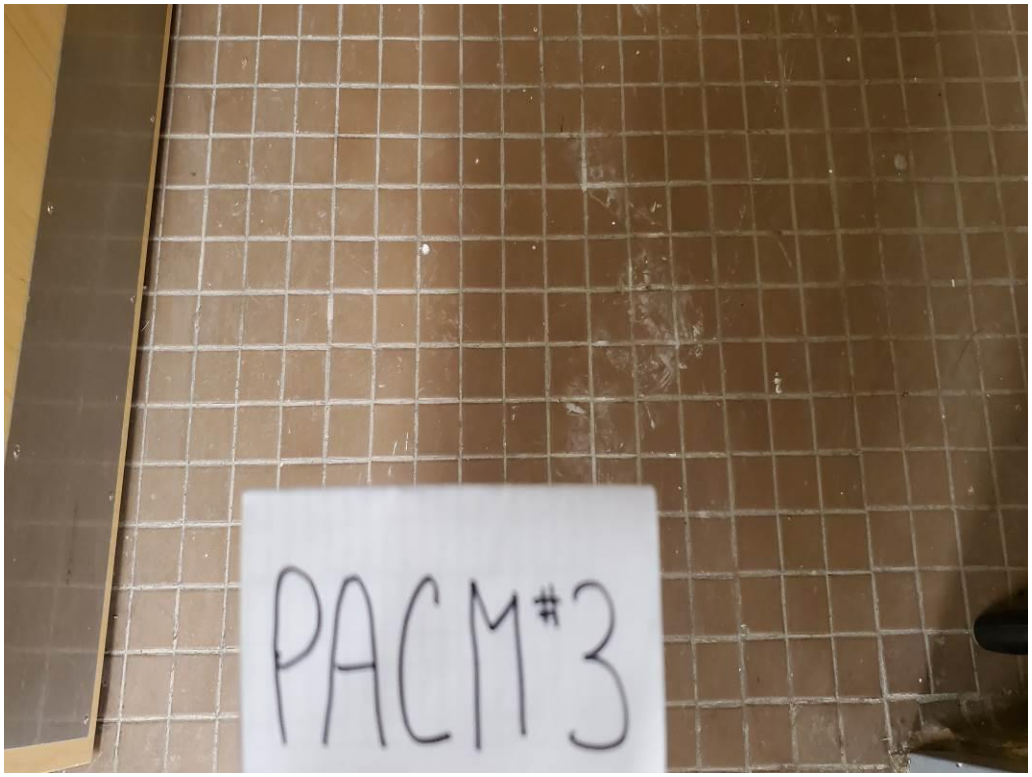
HA #54 – Wood Pattern VSG & Mastic



PACM #1 – 12”x12” Gray Ceramic Floor Tile Grout & Thinset



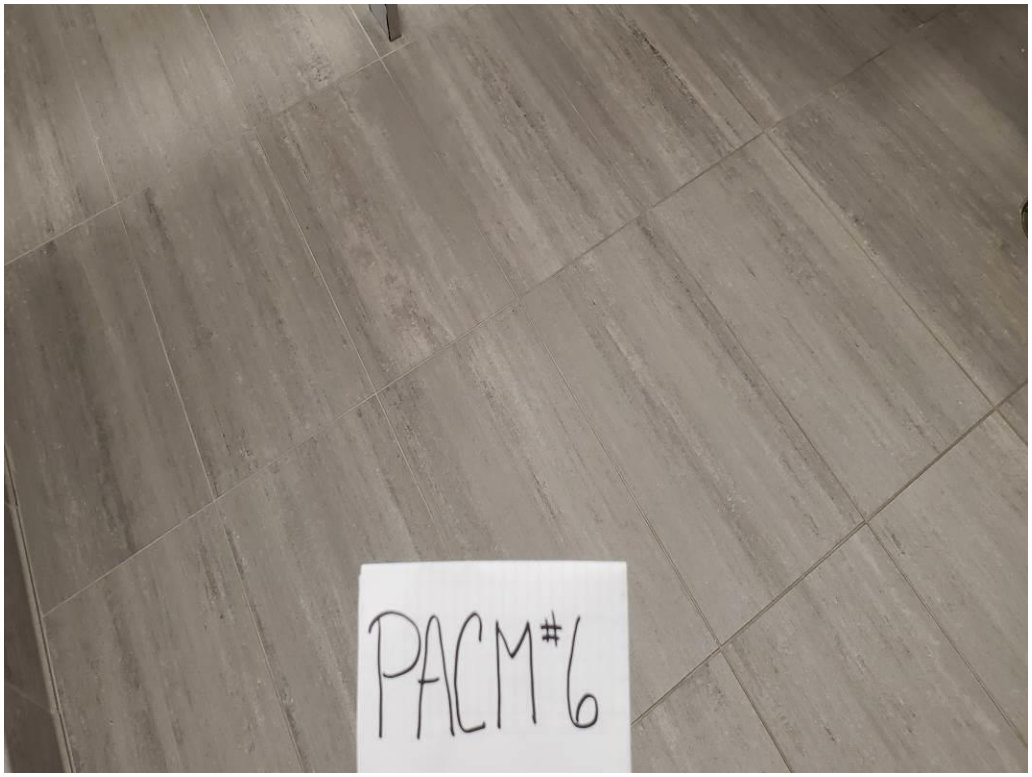
PACM #2 – 12”x12” Tan Ceramic Wall Tile Grout & Adhesive



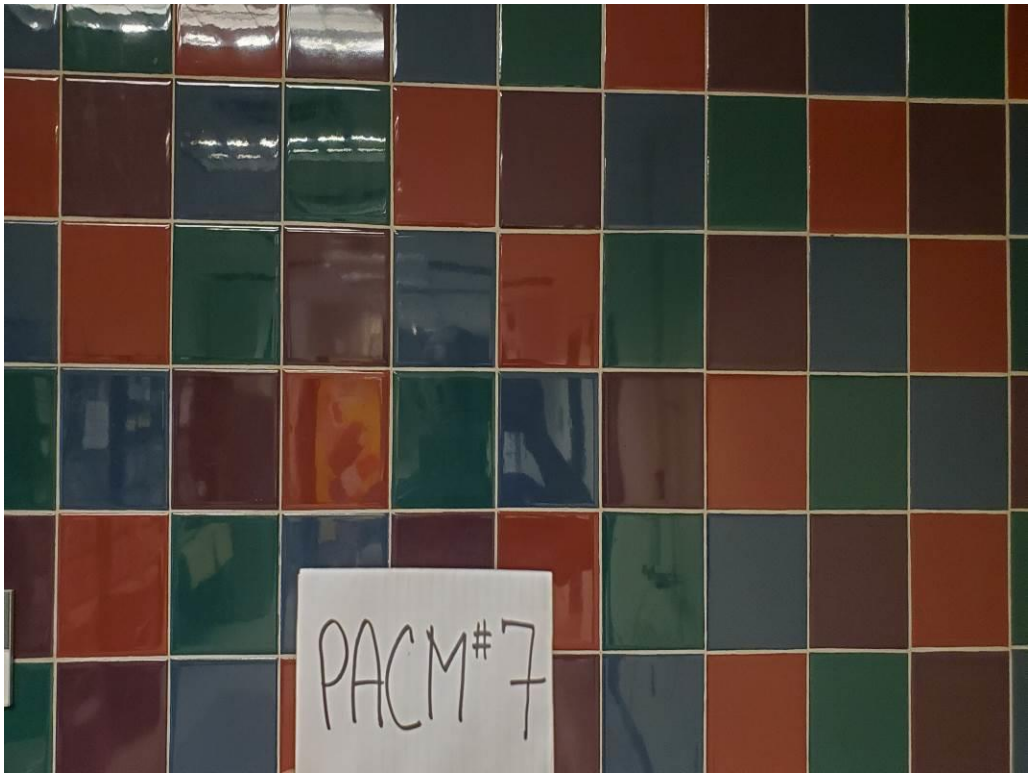
PACM #3 – 1”x1” Brown Ceramic Floor Tile Grout & Thinset

PACM #4 – Vibration dampening Cloth

PACM #5 – Fire Door



PACM #6 – Gray Ceramic Floor & Wall Tile Grout & Adhesive NAD 02FEB2025



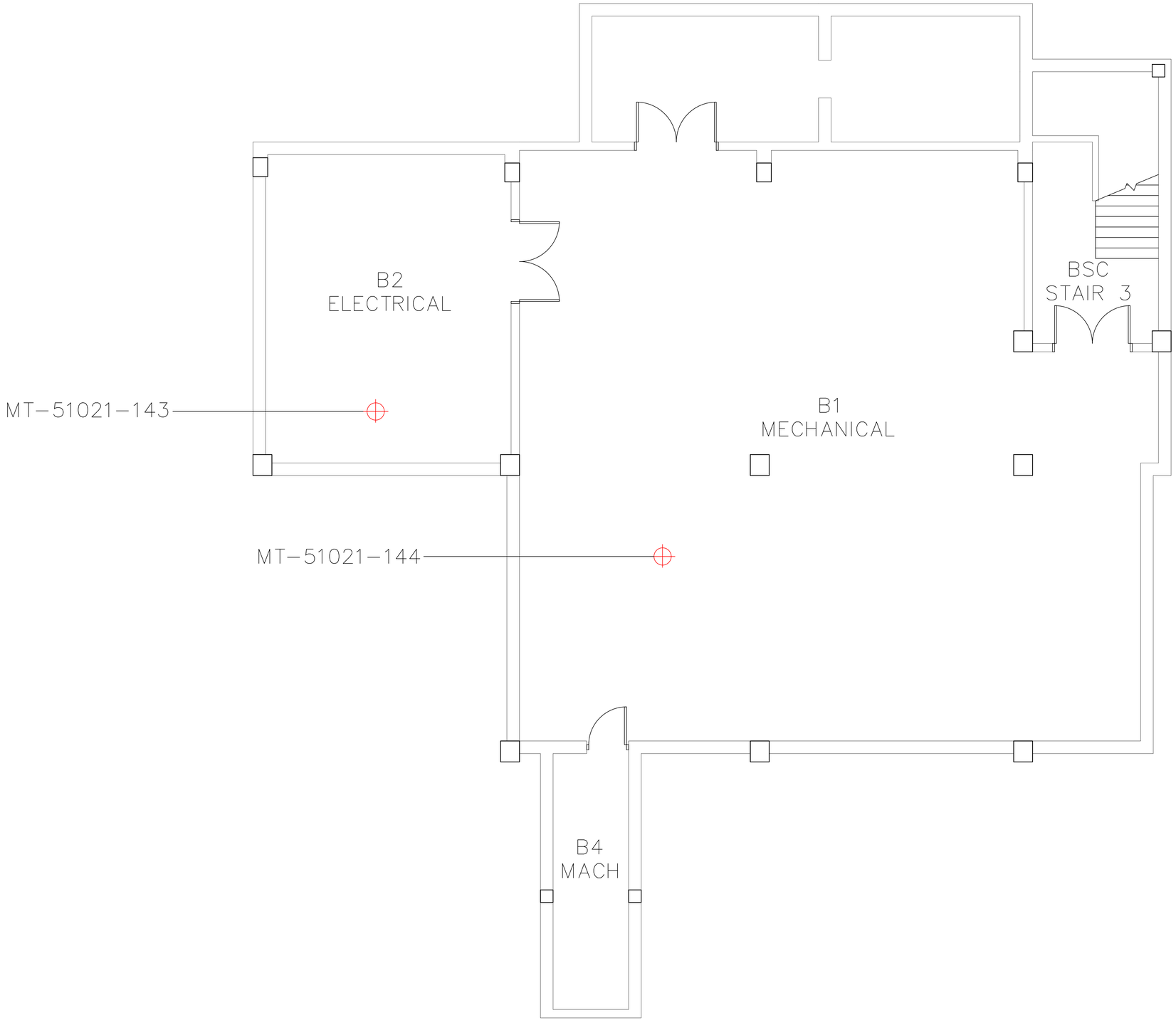
PACM #7 – Multicolor Ceramic Wall Tile Grout & Adhesive

APPENDIX E

BULK SAMPLING LOCATIONS

&

ASBESTOS CONTAINING MATERIAL DRAWING



HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- POSITIVE DUCT DAMPANER
- POSITIVE DUCT SEALANT JOINT
- POSITIVE DUCT INSULATION JOINT
- POSITIVE DUCT INSULATION
- POSITIVE CEILING ADHESIVE
- POSITIVE CEILING TILE
- POSITIVE DRYWALL
- POSITIVE PLASTER/STUCCO
- POSITIVE FIREPROOFING
- POSITIVE CEMENTITIOUS MATERIAL
- POSITIVE FLOOR ADHESIVE
- POSITIVE FLOOR TILE
- POSITIVE DUCT PIN MASTIC
- PRESUMED CERAMIC TILES
- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

Date	06/29/2021
Scale	Not to Scale
Drawn	KC
Approved	XX
Dwg. No.	XXX

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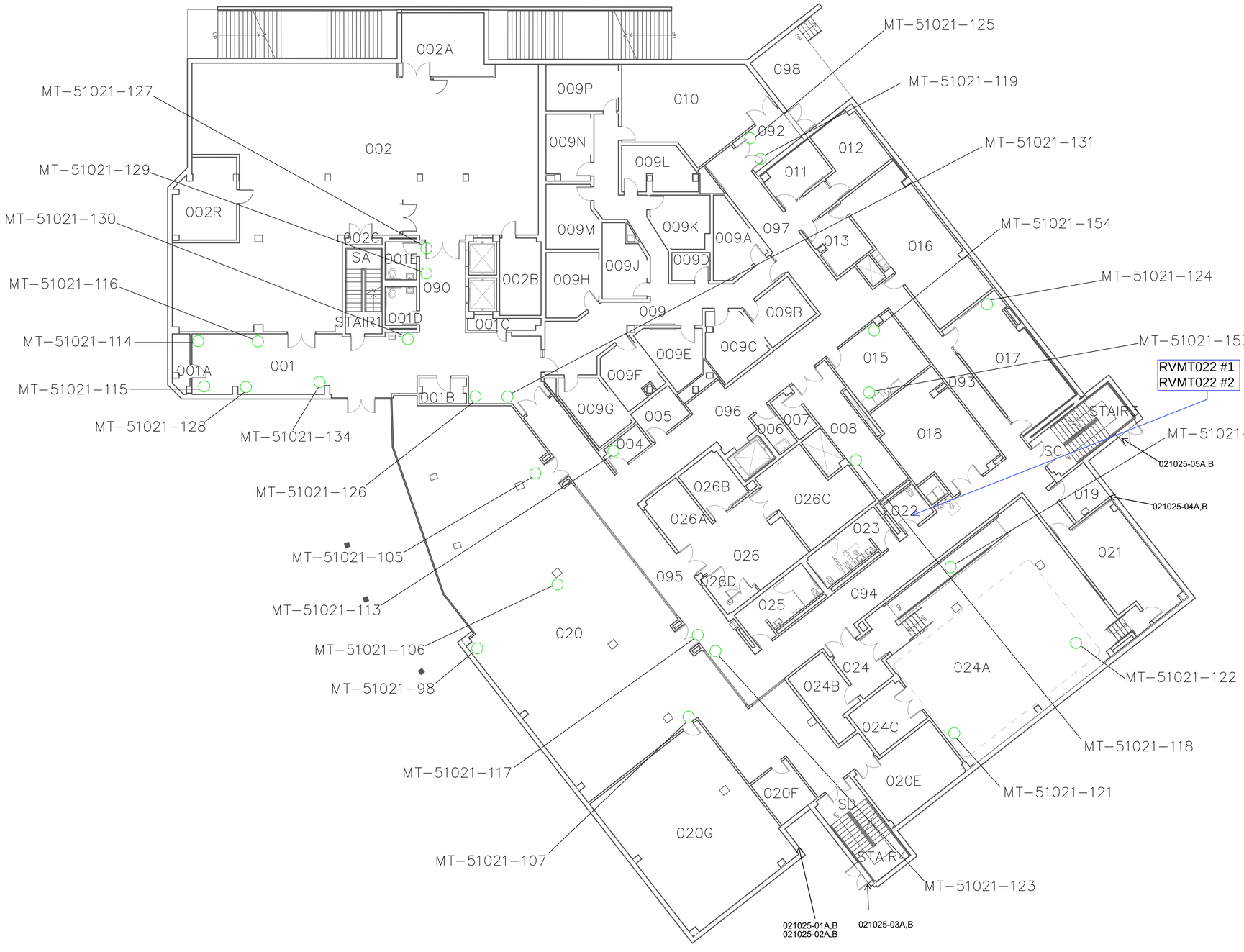
BOGGS ENVIRONMENTAL CONSULTANTS

ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - BASEMENT FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023



HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- POSITIVE DUCT DAMPANER
- POSITIVE DUCT SEALANT JOINT
- POSITIVE DUCT INSULATION JOINT
- POSITIVE DUCT INSULATION
- POSITIVE CEILING ADHESIVE
- POSITIVE CEILING TILE
- POSITIVE DRYWALL
- POSITIVE PLASTER/STUCCO
- POSITIVE FIREPROOFING
- POSITIVE CEMENTITIOUS MATERIAL
- POSITIVE FLOOR ADHESIVE
- POSITIVE FLOOR TILE
- POSITIVE DUCT PIN MASTIC
- PRESUMED CERAMIC TILES
- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

Date	06/29/2021
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Approved	XX
Dwg. No.	XXX

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ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - GROUND FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- POSITIVE DUCT DAMPANER
- POSITIVE DUCT SEALANT JOINT
- POSITIVE DUCT INSULATION JOINT
- POSITIVE DUCT INSULATION
- POSITIVE CEILING ADHESIVE
- POSITIVE CEILING TILE
- POSITIVE DRYWALL
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- POSITIVE FIREPROOFING
- POSITIVE CEMENTITIOUS MATERIAL
- POSITIVE FLOOR ADHESIVE
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- PRESUMED CERAMIC TILES
- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

Date	06/29/2021
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Drawn	KC
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Dwg. No.	XXX

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ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - 1ST FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- POSITIVE DUCT DAMPANER
- POSITIVE DUCT SEALANT JOINT
- POSITIVE DUCT INSULATION JOINT
- POSITIVE DUCT INSULATION
- POSITIVE CEILING ADHESIVE
- POSITIVE CEILING TILE
- POSITIVE DRYWALL
- POSITIVE PLASTER/STUCCO
- POSITIVE FIREPROOFING
- POSITIVE CEMENTITIOUS MATERIAL
- POSITIVE FLOOR ADHESIVE
- POSITIVE FLOOR TILE
- POSITIVE DUCT PIN MASTIC
- PRESUMED CERAMIC TILES
- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

Date	06/29/2021
Scale	Not to Scale
Drawn	KC
Approved	XX
Dwg. No.	XXX

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MACKLIN TOWER BUILDING - SECOND FLOOR

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HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- FD POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- D POSITIVE DUCT DAMPANER
- POSITIVE DUCT SEALANT JOINT
- POSITIVE DUCT INSULATION JOINT
- POSITIVE DUCT INSULATION
- POSITIVE CEILING ADHESIVE
- POSITIVE CEILING TILE
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- POSITIVE FLOOR ADHESIVE
- POSITIVE FLOOR TILE
- POSITIVE DUCT PIN MASTIC
- PRESUMED CERAMIC TILES
- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

Date	06/29/2021
Scale	Not to Scale
Drawn	KC
Approved	XX
Dwg. No.	XXX

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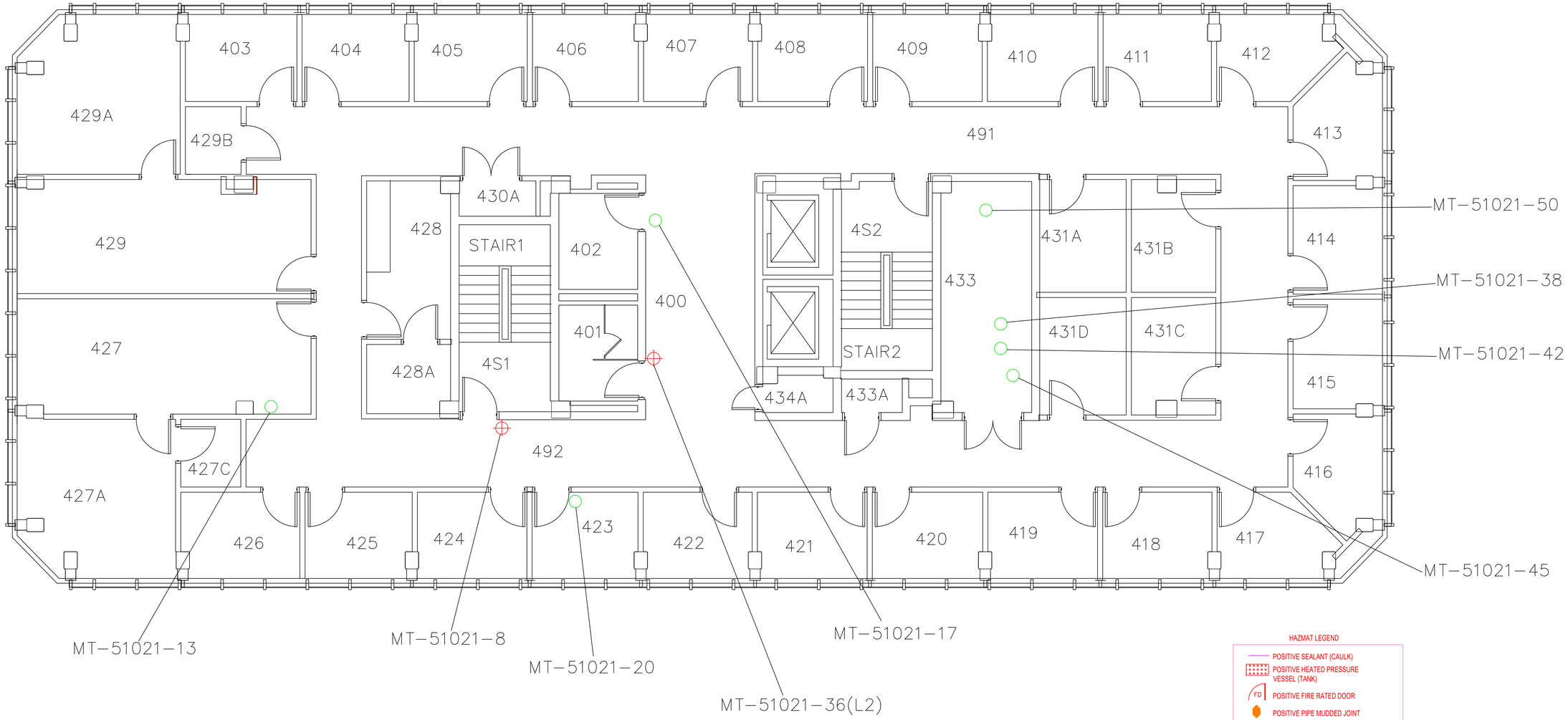
MACKLIN TOWER BUILDING - THIRD FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023



HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- POSITIVE DUCT DAMPANER
- POSITIVE DUCT SEALANT JOINT
- POSITIVE DUCT INSULATION JOINT
- POSITIVE DUCT INSULATION
- POSITIVE CEILING ADHESIVE
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- POSITIVE FLOOR ADHESIVE
- POSITIVE FLOOR TILE
- POSITIVE DUCT PIN MASTIC
- PRESUMED CERAMIC TILES
- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

Date	06/29/2021
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MACKLIN TOWER BUILDING - FOURTH FLOOR

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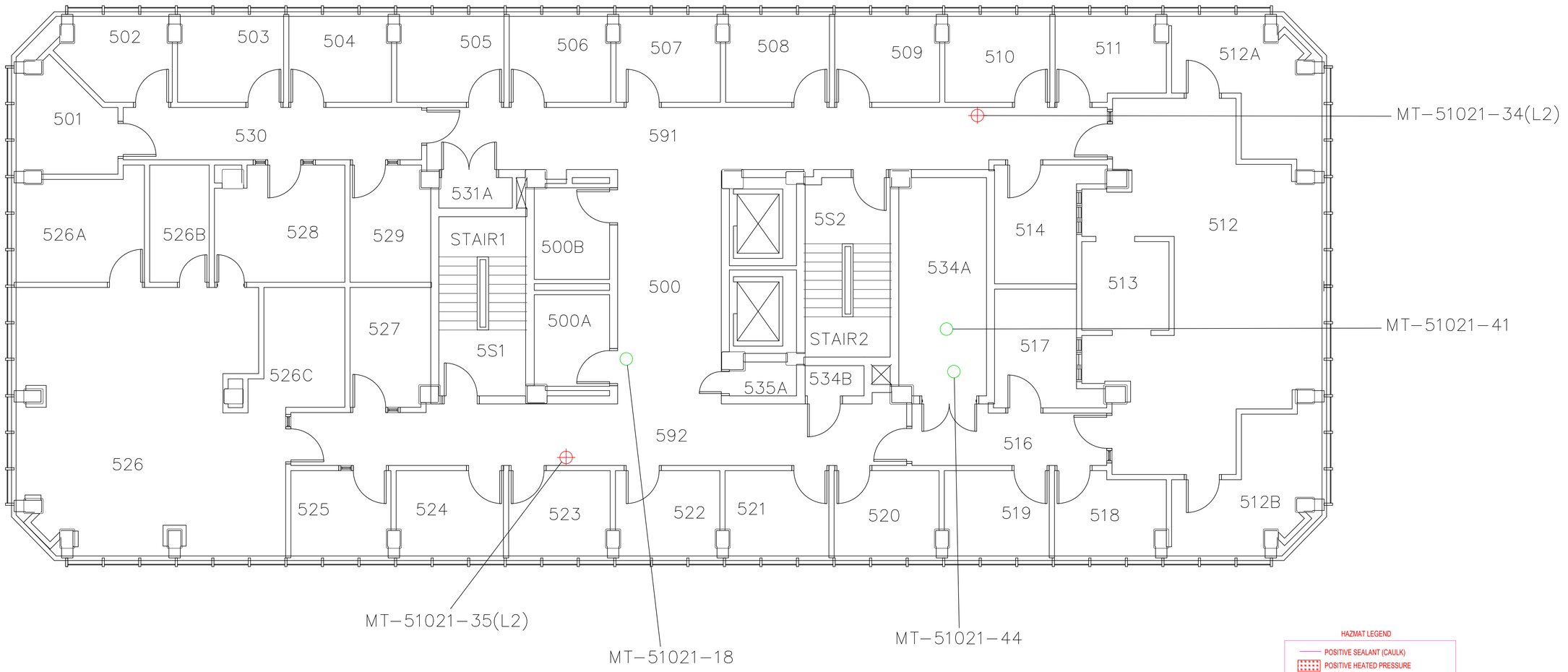

HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- POSITIVE DUCT DAMPANER
- POSITIVE DUCT SEALANT JOINT
- POSITIVE DUCT INSULATION JOINT
- POSITIVE DUCT INSULATION
- POSITIVE CEILING ADHESIVE
- POSITIVE CEILING TILE
- POSITIVE DRYWALL
- POSITIVE PLASTER/STUCCO
- POSITIVE FIREPROOFING
- POSITIVE CEMENTITIOUS MATERIAL
- POSITIVE FLOOR ADHESIVE
- POSITIVE FLOOR TILE
- POSITIVE DUCT PIN MASTIC
- PRESUMED CERAMIC TILES
- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

Date	06/29/2021
Scale	Not to Scale
Drawn	KC
Approved	XX
Dwg. No.	XXX

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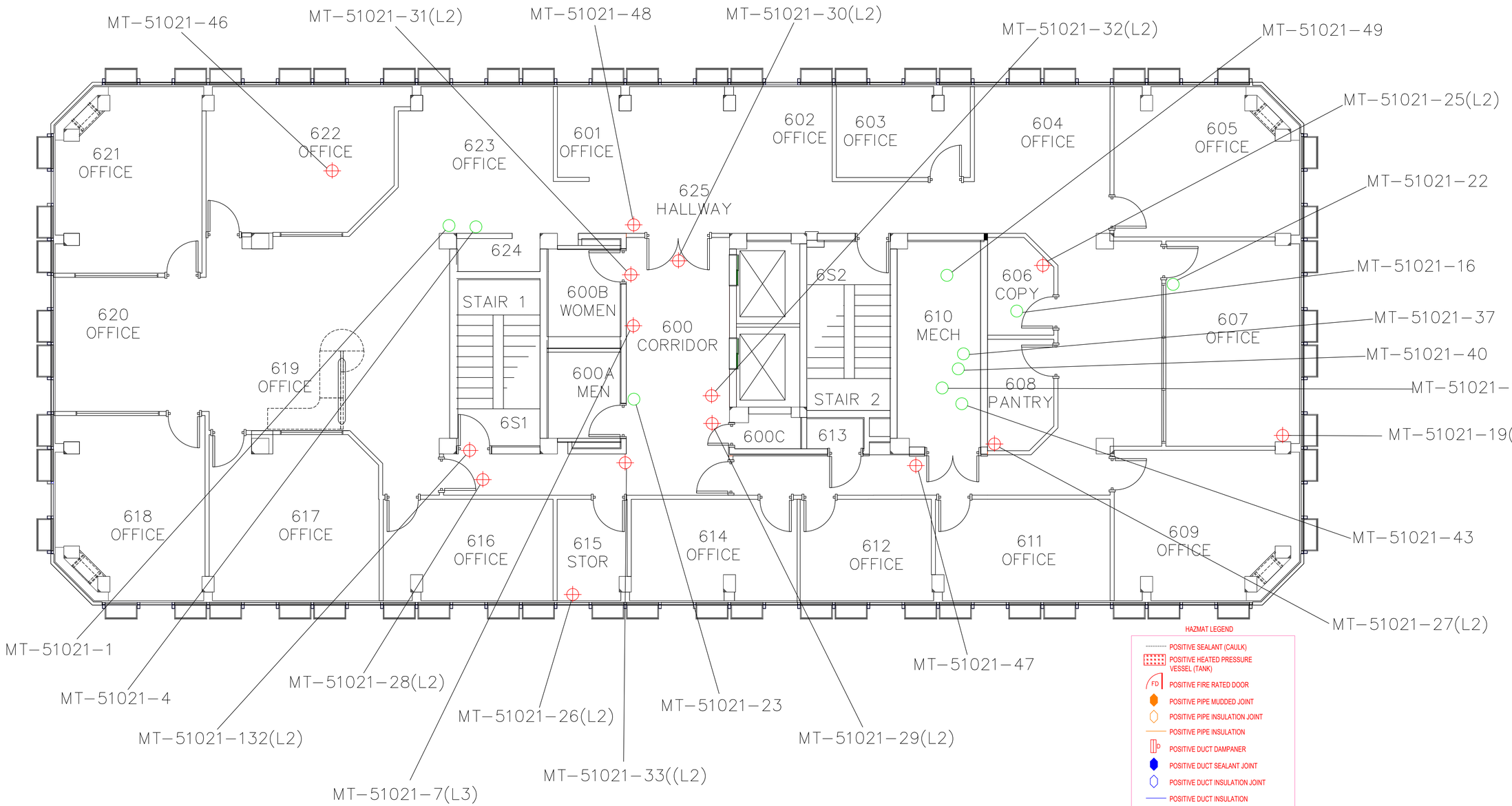
BOGGS ENVIRONMENTAL CONSULTANTS

ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - FIFTH FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023



HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- FD POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- POSITIVE DUCT DAMPANER
- POSITIVE DUCT SEALANT JOINT
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- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

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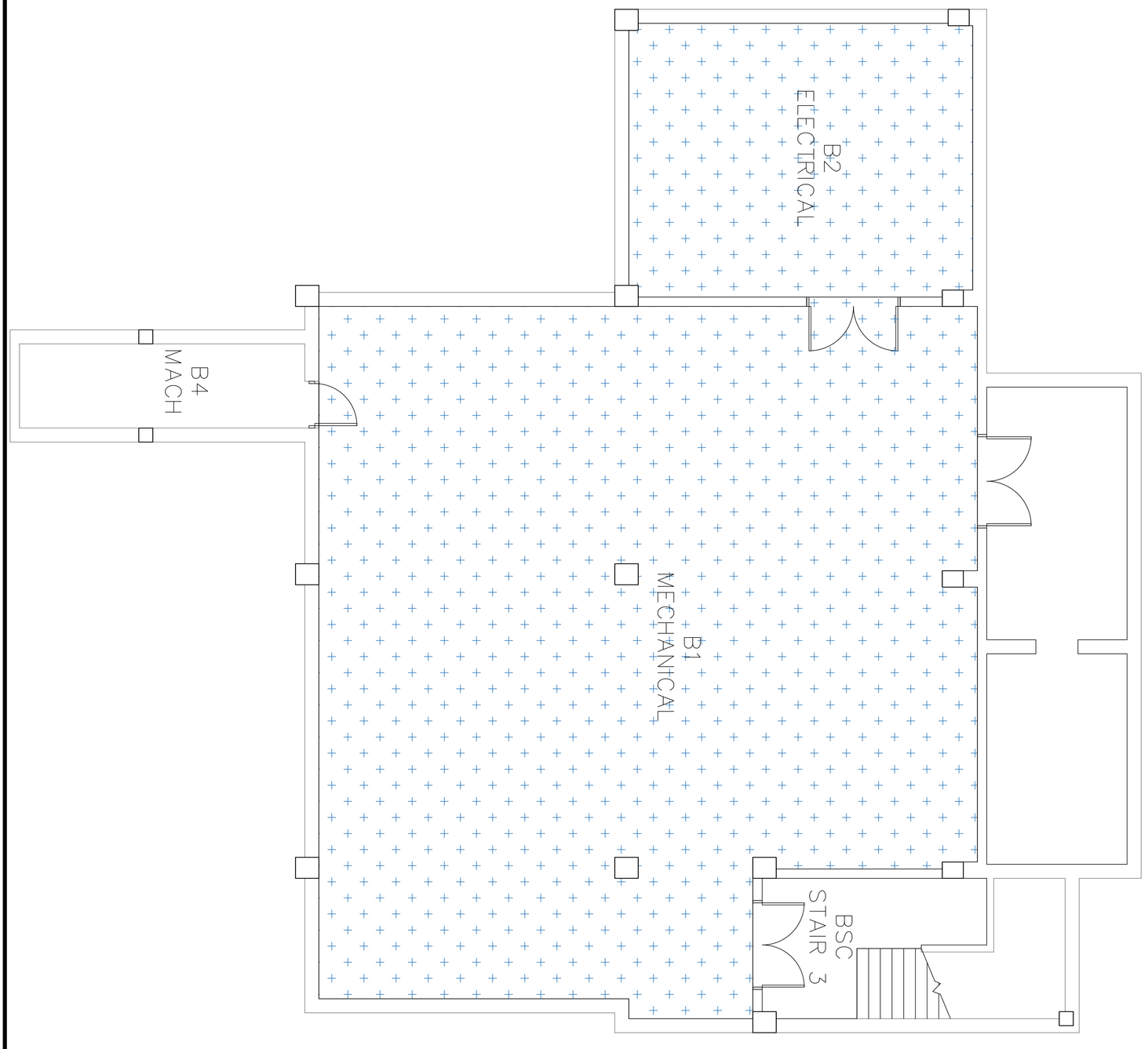
ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - SIXTH FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023



HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
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- POSITIVE FIRE RATED DOOR
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- PRESUMED TRANSITE TABLETOPS
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ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - BASEMENT FLOOR

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No black floor tile mastic uncovered in Room 002
M.L. Rocke 10AUG2023

No ACM drywall joint compound in wall between 004 and 005
M.L. Rocke 10AUG2023

No ACM in gray ceramic tile or grout (homogeneous area P6), rooms 022, 023 & 025
.L. Rocke 28FEB2025

HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
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ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - GROUND FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR
- POSITIVE PIPE MUDDED JOINT
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ROCKVILLE CAMPUS

MACKLIN TOWER - GROUND FLOOR - ABOVE 4 FT.

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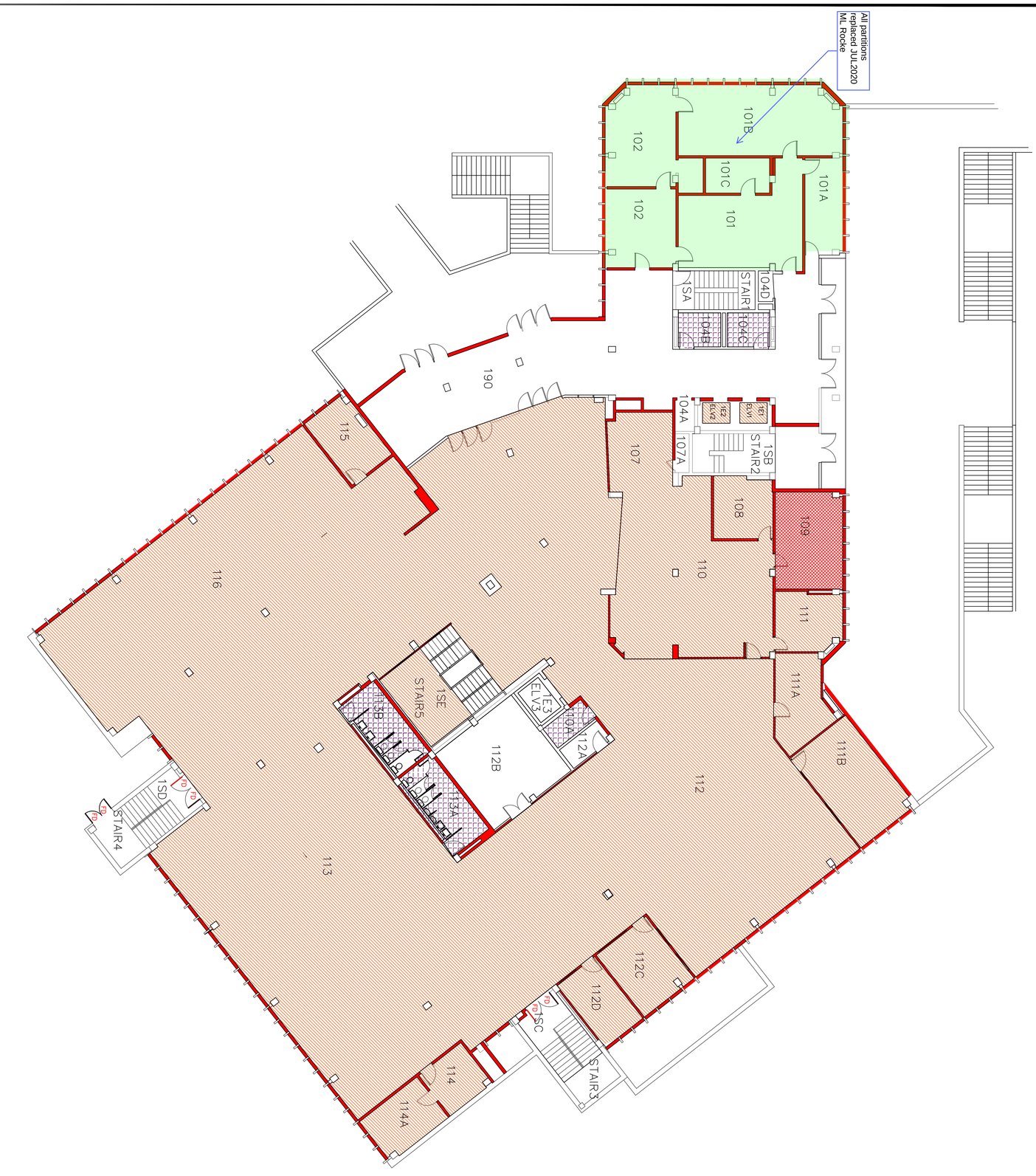

ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - 1ST FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

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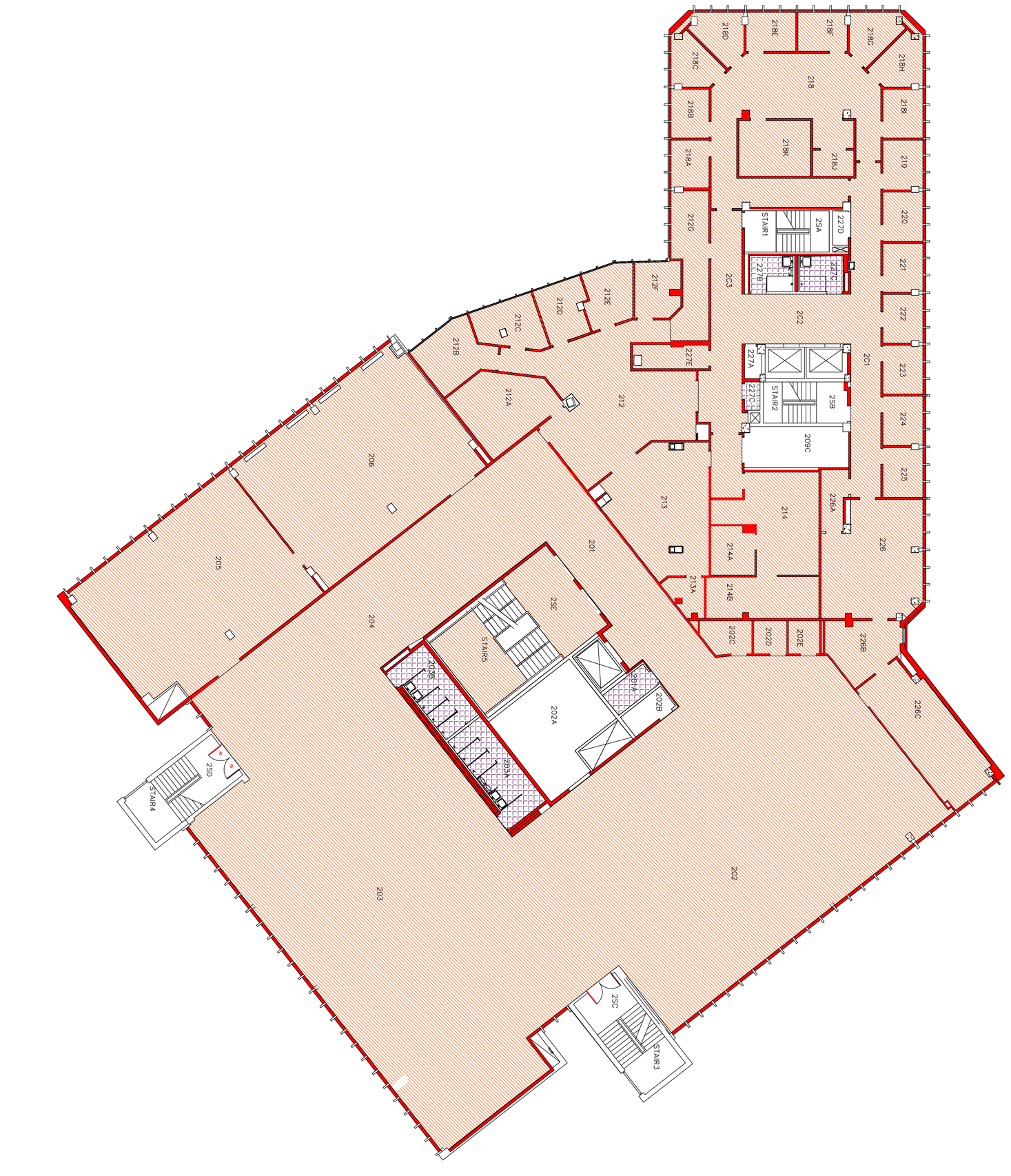

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ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - SECOND FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

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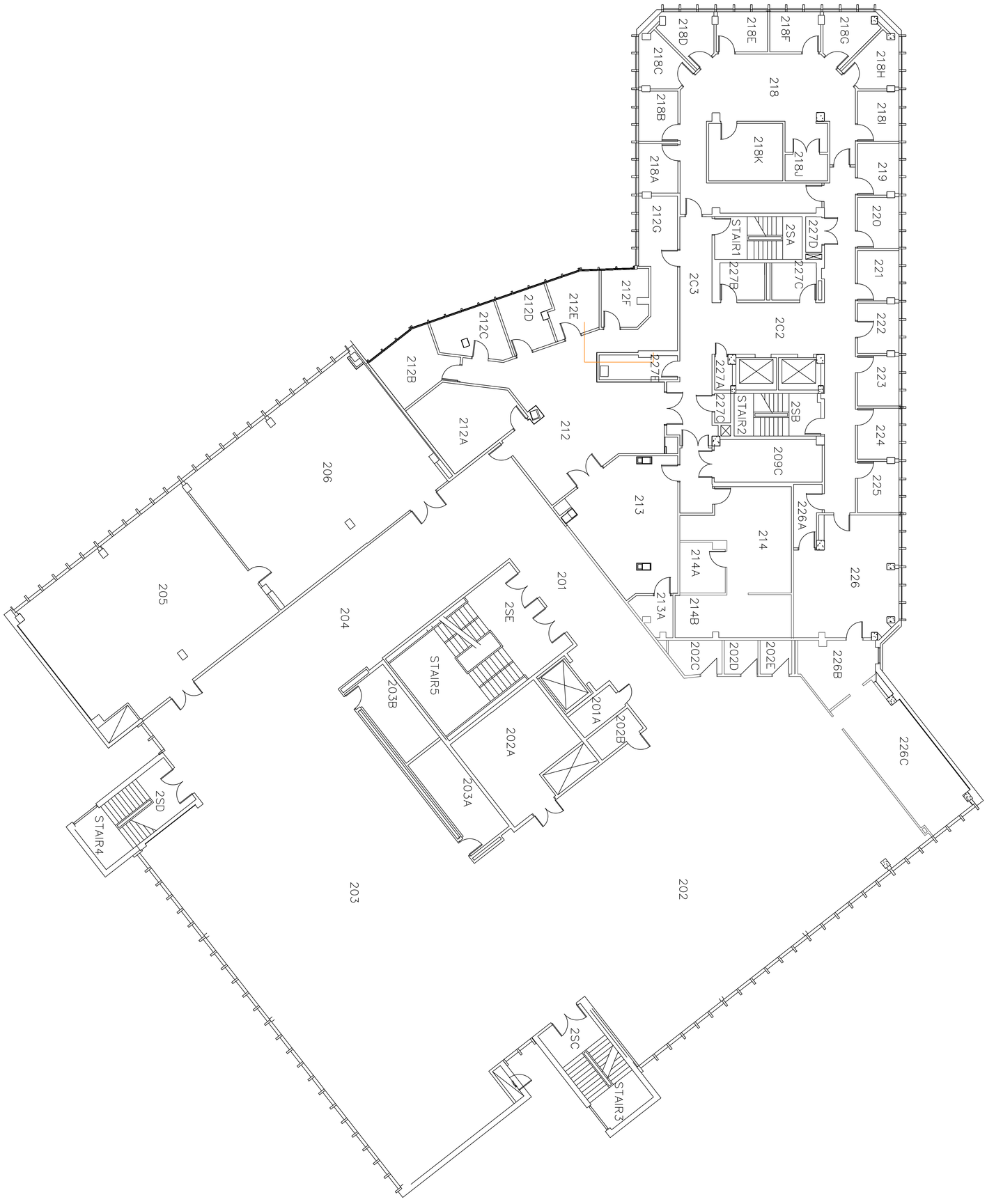

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- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - 2ND FLOOR - ABOVE 4 FT.

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

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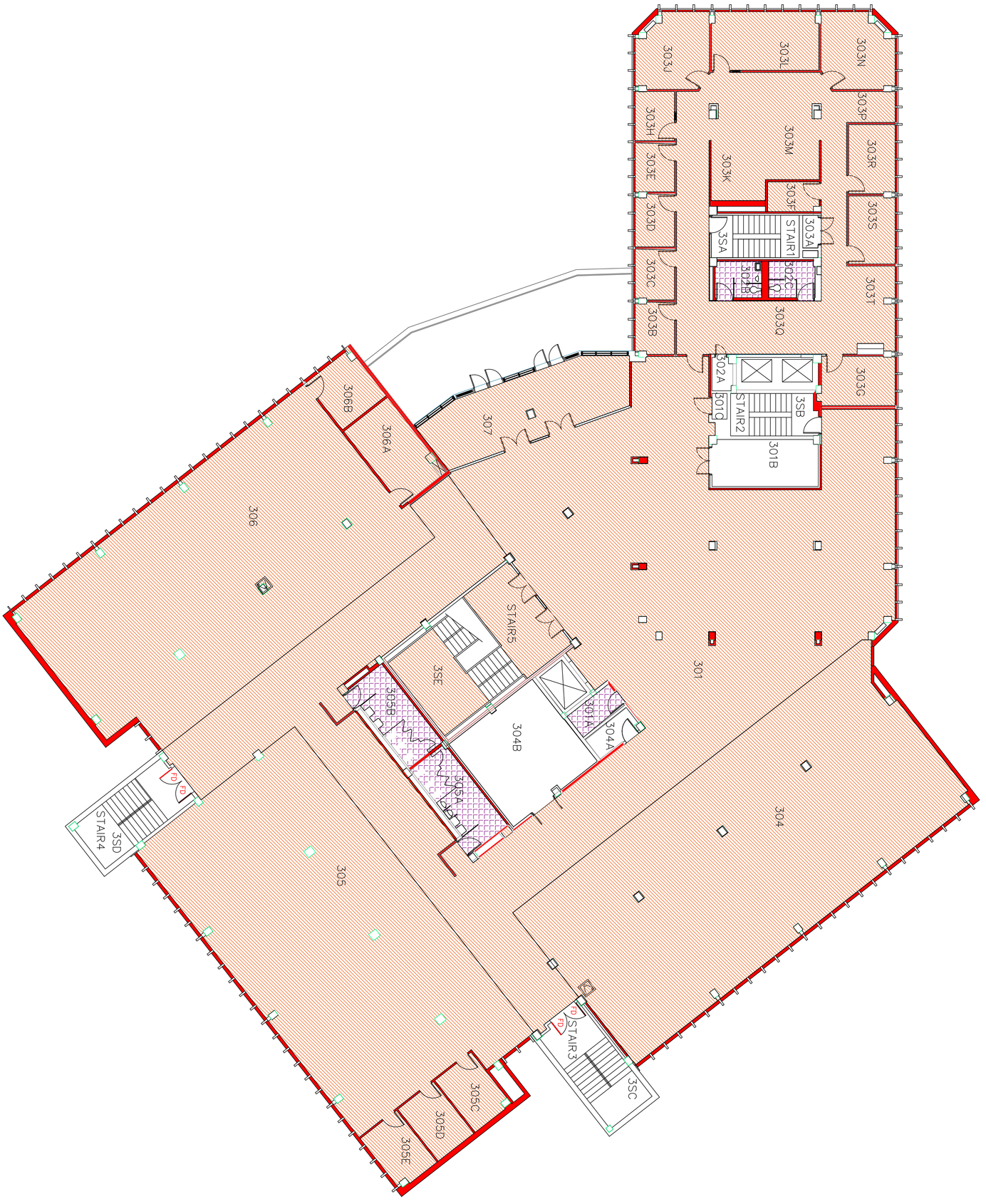

HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
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- PRESUMED CERAMIC TILES
- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - THIRD FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

BOGGS ENVIRONMENTAL CONSULTANTS

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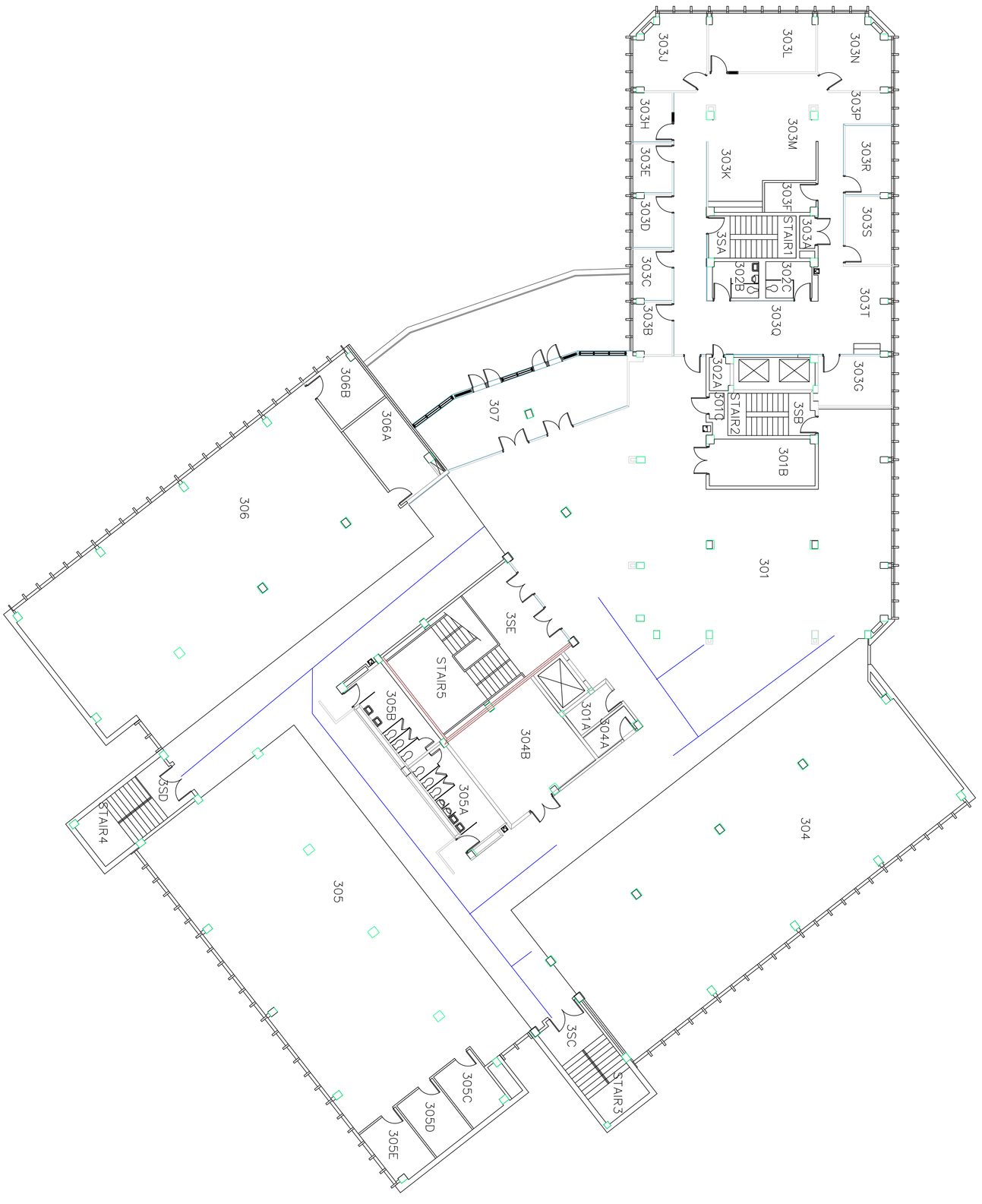
Dwg. No.	XXX



HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
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- POSITIVE PIPE MUDDED JOINT
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- POSITIVE FLOOR TILE
- POSITIVE DUCT PIN MASTIC
- PRESUMED CERAMIC TILES
- PRESUMED VIBRATION DAMPENER
- PRESUMED TRANSITE TABLETOPS
- NEGATIVE SAMPLE LOCATION
- POSITIVE SAMPLE LOCATION

ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - 3RD FLOOR - ABOVE 4 FT.

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

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HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR (FD)
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- POSITIVE DUCT DAMPANER
- POSITIVE DUCT SEALANT JOINT
- POSITIVE DUCT INSULATION JOINT
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- POSITIVE CEILING ADHESIVE
- POSITIVE CEILING TILE
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ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - FOURTH FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
- POSITIVE HEATED PRESSURE VESSEL (TANK)
- POSITIVE FIRE RATED DOOR (FD)
- POSITIVE PIPE MUDDED JOINT
- POSITIVE PIPE INSULATION JOINT
- POSITIVE PIPE INSULATION
- POSITIVE DUCT DAMPANER (D)
- POSITIVE DUCT SEALANT JOINT
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ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - FIFTH FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

621 OFFICE
622 OFFICE
623 OFFICE
601 OFFICE
602 OFFICE
603 OFFICE
604 OFFICE
605 OFFICE
625 HALLWAY
624
STAIR 1
600B WOMEN
600A MEN
6S1
600 CORRIDOR
6S2
STAIR 2
610 MECH
606 COPY
608 PANTRY
600C
613 CUST
607 OFFICE
620 OFFICE
619 OFFICE
618 OFFICE
617 OFFICE
616 OFFICE
615
614 OFFICE
612 OFFICE
611 OFFICE
609 OFFICE

HAZMAT LEGEND

- POSITIVE SEALANT (CAULK)
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BOGGS ENVIRONMENTAL CONSULTANTS

ROCKVILLE CAMPUS

MACKLIN TOWER BUILDING - SIXTH FLOOR

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

621 OFFICE
622 OFFICE
623 OFFICE
601 OFFICE
602 OFFICE
603 OFFICE
604 OFFICE
605 OFFICE
625 HALLWAY
624
STAIR 1
600B WOMEN
600 CORRIDOR
6S2
606 COPY
620 OFFICE
619 OFFICE
600A MEN
610 MECH
607 OFFICE
STAIR 2
608 PANTRY
6S1
600C
613
618 OFFICE
617 OFFICE
616 OFFICE
615 STOR
614 OFFICE
612 OFFICE
611 OFFICE
609 OFFICE

HAZMAT LEGEND

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MACKLIN TOWER BUILDING - 6TH FLOOR - ABOVE 4 FT.

2021 COLLEGEWIDE LIMITED ASBESTOS RE-SURVEY, FP21-023

APPENDIX F

EUROFINS CEI ANALYTICAL RESULTS

&

CHAIN OF CUSTODY

eurofins | CEI

June 2, 2021

Boggs Environmental Consultants
200 West Main St.
Middletown, MD 21769

CLIENT PROJECT: Montgomery College - Macklin Tower, MD20187
CEI LAB CODE: A216547

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on May 17, 2021. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations.

Kind Regards,

Tianbao Bai, Ph.D., CIH
Laboratory Director

NVLAP® TESTING
NVLAP LAB CODE 101768-0

eurofins | CEI

ASBESTOS ANALYTICAL REPORT
By: Polarized Light Microscopy

Prepared for

Boggs Environmental Consultants

CLIENT PROJECT: Montgomery College - Macklin Tower, MD20187

LAB CODE: A216547

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 06/02/21

TOTAL SAMPLES ANALYZED: 154

SAMPLES >1% ASBESTOS: 48

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Montgomery College - Macklin Tower, MD20187 **LAB CODE: A216547**

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
MT-51021-1		A93145	White	Gypsum Board Sheeting/joint Compound	None Detected
MT-51021-2		A93146	White	Gypsum Board Sheeting	None Detected
MT-51021-3		A93147	White	Gypsum Board Sheeting	None Detected
MT-51021-4		A93148	White	Joint Finishing Compound	None Detected
MT-51021-5		A93149	White	Joint Finishing Compound	Chrysotile 2%
MT-51021-6		A93150	White	Joint Finishing Compound	None Detected
MT-51021-7		A93151	Black,Brown	Floor Tile Mastic	Chrysotile 5%
MT-51021-8		A93152	Black,Brown	Floor Tile Mastic	Chrysotile 5%
MT-51021-9		A93153	Black,Brown	Floor Tile Mastic	Chrysotile 5%
MT-51021-10		A93154	Yellow	Carpet Mastic	None Detected
MT-51021-11		A93155	Yellow	Carpet Mastic	None Detected
MT-51021-12		A93156	Yellow,Black	Carpet Mastic	Chrysotile 2%
MT-51021-13		A93157	White	Pinhole & Puncture Act	None Detected
MT-51021-14		A93158	White	Pinhole & Puncture Act	None Detected
MT-51021-15		A93159	White	Pinhole & Puncture Act	None Detected
MT-51021-16		A93160	White	Pinhole & Puncture Act	None Detected
MT-51021-17		A93161	White	Pinhole & Puncture Act	None Detected
MT-51021-18		A93162	White	Pinhole & Puncture Act	None Detected
MT-51021-19		A93163A	Tan	Vinyl Cove Base	None Detected
	Layer 1	A93163B	Tan	Mastic	None Detected
	Layer 2	A93163B	White	Mud	Chrysotile 2%
MT-51021-20		A93164A	Tan	Vinyl Cove Base	None Detected
		A93164B	Tan	Mastic	None Detected
MT-51021-21		A93165A	Tan	Vinyl Cove Base	None Detected
		A93165B	Tan	Mastic	None Detected
MT-51021-22		A93166	White	Textured Act	None Detected
MT-51021-23		A93167	White	Textured Act	None Detected
MT-51021-24		A93168	White	Textured Act	None Detected
MT-51021-25		A93169A	Dark Blue,Black	Vft	None Detected
		A93169B	Yellow,Black	Mastic	Chrysotile 3%

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METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
MT-51021-26		A93170A	Dark Blue,Black	Vft	None Detected
		A93170B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-27		A93171A	Dark Blue,Black	Vft	None Detected
		A93171B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-28		A93172A	Off-white,Black	Vft	None Detected
		A93172B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-29		A93173A	Off-white,Black	Vft	None Detected
		A93173B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-30		A93174A	Off-white,Black	Vft	None Detected
		A93174B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-31		A93175A	Brown,Black	Vft	None Detected
		A93175B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-32		A93176A	Brown,Black	Vft	None Detected
		A93176B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-33		A93177A	Brown,Black	Vft	None Detected
		A93177B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-34		A93178A	Pink, Multicolored	Vft	None Detected
		A93178B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-35		A93179A	Pink, Multicolored	Vft	None Detected
		A93179B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-36		A93180A	Pink, Multicolored	Vft	None Detected
		A93180B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-37		A93181	Brown	Metal Duct Seam Sealant	None Detected
MT-51021-38		A93182	Brown	Metal Duct Seam Sealant	None Detected
MT-51021-39		A93183	Brown	Metal Duct Seam Sealant	None Detected
MT-51021-40		A93184	White	Pipe Insulation Mastic	None Detected
MT-51021-41		A93185	White	Pipe Insulation Mastic	None Detected
MT-51021-42		A93186	White	Pipe Insulation Mastic	None Detected
MT-51021-43		A93187	Red	Fire Stop	None Detected

Asbestos Report Summary

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METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
MT-51021-44		A93188	Red	Fire Stop	None Detected
MT-51021-45		A93189	Red	Fire Stop	None Detected
MT-51021-46		A93190	Off-white	Pipe Wrap Mastic	Chrysotile 5%
MT-51021-47		A93191	Off-white	Pipe Wrap Mastic	Chrysotile 5%
MT-51021-48		A93192	Off-white	Pipe Wrap Mastic	Chrysotile 5%
MT-51021-49		A93193	Gray	Metal Duct Seam Sealant	None Detected
MT-51021-50		A93194	Gray	Metal Duct Seam Sealant	None Detected
MT-51021-51		A93195	Gray	Metal Duct Seam Sealant	None Detected
MT-51021-52		A93196A	Gray	Vinyl Cove Base	None Detected
		A93196B	Yellow	Mastic	None Detected
MT-51021-53		A93197A	Gray	Vinyl Cove Base	None Detected
		A93197B	Yellow	Mastic	None Detected
MT-51021-54		A93198A	Gray	Vinyl Cove Base	None Detected
		A93198B	Yellow	Mastic	None Detected
MT-51021-55		A93199A	Light Blue,Black	Vft	None Detected
		A93199B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-56		A93200A	Light Blue,Black	Vft	None Detected
		A93200B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-57		A93201A	Light Blue,Black	Vft	None Detected
		A93201B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-58		A93202A	Maroon	Vinyl Cove Base	None Detected
		A93202B	Tan	Mastic	None Detected
MT-51021-59		A93203A	Maroon	Vinyl Cove Base	None Detected
		A93203B	Tan	Mastic	None Detected
MT-51021-60		A93204A	Maroon	Vinyl Cove Base	None Detected
		A93204B	Tan	Mastic	None Detected
MT-51021-61		A93205	White	Small & Large Pinhole Act	None Detected
MT-51021-62		A93206	White	Small & Large Pinhole Act	None Detected
MT-51021-63		A93207	White	Small & Large Pinhole Act	None Detected
MT-51021-64		A93208A	Navy Blue,Light Blue	Vft	None Detected

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METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
		A93208B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-65		A93209A	Navy Blue,Light Blue	Vft	None Detected
		A93209B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-66		A93210A	Navy Blue,Light Blue	Vft	None Detected
		A93210B	Yellow,Black	Mastic	Chrysotile 3%
MT-51021-67		A93211A	Navy Blue	Vinyl Cove Base	None Detected
		A93211B	Yellow	Mastic	None Detected
MT-51021-68		A93212A	Navy Blue	Vinyl Cove Base	None Detected
		A93212B	Yellow	Mastic	None Detected
MT-51021-69		A93213A	Navy Blue	Vinyl Cove Base	None Detected
		A93213B	Yellow	Mastic	None Detected
MT-51021-70		A93214A	Black	Vinyl Cove Base	None Detected
		A93214B	Yellow	Mastic	None Detected
MT-51021-71		A93215A	Black	Vinyl Cove Base	None Detected
		A93215B	Yellow	Mastic	None Detected
MT-51021-72		A93216A	Black	Vinyl Cove Base	None Detected
		A93216B	Yellow	Mastic	None Detected
MT-51021-73		A93217A	Light Blue,Blue	Vft	None Detected
		A93217B	Yellow	Mastic	None Detected
		A93217C	Tan	Vft	None Detected
		A93217D	Yellow	Mastic	None Detected
MT-51021-74		A93218A	Light Blue,Blue	Vft	None Detected
		A93218B	Yellow	Mastic	None Detected
MT-51021-75		A93219A	Light Blue,Blue	Vft	None Detected
		A93219B	Yellow	Mastic	None Detected
MT-51021-76		A93220A	Navy Blue	Vinyl Stair Tread	None Detected
		A93220B	Yellow	Mastic	None Detected
MT-51021-77		A93221A	Navy Blue	Vinyl Stair Tread	None Detected
		A93221B	Yellow	Mastic	None Detected
MT-51021-78		A93222A	Navy Blue	Vinyl Stair Tread	None Detected

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Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
		A93222B	Yellow	Mastic	None Detected
MT-51021-79	Layer 1	A93223A	Yellow	Mastic	None Detected
	Layer 2	A93223A	Beige	Vft	None Detected
		A93223B	Black	Mastic	Chrysotile 5%
MT-51021-80	Layer 1	A93224A	Yellow	Mastic	None Detected
	Layer 2	A93224A	Beige	Vft	None Detected
		A93224B	Black	Mastic	Chrysotile 5%
MT-51021-81	Layer 1	A93225A	Yellow	Mastic	None Detected
	Layer 2	A93225A	Beige	Vft	None Detected
		A93225B	Black	Mastic	Chrysotile 5%
MT-51021-82		A93226	Off-white	Inset Pinhole & Fissure Act	None Detected
MT-51021-83		A93227	Off-white	Inset Pinhole & Fissure Act	None Detected
MT-51021-84		A93228	Off-white	Inset Pinhole & Fissure Act	None Detected
MT-51021-85		A93229	White	Pinhole & Fissure Act	None Detected
MT-51021-86		A93230	White	Pinhole & Fissure Act	None Detected
MT-51021-87		A93231	White	Pinhole & Fissure Act	None Detected
MT-51021-88		A93232	White	Duct Insulation Mastic	Chrysotile 10%
MT-51021-89		A93233	White	Duct Insulation Mastic	Chrysotile 10%
MT-51021-90		A93234	White	Duct Insulation Mastic	Chrysotile 10%
MT-51021-91		A93235A	Marble Pattern	Flooring	None Detected
		A93235B	Yellow	Mastic	None Detected
MT-51021-92		A93236A	Marble Pattern	Flooring	None Detected
		A93236B	Yellow	Mastic	None Detected
MT-51021-93		A93237A	Marble Pattern	Flooring	None Detected
		A93237B	Yellow	Mastic	None Detected
MT-51021-94	Layer 1	A93238	White	Finished Plaster Skim Coat	None Detected
	Layer 2	A93238	Gray	Finished Plaster Base Coat	None Detected
MT-51021-95	Layer 1	A93239	White	Finished Plaster Skim Coat	None Detected
	Layer 2	A93239	Gray	Finished Plaster Base Coat	None Detected
MT-51021-96	Layer 1	A93240	White	Finished Plaster Skim Coat	None Detected
	Layer 2	A93240	Gray	Finished Plaster Base Coat	None Detected

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METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
MT-51021-97	Layer 1	A93241	White	Finished Plaster Skim Coat	None Detected
	Layer 2	A93241	Gray	Finished Plaster Base Coat	None Detected
MT-51021-98	Layer 1	A93242	White	Finished Plaster Skim Coat	None Detected
	Layer 2	A93242	Gray	Finished Plaster Base Coat	None Detected
MT-51021-99		A93243A	Tan Brown, Green	Vft	None Detected
		A93243B	Yellow	Mastic	None Detected
MT-51021-100		A93244A	Tan Brown, Green	Vft	None Detected
		A93244B	Yellow	Mastic	None Detected
MT-51021-101		A93245A	Tan Brown, Green	Vft	None Detected
		A93245B	Yellow	Mastic	None Detected
MT-51021-102		A93246A	Tan,Brown	Vft	Chrysotile 10%
		A93246B	Black	Mastic	Chrysotile 5%
MT-51021-103		A93247A	Tan,Brown	Vft	Chrysotile 10%
		A93247B	Black	Mastic	Chrysotile 5%
MT-51021-104		A93248A	Tan,Brown	Vft	Chrysotile 10%
		A93248B	Black	Mastic	Chrysotile 5%
MT-51021-105		A93249A	Off-white,Tan	Vft	None Detected
		A93249B	Yellow,Black	Mastic	None Detected
MT-51021-106		A93250A	Off-white,Tan	Vft	None Detected
		A93250B	Yellow,Black	Mastic	None Detected
MT-51021-107		A93251A	Off-white,Tan	Vft	None Detected
		A93251B	Yellow,Black	Mastic	None Detected
MT-51021-108		A93252	White	Interior Duct Insulation	None Detected
MT-51021-109		A93253	White	Interior Duct Insulation	None Detected
MT-51021-110		A93254	White	Interior Duct Insulation	None Detected
MT-51021-111		A93255A	White,Black	Vft	None Detected
		A93255B	Yellow	Mastic	None Detected
MT-51021-112		A93256A	White,Black	Vft	None Detected
		A93256B	Yellow	Mastic	None Detected

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Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
MT-51021-113		A93257A	White,Black	Vft	None Detected
		A93257B	Yellow	Mastic	None Detected
MT-51021-114		A93258A	Gray Orange, Black	Vft	None Detected
		A93258B	Yellow	Mastic	None Detected
MT-51021-115		A93259A	Gray Orange, Black	Vft	None Detected
		A93259B	Yellow	Mastic	None Detected
MT-51021-116		A93260A	Gray Orange, Black	Vft	None Detected
		A93260B	Yellow	Mastic	None Detected
MT-51021-117		A93261A	Gray	Vft	None Detected
		A93261B	Gray	Mastic	None Detected
MT-51021-118		A93262A	Gray	Vft	None Detected
		A93262B	Gray	Mastic	None Detected
MT-51021-119		A93263A	Gray	Vft	None Detected
		A93263B	Gray	Mastic	None Detected
MT-51021-120		A93264	Gray	Spray Applied Fireproofing	None Detected
MT-51021-121		A93265	Gray	Spray Applied Fireproofing	None Detected
MT-51021-122		A93266	Gray	Spray Applied Fireproofing	None Detected
MT-51021-123		A93267A	Dark Gray	Vinyl Cove Base	None Detected
		A93267B	Tan	Mastic	None Detected
MT-51021-124		A93268A	Dark Gray	Vinyl Cove Base	None Detected
		A93268B	Tan	Mastic	None Detected
MT-51021-125		A93269A	Dark Gray	Vinyl Cove Base	None Detected
		A93269B	Tan	Mastic	None Detected
MT-51021-126		A93270A	Brown	Vinyl Cove Base	None Detected
		A93270B	Tan	Mastic	None Detected
MT-51021-127		A93271A	Brown	Vinyl Cove Base	None Detected
		A93271B	Tan	Mastic	None Detected
MT-51021-128		A93272A	Brown	Vinyl Cove Base	None Detected
		A93272B	Tan	Mastic	None Detected

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METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
MT-51021-129		A93273A	Gray Red,Black	Vft	None Detected
		A93273B	Clear	Mastic	None Detected
MT-51021-130		A93274A	Gray Red,Black	Vft	None Detected
		A93274B	Clear	Mastic	None Detected
MT-51021-131		A93275A	Gray Red,Black	Vft	None Detected
		A93275B	Clear	Mastic	None Detected
MT-51021-132		A93276A	Black	Vinyl Threshold Strip	None Detected
		A93276B	Black	Mastic	Chrysotile 2%
MT-51021-133		A93277	Black	Vinyl Threshold Strip	None Detected
MT-51021-134		A93278A	Black	Vinyl Threshold Strip	None Detected
		A93278B	Brown	Mastic	None Detected
MT-51021-135		A93279A	Orange	Vft	None Detected
		A93279B	Clear	Mastic	None Detected
MT-51021-136		A93280A	Orange	Vft	None Detected
		A93280B	Clear	Mastic	None Detected
MT-51021-137		A93281A	Marble Pattern	Vft	None Detected
		A93281B	Yellow	Mastic	None Detected
MT-51021-138		A93282A	Marble Pattern	Vft	None Detected
		A93282B	Yellow	Mastic	None Detected
MT-51021-139		A93283A	Yellow	Vft	None Detected
	Layer 1	A93283B	Yellow	Mastic	None Detected
	Layer 2	A93283B	Gray	Leveling Compound	None Detected
	Layer 3	A93283B	Black	Mastic	Chrysotile 5%
MT-51021-140		A93284A	Yellow	Vft	None Detected
	Layer 1	A93284B	Yellow	Mastic	None Detected
	Layer 2	A93284B	Gray	Leveling Compound	None Detected
	Layer 3	A93284B	Black	Mastic	Chrysotile 5%
MT-51021-141		A93285A	Purple,Orange	Vsg	None Detected
		A93285B	Black	Mastic	Chrysotile 3%
MT-51021-142		A93286A	Purple,Orange	Vsg	None Detected
		A93286B	Black	Mastic	Chrysotile 3%

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METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
MT-51021-143		A93287	Tan	Ceiling Insulation Pin Mastic	Chrysotile 5%
MT-51021-144		A93288	Tan	Ceiling Insulation Pin Mastic	Chrysotile 5%
MT-51021-145		A93289A	Pink,Black	Vft	None Detected
		A93289B	Black,Brown	Mastic	Chrysotile 5%
MT-51021-146		A93290A	Pink,Black	Vft	None Detected
		A93290B	Black,Brown	Mastic	Chrysotile 5%
MT-51021-147		A93291	Black	Tar Sealant	None Detected
MT-51021-148		A93292	Black	Tar Sealant	None Detected
MT-51021-149		A93293A	Black,White	Vft	None Detected
		A93293B	Yellow	Mastic	None Detected
MT-51021-150		A93294A	Black,White	Vft	None Detected
		A93294B	Yellow	Mastic	None Detected
MT-51021-151		A93295A	Red	Vft	None Detected
		A93295B	Yellow	Mastic	None Detected
MT-51021-152		A93296A	Red	Vft	None Detected
		A93296B	Yellow	Mastic	None Detected
MT-51021-153		A93297A	Wood Pattern	Vsg	None Detected
		A93297B	Gray	Mastic	None Detected
MT-51021-154		A93298A	Wood Pattern	Vsg	None Detected
		A93298B	Gray	Mastic	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Boggs Environmental Consultants
200 West Main St.
Middletown, MD 21769

Lab Code: A216547
Date Received: 05-17-21
Date Analyzed: 06-02-21
Date Reported: 06-02-21

Project: Montgomery College - Macklin Tower, MD20187

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
MT-51021-1 A93145	Gypsum Board Sheeting/joint Compound	Heterogeneous White Fibrous Bound	15%	Cellulose	73% 10% 2%	Gypsum Calc Carb Paint	None Detected
MT-51021-2 A93146	Gypsum Board Sheeting	Heterogeneous White Fibrous Bound	15%	Cellulose	83% 2%	Gypsum Paint	None Detected
MT-51021-3 A93147	Gypsum Board Sheeting	Heterogeneous White Fibrous Bound	15%	Cellulose	83% 2%	Gypsum Paint	None Detected
MT-51021-4 A93148	Joint Finishing Compound	Heterogeneous White Non-fibrous Bound			60% 35% 5%	Binder Calc Carb Paint	None Detected
MT-51021-5 A93149	Joint Finishing Compound	Heterogeneous White Non-fibrous Bound			58% 35% 5%	Binder Calc Carb Paint	**2% Chrysotile**
MT-51021-6 A93150	Joint Finishing Compound	Heterogeneous White Non-fibrous Bound			60% 35% 5%	Binder Calc Carb Paint	None Detected
MT-51021-7 A93151	Floor Tile Mastic	Homogeneous Black,Brown Non-fibrous Bound			95%	Mastic	**5% Chrysotile**

Lab Notes: Unable to separate mastics for analysis.

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Boggs Environmental Consultants
200 West Main St.
Middletown, MD 21769

Lab Code: A216547
Date Received: 05-17-21
Date Analyzed: 06-02-21
Date Reported: 06-02-21

Project: Montgomery College - Macklin Tower, MD20187

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
MT-51021-8 A93152	Floor Tile Mastic	Homogeneous Black,Brown Non-fibrous Bound			95%	Mastic	**5% Chrysotile**
Lab Notes: Unable to separate mastics for analysis.							
MT-51021-9 A93153	Floor Tile Mastic	Homogeneous Black,Brown Non-fibrous Bound			95%	Mastic	**5% Chrysotile**
Lab Notes: Unable to separate mastics for analysis.							
MT-51021-10 A93154	Carpet Mastic	Homogeneous Yellow Non-fibrous Bound	<1%	Synthetic Fiber	100%	Mastic	None Detected
MT-51021-11 A93155	Carpet Mastic	Homogeneous Yellow Non-fibrous Bound	<1%	Synthetic Fiber	100%	Mastic	None Detected
MT-51021-12 A93156	Carpet Mastic	Homogeneous Yellow,Black Non-fibrous Bound	<1%	Synthetic Fiber	98%	Mastic	**2% Chrysotile**
Lab Notes: Unable to separate mastics for analysis.							
MT-51021-13 A93157	Pinhole & Puncture Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-14 A93158	Pinhole & Puncture Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Boggs Environmental Consultants
200 West Main St.
Middletown, MD 21769

Lab Code: A216547
Date Received: 05-17-21
Date Analyzed: 06-02-21
Date Reported: 06-02-21

Project: Montgomery College - Macklin Tower, MD20187

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
MT-51021-15 A93159	Pinhole & Puncture Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-16 A93160	Pinhole & Puncture Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-17 A93161	Pinhole & Puncture Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-18 A93162	Pinhole & Puncture Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-19 A93163A	Vinyl Cove Base	Homogeneous Tan Non-fibrous Tightly Bound			100%	Vinyl	None Detected
Layer 1 A93163B	Mastic	Homogeneous Tan Non-fibrous Bound			100%	Vinyl	None Detected
Layer 2 A93163B	Mud	Homogeneous White Non-fibrous Bound			58% 40%	Binder Calc Carb	**2% Chrysotile**

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
MT-51021-20 A93164A	Vinyl Cove Base	Homogeneous Tan Non-fibrous Tightly Bound			100%	Vinyl	None Detected
A93164B	Mastic	Homogeneous Tan Non-fibrous Bound			100%	Vinyl	None Detected
MT-51021-21 A93165A	Vinyl Cove Base	Homogeneous Tan Non-fibrous Tightly Bound			100%	Vinyl	None Detected
A93165B	Mastic	Homogeneous Tan Non-fibrous Bound			100%	Vinyl	None Detected
MT-51021-22 A93166	Textured Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-23 A93167	Textured Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-24 A93168	Textured Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous		ASBESTOS %
MT-51021-25 A93169A	Vft	Homogeneous Dark Blue,Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93169B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound		97%	Mastic	**3% Chrysotile**
Lab Notes: Unable to separate mastics for analysis.						
MT-51021-26 A93170A	Vft	Homogeneous Dark Blue,Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93170B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound		97%	Mastic	**3% Chrysotile**
Lab Notes: Unable to separate mastics for analysis.						
MT-51021-27 A93171A	Vft	Homogeneous Dark Blue,Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93171B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound		97%	Mastic	**3% Chrysotile**
Lab Notes: Unable to separate mastics for analysis.						
MT-51021-28 A93172A	Vft	Homogeneous Off-white,Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected

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A93172B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-29 A93173A	Vft	Homogeneous Off-white,Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93173B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-30 A93174A	Vft	Homogeneous Off-white,Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93174B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-31 A93175A	Vft	Homogeneous Brown,Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected

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A93175B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-32 A93176A	Vft	Homogeneous Brown,Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93176B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-33 A93177A	Vft	Homogeneous Brown,Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93177B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-34 A93178A	Vft	Homogeneous Pink,Multicolored Non-fibrous Tightly Bound	100%	Vinyl	None Detected

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A93178B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-35 A93179A	Vft	Homogeneous Pink,Multicolored Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93179B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-36 A93180A	Vft	Homogeneous Pink,Multicolored Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93180B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-37 A93181	Metal Duct Seam Sealant	Homogeneous Brown Non-fibrous Bound	100%	Binder	None Detected
MT-51021-38 A93182	Metal Duct Seam Sealant	Homogeneous Brown Non-fibrous Bound	100%	Binder	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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MT-51021-39 A93183	Metal Duct Seam Sealant	Homogeneous Brown Non-fibrous Bound			100%	Binder	None Detected
MT-51021-40 A93184	Pipe Insulation Mastic	Homogeneous White Non-fibrous Bound	2%	Fiberglass	98%	Mastic	None Detected
MT-51021-41 A93185	Pipe Insulation Mastic	Homogeneous White Non-fibrous Bound	2%	Fiberglass	98%	Mastic	None Detected
MT-51021-42 A93186	Pipe Insulation Mastic	Homogeneous White Non-fibrous Bound	2%	Fiberglass	98%	Mastic	None Detected
MT-51021-43 A93187	Fire Stop	Homogeneous Red Fibrous Bound	10%	Fiberglass	90%	Caulk	None Detected
MT-51021-44 A93188	Fire Stop	Homogeneous Red Fibrous Bound	10%	Fiberglass	90%	Caulk	None Detected
MT-51021-45 A93189	Fire Stop	Homogeneous Red Fibrous Bound	10%	Fiberglass	90%	Caulk	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
MT-51021-46 A93190	Pipe Wrap Mastic	Homogeneous Off-white Non-fibrous Bound	2%	Talc	93%	Mastic	**5% Chrysotile**
MT-51021-47 A93191	Pipe Wrap Mastic	Homogeneous Off-white Non-fibrous Bound	2%	Talc	93%	Mastic	**5% Chrysotile**
MT-51021-48 A93192	Pipe Wrap Mastic	Homogeneous Off-white Non-fibrous Bound	2%	Talc	93%	Mastic	**5% Chrysotile**
MT-51021-49 A93193	Metal Duct Seam Sealant	Homogeneous Gray Non-fibrous Bound	<1%	Synthetic Fiber	100%	Binder	None Detected
MT-51021-50 A93194	Metal Duct Seam Sealant	Homogeneous Gray Non-fibrous Bound	<1%	Synthetic Fiber	100%	Binder	None Detected
MT-51021-51 A93195	Metal Duct Seam Sealant	Homogeneous Gray Non-fibrous Bound	<1%	Synthetic Fiber	100%	Binder	None Detected
MT-51021-52 A93196A	Vinyl Cove Base	Homogeneous Gray Non-fibrous Tightly Bound			100%	Vinyl	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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A93196B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021-53 A93197A	Vinyl Cove Base	Homogeneous Gray Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93197B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021-54 A93198A	Vinyl Cove Base	Homogeneous Gray Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93198B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021-55 A93199A	Vft	Homogeneous Light Blue,Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93199B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound		97%	Mastic	**3% Chrysotile**

Lab Notes: Unable to separate mastics for analysis.

ASBESTOS BULK ANALYSIS

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous	ASBESTOS %
MT-51021-56 A93200A	Vft	Homogeneous Light Blue,Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93200B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	**3% Chrysotile**
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-57 A93201A	Vft	Homogeneous Light Blue,Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93201B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	**3% Chrysotile**
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-58 A93202A	Vinyl Cove Base	Homogeneous Maroon Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93202B	Mastic	Homogeneous Tan Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-59 A93203A	Vinyl Cove Base	Homogeneous Maroon Non-fibrous Tightly Bound	100%	Vinyl	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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A93203B	Mastic	Homogeneous Tan Non-fibrous Bound			100%	Mastic	None Detected
MT-51021-60 A93204A	Vinyl Cove Base	Homogeneous Maroon Non-fibrous Tightly Bound			100%	Vinyl	None Detected
A93204B	Mastic	Homogeneous Tan Non-fibrous Bound			100%	Mastic	None Detected
MT-51021-61 A93205	Small & Large Pinhole Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-62 A93206	Small & Large Pinhole Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-63 A93207	Small & Large Pinhole Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-64 A93208A	Vft	Homogeneous Navy Blue,Light Blue Non-fibrous Tightly Bound			100%	Vinyl	None Detected

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A93208B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-65 A93209A	Vft	Homogeneous Navy Blue,Light Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93209B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-66 A93210A	Vft	Homogeneous Navy Blue,Light Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93210B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound	97%	Mastic	3% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-67 A93211A	Vinyl Cove Base	Homogeneous Navy Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected

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A93211B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-68 A93212A	Vinyl Cove Base	Homogeneous Navy Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93212B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-69 A93213A	Vinyl Cove Base	Homogeneous Navy Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93213B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-70 A93214A	Vinyl Cove Base	Homogeneous Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93214B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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MT-51021-71 A93215A	Vinyl Cove Base	Homogeneous Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93215B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021-72 A93216A	Vinyl Cove Base	Homogeneous Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93216B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021-73 A93217A	Vft	Homogeneous Light Blue,Blue Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93217B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
A93217C	Vft	Homogeneous Tan Non-fibrous Tightly Bound		100%	Vinyl	None Detected

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A93217D	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-74 A93218A	Vft	Homogeneous Light Blue,Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93218B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-75 A93219A	Vft	Homogeneous Light Blue,Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93219B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-76 A93220A	Vinyl Stair Tread	Homogeneous Navy Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93220B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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MT-51021-77 A93221A	Vinyl Stair Tread	Homogeneous Navy Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93221B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-78 A93222A	Vinyl Stair Tread	Homogeneous Navy Blue Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93222B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-79 Layer 1 A93223A	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
Layer 2 A93223A	Vft	Homogeneous Beige Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93223B	Mastic	Homogeneous Black Non-fibrous Bound	95%	Mastic	**5% Chrysotile**

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
MT-51021-80 Layer 1 A93224A	Mastic	Homogeneous Yellow Non-fibrous Bound			100%	Mastic	None Detected
Layer 2 A93224A	Vft	Homogeneous Beige Non-fibrous Tightly Bound			100%	Vinyl	None Detected
A93224B	Mastic	Homogeneous Black Non-fibrous Bound			95%	Mastic	**5% Chrysotile**
MT-51021-81 Layer 1 A93225A	Mastic	Homogeneous Yellow Non-fibrous Bound			100%	Mastic	None Detected
Layer 2 A93225A	Vft	Homogeneous Beige Non-fibrous Tightly Bound			100%	Vinyl	None Detected
A93225B	Mastic	Homogeneous Black Non-fibrous Bound			95%	Mastic	**5% Chrysotile**
MT-51021-82 A93226	Inset Pinhole & Fissure Act	Heterogeneous Off-white Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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MT-51021-83 A93227	Inset Pinhole & Fissure Act	Heterogeneous Off-white Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-84 A93228	Inset Pinhole & Fissure Act	Heterogeneous Off-white Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-85 A93229	Pinhole & Fissure Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-86 A93230	Pinhole & Fissure Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-87 A93231	Pinhole & Fissure Act	Heterogeneous White Fibrous Loosely Bound	40% 25%	Cellulose Fiberglass	30% 5%	Perlite Binder	None Detected
MT-51021-88 A93232	Duct Insulation Mastic	Homogeneous White Non-fibrous Bound			90%	Mastic	**10% Chrysotile**
MT-51021-89 A93233	Duct Insulation Mastic	Homogeneous White Non-fibrous Bound			90%	Mastic	**10% Chrysotile**

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Boggs Environmental Consultants
200 West Main St.
Middletown, MD 21769

Lab Code: A216547
Date Received: 05-17-21
Date Analyzed: 06-02-21
Date Reported: 06-02-21

Project: Montgomery College - Macklin Tower, MD20187

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous		ASBESTOS %
MT-51021-90 A93234	Duct Insulation Mastic	Homogeneous White Non-fibrous Bound		90%	Mastic	10% Chrysotile
MT-51021-91 A93235A	Flooring	Homogeneous Marble Pattern Non-fibrous Tightly Bound		70% 30%	Silicates Binder	None Detected
A93235B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021-92 A93236A	Flooring	Homogeneous Marble Pattern Non-fibrous Tightly Bound		70% 30%	Silicates Binder	None Detected
A93236B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021-93 A93237A	Flooring	Homogeneous Marble Pattern Non-fibrous Tightly Bound		70% 30%	Silicates Binder	None Detected
A93237B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous		ASBESTOS %
MT-51021-94 Layer 1 A93238	Finished Plaster Skim Coat	Homogeneous White Non-fibrous Bound		80% 20%	Binder Calc Carb	None Detected
Layer 2 A93238	Finished Plaster Base Coat	Homogeneous Gray Non-fibrous Bound		75% 25%	Silicates Binder	None Detected
MT-51021-95 Layer 1 A93239	Finished Plaster Skim Coat	Homogeneous White Non-fibrous Bound		80% 20%	Binder Calc Carb	None Detected
Layer 2 A93239	Finished Plaster Base Coat	Homogeneous Gray Non-fibrous Bound		75% 25%	Silicates Binder	None Detected
MT-51021-96 Layer 1 A93240	Finished Plaster Skim Coat	Homogeneous White Non-fibrous Bound		80% 20%	Binder Calc Carb	None Detected
Layer 2 A93240	Finished Plaster Base Coat	Homogeneous Gray Non-fibrous Bound		75% 25%	Silicates Binder	None Detected
MT-51021-97 Layer 1 A93241	Finished Plaster Skim Coat	Homogeneous White Non-fibrous Bound		80% 20%	Binder Calc Carb	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous	ASBESTOS %
Layer 2 A93241	Finished Plaster Base Coat	Homogeneous Gray Non-fibrous Bound	75% 25%	Silicates Binder	None Detected
MT-51021-98 Layer 1 A93242	Finished Plaster Skim Coat	Homogeneous White Non-fibrous Bound	80% 20%	Binder Calc Carb	None Detected
Layer 2 A93242	Finished Plaster Base Coat	Homogeneous Gray Non-fibrous Bound	75% 25%	Silicates Binder	None Detected
MT-51021-99 A93243A	Vft	Homogeneous Tan Brown, Green Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93243B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021 -100 A93244A	Vft	Homogeneous Tan Brown, Green Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93244B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous	ASBESTOS %
MT-51021 -101 A93245A	Vft	Homogeneous Tan Brown, Green Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93245B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021 -102 A93246A	Vft	Homogeneous Tan,Brown Non-fibrous Tightly Bound	90%	Vinyl	**10% Chrysotile**
A93246B	Mastic	Homogeneous Black Non-fibrous Bound	95%	Mastic	**5% Chrysotile**
MT-51021 -103 A93247A	Vft	Homogeneous Tan,Brown Non-fibrous Tightly Bound	90%	Vinyl	**10% Chrysotile**
A93247B	Mastic	Homogeneous Black Non-fibrous Bound	95%	Mastic	**5% Chrysotile**
MT-51021 -104 A93248A	Vft	Homogeneous Tan,Brown Non-fibrous Tightly Bound	90%	Vinyl	**10% Chrysotile**

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous		ASBESTOS %
A93248B	Mastic	Homogeneous Black Non-fibrous Bound		95%	Mastic	5% Chrysotile
MT-51021 -105 A93249A	Vft	Homogeneous Off-white,Tan Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93249B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound		100%	Mastic	None Detected
Lab Notes: Unable to separate mastics for analysis.						
MT-51021 -106 A93250A	Vft	Homogeneous Off-white,Tan Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93250B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound		100%	Mastic	None Detected
Lab Notes: Unable to separate mastics for analysis.						
MT-51021 -107 A93251A	Vft	Homogeneous Off-white,Tan Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93251B	Mastic	Homogeneous Yellow,Black Non-fibrous Bound		100%	Mastic	None Detected
Lab Notes: Unable to separate mastics for analysis.						

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		 Non-Fibrous		ASBESTOS %
MT-51021-108 A93252	Interior Duct Insulation	Homogeneous White Non-fibrous Tightly Bound	80%	Fiberglass	20%	Binder	None Detected
MT-51021-109 A93253	Interior Duct Insulation	Homogeneous White Non-fibrous Tightly Bound	80%	Fiberglass	20%	Binder	None Detected
MT-51021-110 A93254	Interior Duct Insulation	Homogeneous White Non-fibrous Tightly Bound	80%	Fiberglass	20%	Binder	None Detected
MT-51021-111 A93255A	Vft	Homogeneous White,Black Non-fibrous Tightly Bound			100%	Vinyl	None Detected
A93255B	Mastic	Homogeneous Yellow Non-fibrous Bound			100%	Mastic	None Detected
MT-51021-112 A93256A	Vft	Homogeneous White,Black Non-fibrous Tightly Bound			100%	Vinyl	None Detected
A93256B	Mastic	Homogeneous Yellow Non-fibrous Bound			100%	Mastic	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous		ASBESTOS %
MT-51021 -113 A93257A	Vft	Homogeneous White,Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93257B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -114 A93258A	Vft	Homogeneous Gray Orange, Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93258B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -115 A93259A	Vft	Homogeneous Gray Orange, Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93259B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -116 A93260A	Vft	Homogeneous Gray Orange, Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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A93260B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-117 A93261A	Vft	Homogeneous Gray Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93261B	Mastic	Homogeneous Gray Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-118 A93262A	Vft	Homogeneous Gray Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93262B	Mastic	Homogeneous Gray Non-fibrous Bound	100%	Mastic	None Detected
MT-51021-119 A93263A	Vft	Homogeneous Gray Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93263B	Mastic	Homogeneous Gray Non-fibrous Bound	100%	Mastic	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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MT-51021 -120 A93264	Spray Applied Fireproofing	Homogeneous Gray Fibrous Loose	100%	Mineral Wool			None Detected
MT-51021 -121 A93265	Spray Applied Fireproofing	Homogeneous Gray Fibrous Loose	100%	Mineral Wool			None Detected
MT-51021 -122 A93266	Spray Applied Fireproofing	Homogeneous Gray Fibrous Loose	100%	Mineral Wool			None Detected
MT-51021 -123 A93267A	Vinyl Cove Base	Homogeneous Dark Gray Non-fibrous Tightly Bound			100%	Vinyl	None Detected
A93267B	Mastic	Homogeneous Tan Non-fibrous Bound			100%	Mastic	None Detected
MT-51021 -124 A93268A	Vinyl Cove Base	Homogeneous Dark Gray Non-fibrous Tightly Bound			100%	Vinyl	None Detected
A93268B	Mastic	Homogeneous Tan Non-fibrous Bound			100%	Mastic	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous		ASBESTOS %
MT-51021 -125 A93269A	Vinyl Cove Base	Homogeneous Dark Gray Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93269B	Mastic	Homogeneous Tan Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -126 A93270A	Vinyl Cove Base	Homogeneous Brown Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93270B	Mastic	Homogeneous Tan Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -127 A93271A	Vinyl Cove Base	Homogeneous Brown Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93271B	Mastic	Homogeneous Tan Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -128 A93272A	Vinyl Cove Base	Homogeneous Brown Non-fibrous Tightly Bound		100%	Vinyl	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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A93272B	Mastic	Homogeneous Tan Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -129 A93273A	Vft	Homogeneous Gray Red,Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93273B	Mastic	Homogeneous Clear Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -130 A93274A	Vft	Homogeneous Gray Red,Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93274B	Mastic	Homogeneous Clear Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -131 A93275A	Vft	Homogeneous Gray Red,Black Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93275B	Mastic	Homogeneous Clear Non-fibrous Bound		100%	Mastic	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous	ASBESTOS %
MT-51021 -132 A93276A	Vinyl Threshold Strip	Homogeneous Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93276B	Mastic	Homogeneous Black Non-fibrous Bound	98%	Mastic	2% Chrysotile
MT-51021 -133 A93277	Vinyl Threshold Strip	Homogeneous Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
Lab Notes: No mastic present.					
MT-51021 -134 A93278A	Vinyl Threshold Strip	Homogeneous Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93278B	Mastic	Homogeneous Brown Non-fibrous Bound	100%	Mastic	None Detected
MT-51021 -135 A93279A	Vft	Homogeneous Orange Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93279B	Mastic	Homogeneous Clear Non-fibrous Bound	100%	Mastic	None Detected

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MT-51021 -136 A93280A	Vft	Homogeneous Orange Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93280B	Mastic	Homogeneous Clear Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -137 A93281A	Vft	Homogeneous Marble Pattern Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93281B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -138 A93282A	Vft	Homogeneous Marble Pattern Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93282B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -139 A93283A	Vft	Homogeneous Yellow Non-fibrous Tightly Bound		100%	Vinyl	None Detected

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Layer 1 A93283B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
Layer 2 A93283B	Leveling Compound	Homogeneous Gray Non-fibrous Bound		100%	Binder	None Detected
Layer 3 A93283B	Mastic	Homogeneous Black Non-fibrous Bound		95%	Mastic	5% Chrysotile
MT-51021 -140 A93284A	Vft	Homogeneous Yellow Non-fibrous Tightly Bound		100%	Vinyl	None Detected
Layer 1 A93284B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
Layer 2 A93284B	Leveling Compound	Homogeneous Gray Non-fibrous Bound		100%	Binder	None Detected
Layer 3 A93284B	Mastic	Homogeneous Black Non-fibrous Bound		95%	Mastic	5% Chrysotile

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous		Non-Fibrous		ASBESTOS %
MT-51021 -141 A93285A	Vsg	Homogeneous Purple,Orange Non-fibrous Tightly Bound	50%	Cellulose	50%	Vinyl	None Detected
A93285B	Mastic	Homogeneous Black Non-fibrous Bound			97%	Mastic	**3% Chrysotile**
MT-51021 -142 A93286A	Vsg	Homogeneous Purple,Orange Non-fibrous Tightly Bound	50%	Cellulose	50%	Vinyl	None Detected
A93286B	Mastic	Homogeneous Black Non-fibrous Bound			97%	Mastic	**3% Chrysotile**
MT-51021 -143 A93287	Ceiling Insulation Pin Mastic	Homogeneous Tan Non-fibrous Bound			95%	Mastic	**5% Chrysotile**
MT-51021 -144 A93288	Ceiling Insulation Pin Mastic	Homogeneous Tan Non-fibrous Bound			95%	Mastic	**5% Chrysotile**
MT-51021 -145 A93289A	Vft	Homogeneous Pink,Black Non-fibrous Tightly Bound			100%	Vinyl	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

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A93289B	Mastic	Homogeneous Black,Brown Non-fibrous Bound	95%	Mastic	5% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-146 A93290A	Vft	Homogeneous Pink,Black Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93290B	Mastic	Homogeneous Black,Brown Non-fibrous Bound	95%	Mastic	5% Chrysotile
Lab Notes: Unable to separate mastics for analysis.					
MT-51021-147 A93291	Tar Sealant	Homogeneous Black Non-fibrous Bound	100%	Tar	None Detected
MT-51021-148 A93292	Tar Sealant	Homogeneous Black Non-fibrous Bound	100%	Tar	None Detected
MT-51021-149 A93293A	Vft	Homogeneous Black,White Non-fibrous Tightly Bound	100%	Vinyl	None Detected
A93293B	Mastic	Homogeneous Yellow Non-fibrous Bound	100%	Mastic	None Detected

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ASBESTOS BULK PLM, EPA 600 METHOD

Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous		ASBESTOS %
MT-51021 -150 A93294A	Vft	Homogeneous Black,White Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93294B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -151 A93295A	Vft	Homogeneous Red Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93295B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -152 A93296A	Vft	Homogeneous Red Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93296B	Mastic	Homogeneous Yellow Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -153 A93297A	Vsg	Homogeneous Wood Pattern Non-fibrous Tightly Bound		100%	Vinyl	None Detected

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Client ID / Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS Fibrous	Non-Fibrous		ASBESTOS %
A93297B	Mastic	Homogeneous Gray Non-fibrous Bound		100%	Mastic	None Detected
MT-51021 -154 A93298A	Vsg	Homogeneous Wood Pattern Non-fibrous Tightly Bound		100%	Vinyl	None Detected
A93298B	Mastic	Homogeneous Gray Non-fibrous Bound		100%	Mastic	None Detected

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LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
Non-Trem = Non-Asbestiform Tremolite
Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REPORTING LIMIT FOR POINT COUNTS: 0.25% by 400 Points or 0.1% by 1,000 Points

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. *Estimated measurement of uncertainty is available on request.*

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by Eurofins CEI. Eurofins CEI makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

Information provided by customer includes customer sample ID and sample description.

ANALYST: Ryan Steele

APPROVED BY: Tianbao Bai, Ph.D., CIH
Laboratory Director

NVLAP® TESTING
NVLAP LAB CODE 101768-0

154

eurofins | CEI

CHAIN OF CUSTODY

730 SE Maynard Road, Cary, NC 27511
Tel: 866-481-1412; Fax: 919-481-1442

LAB USE ONLY:	
CEI Lab Code:	A21654?
CEI Lab I.D. Range:	A93145-A93298

COMPANY INFORMATION		PROJECT INFORMATION	
CEI CLIENT #: 30189		Job Contact: Derrick Klein	
Company: Boggs Environmental Consultants Inc.		Email / Tel: dklein@boggsenvironmental.com / 509-205-8863	
Address: 200 West Main Street,		Project Name: Montgomery College - Macklin Tower	
Middletown, Maryland 21769		Project ID#: MD20187	
Email: rrobinson@boggsenvironmental.com		PO #:	
Tel: 301-694-5687	Fax: 301-694-9799	STATE SAMPLES COLLECTED IN:	Maryland

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	1 DAY	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	☐	☐	☐	☐	☐	☑
PLM POINT COUNT (400)	EPA 600	☐	☐	☐	☐	☐	☐
PLM POINT COUNT (1000)	EPA 600	☐	☐	☐	☐	☐	☐
PLM GRAV w POINT COUNT	EPA 600		☐	☐	☐	☐	☐
PLM BULK	CARB 435		☐	☐	☐	☐	☐
PCM AIR	NIOSH 7400	☐	☐	☐	☐	☐	☐
TEM AIR	EPA AHERA	☐	☐	☐	☐	☐	☐
TEM AIR	NIOSH 7402	☐	☐	☐	☐	☐	☐
TEM AIR (PCME)	ISO 10312	☐	☐	☐	☐	☐	☐
TEM AIR	ASTM 6281-15	☐	☐	☐	☐	☐	☐
TEM BULK	CHATFIELD		☐	☐	☐	☐	☐
TEM DUST WIPE	ASTM D6480-05 (2010)	☐	☐	☐	☐	☐	☐
TEM DUST MICROVAC	ASTM D5755-09 (2014)	☐	☐	☐	☐	☐	☐
TEM SOIL	ASTM D7521-16			☐	☐	☐	☐
TEM VERMICULITE	CINCINNATI METHOD			☐	☐	☐	☐
TEM QUALITTATIVE	IN-HOUSE METHOD		☐	☐	☐	☐	☐
OTHER:		☐	☐	☐	☐	☐	☐

REMARKS / SPECIAL INSTRUCTIONS:
See Attached BEC Logsheet
2 Bags of samples

☑ Accept Samples BB
☐ Reject Samples

Relinquished By:	Date/Time	Received By:	Date/Time
[signature]	5/14/21 1700	J.C	05/17 9:30

Samples will be disposed of 30 days after analysis

BOGGS ENVIRONMENTAL CONSULTANTS

ASBESTOS INSPECTION BULK SAMPLING LOGSHEET

Date: 5/10/2021

Staff: Derrick Klein

Project #: MD20187

Project Location: Montgomery College - Macklin Tower
51 Mannakee Street, Rockville, Maryland 20850

Sample #	Ha #	Sample Location	Material Identification Color/Description	Friable/ Nonfriable CHECK F	CHECK NF
MT-51021-1	1	Room 625: Hallway	Gypsum Board Sheeting		✓
-2	1	Room 303L: Conference	↓		✓
-3	1	Room 112: Library	↓		✓
-4	2	Room 625: Hallway	Joint Finishing Compound		✓
-5	2	Room 303L: Conference	↓		✓
-6	2	Room 112: Library	↓		✓
-7	3	Room 400: Corridor	Black Floor Tile Mastic		✓
-8	3	Room 492: North Corridor	↓		✓
-9	3	Room 109: Lounge	↓		✓
-10	4	Room 303L: Conference	Yellow Carpet Mastic		✓
-11	4	Room 212: Office	↓		✓
-12	4	Room 304: Library	↓		✓
-13	5	Room 427: Office	2' x 4' White Pinhole + Puncture ACT	✓	
-14	5	Room 218B: Office	↓	✓	
-15	5	Room 301: Library	↓	✓	
-16	6	Room 606: Copy/Fax	2' x 2' White Pinhole + Puncture ACT	✓	
-17	6	Room 400: Elevator Lobby	↓	✓	
-18	6	Room 500: Elevator Lobby	↓	✓	
-19	7	Room 607: Conference	Tan Vinyl Cove Base w/ Mastic		✓
-20	7	Room 423: Office	↓		✓

BOGGS
ENVIRONMENTAL CONSULTANTS

ASBESTOS INSPECTION BULK SAMPLING LOGSHEET

Date: 5/10/2021
Staff: Derrick Klein
Project #: MD20187

Project Location: Montgomery College - Macklin Tower
51 Mannakee Street, Rockville, Maryland 20850

			Material Identification	Friable/ Nonfriable	
Sample #	Ha #	Sample Location	Color/Description	CHECK F	CHECK NF
MT-510821-21	7	Room 218H: Office	Tan Vinyl Cove Base w/Mastic		✓
-22	8	Room 607: Conference	2'x2' White Textured ACT	✓	
-23	8	Room 600: Corridor	"	✓	
-24	8	Room 212: Office	"	✓	
-25	9	Room 606: Copy/Fax	12"x12" Dark Blue w/Black Spots VFT + Mastic		✓
-26	9	Room 615: Storage	"		✓
-27	9	Room 608: Pantry	"		✓
-28	10	Room 600: Corridor	12"x12" Off-White w/Black Spots VFT + Mastic		✓
-29	10	Room 600: Corridor	"		✓
-30	10	Room 600: Corridor	"		✓
-31	11	Room 600: Corridor	12"x12" Brown w/Black Spots VFT + Mastic		✓
-32	11	Room 600: Corridor	"		✓
-33	11	Room 600: Corridor	"		✓
-34	12	Room 591: South Corridor	12"x12" Pink w/Multicolored Spots VFT + Mastic		✓
-35	12	Room 592: North Corridor	"		✓
-36	12	Room 400: Elevator Lobby	"		✓
-37	13	Room 610: Mech	Brown Metal Duct Seam Sealant		✓
-38	13	Room 433: Mech/IT	"		✓
-39	13	Room 301B: Mech	"		✓
-40	14	Room 610: Mech	White Pipe Insulation Mastic		✓

BOGGS ENVIRONMENTAL CONSULTANTS

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Project #: MD20187

Project Location: Montgomery College - Macklin Tower
51 Mannakee Street, Rockville, Maryland 20850

			Material Identification	Friable/ Nonfriable	
Sample #	Ha #	Sample Location	Color/Description	CHECK F	CHECK NF
MT-51021-41	14	Room 534A: Mech	White Pipe Insulation Mastic		✓
-42	14	Room 433: IT/Mech	↓		✓
-43	15	Room 610: Mech	Red Fire Stop		✓
-44	15	Room 534A: Mech	↓		✓
-45	15	Room 433: IT/Mech	↓		✓
-46	16	Room 622: Office	Off-White Pipe Wrap Mastic		✓
-47	16	Room 625: Hallway	↓		✓
-48	16	Room 625: Hallway	↓		✓
-49	17	Room 610: Mech	Gray Metal Duct Seam Sealant		✓
-50	17	Room 433: IT/Mech	↓		✓
-51	17	Room 209C: Mech	↓		✓
-52	18	Room 2C1: Corridor	Gray Vinyl Cove Base w/Mastic		✓
-53	18	Room 2C2: Elevator Lobby	↓		✓
-54	18	Room 2C3: Corridor	↓		✓
-55	19	Room 2C1: Corridor	12"x12" Light Blue w/Black Spots VFT + Mastic		✓
-56	19	Room 2C2: Elevator Lobby	↓		✓
-57	19	Room 2C3: Corridor	↓		✓
-58	20	Room 2C3: Corridor	Maroon Vinyl Cove Base w/Mastic		✓
-59	20	Room 212: Office	↓		✓
-60	20	Room 213: Conference	↓		✓

BOGGS ENVIRONMENTAL CONSULTANTS

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Date: 5/10/2021

Staff: Derrick Klein

Project #: MD20187

Project Location: Montgomery College - Macklin Tower
51 Mannakee Street, Rockville, Maryland 20850

			Material Identification	Friable/ Nonfriable	
Sample #	Ha #	Sample Location	Color/Description	CHECK F	CHECK NF
MT-51021-61	21	Room 212B: Office	2'x4' White Small + Large Pinhole ACT	✓	
-62	21	Room 212D: Office	↓	✓	
-63	21	Room 213: Conference	↓	✓	
-64	22	Room 307: Lounge	12"x12" Navy Blue w/Light Blue Specks VFT +Mastic		✓
-65	22	Room 307: Lounge	↓		✓
-66	22	Room 307: Lounge	↓		✓
-67	23	Room 307: Lounge	Navy Blue Vinyl Cove Base w/Mastic		✓
-68	23	Room 307: Lounge	↓		✓
-69	23	Room 307: Lounge	↓		✓
-70	24	Room 301: Library	Black Vinyl Cove Base w/Mastic		✓
-71	24	Room 203: Library	↓		✓
-72	24	Room 116: Library	↓		✓
-73	25	Room 301: Library	12"x12" Light Blue w/Blue Specks VFT +Mastic		✓
-74	25	Room 2SE: Stair 5	↓		✓
-75	25	Room 1SE: Stair 5	↓		✓
-76	26	Room 3SE: Stair 5	Navy Blue Vinyl Stair Tread w/Mastic		✓
-77	26	Room 2SE: Stair 5	↓		✓
-78	26	Room 1SE: Stair 5	↓		✓
-79	27	Room 303K: Copy/Print	Beige VFT w/Mastic (sublayer)		✓
-80	27	Room 303L: Conference	↓		✓

BOGGS ENVIRONMENTAL CONSULTANTS

ASBESTOS INSPECTION BULK SAMPLING LOGSHEET

Date: 5/10/2021

Staff: Derrick Klein

Project #: MD20187

Project Location: Montgomery College - Macklin Tower
51 Mannakee Street, Rockville, Maryland 20850

			Material Identification	Friable/ Nonfriable	
Sample #	Ha #	Sample Location	Color/Description	CHECK F	CHECK NF
MT-51021-81	27	Room 303M: Workstation	Beige VFT w/ Mastic (sublayer)		✓
-82	28	Room 306: Library	2'x2' Off-White Inset Pinhole + Fissure ACT	✓	
-83	28	Room 202: Library	↓	✓	
-84	28	Room 112: Library	↓	✓	
-85	29	Room 301: Library	2'x2' White Pinhole + Fissure ACT	✓	
-86	29	Room 202: Library	↓	✓	
-87	29	Room 112: Library	↓	✓	
-88	30	Room 301: Library	White Duct Insulation Mastic		✓
-89	30	Room 304: Library	↓		✓
-90	30	Room 305: Library	↓		✓
-91	31	Room 305 Library	12"x12" Marble Pattern Flooring		✓
-92	31	Room 305: Library	↓		✓
-93	31	Room 305: Library	↓		✓
-94	32	Room 305: Library	Finished Plaster		✓
-95	32	Room 203: Library	↓		✓
-96	32	Room 113 Library	↓		✓
-97	32	Room 116: Library	↓		✓
-98	32	Room 020: Writing Center	↓		✓
-99	33	Room 112: Library	12"x12" Tan w/ Brown + Green Specks VFT + Mastic		✓
-100	33	Room 112: Library	↓		✓

BOGGS ENVIRONMENTAL CONSULTANTS

ASBESTOS INSPECTION BULK SAMPLING LOGSHEET

Date: 5/10/2021

Staff: Derrick Klein

Project #: MD20187

Project Location: Montgomery College - Macklin Tower
51 Mannakee Street, Rockville, Maryland 20850

			Material Identification	Friable/ Nonfriable	
Sample #	Ha #	Sample Location	Color/Description	CHECK F	CHECK NF
MT-510321-101	33	Room 110: Library Service	12"x12" Tan w/Brown+Green Specks VFT +Mastic		✓
-102	34	Room 109: Lounge	12"x12" Tan w/Brown Specks VFT +Mastic		✓
-103	34	Room 109: Lounge	"		✓
-104	34	Room 109: Lounge	"		✓
-105	35	Room 020: Writing Center	12"x12" Off-White w/Tan Specks VFT +Mastic		✓
-106	35	Room 020: Writing Center	"		✓
-107	35	Room 020: Writing Center	"		✓
-108	36	Room 304B: Mechanical	White Interior Duct Insulation		✓
-109	36	Room 202A: Mechanical	"		✓
-110	36	Room 112B: Mechanical	"		✓
-111	37	Room 303F: IT Closet	12"x12" White w/Black Specks VFT +Mastic		✓
-112	37	Room 303F: IT Closet	"		✓
-113	37	Room 004: IT Closet	"		✓
-114	38	Room 001: Lounge/Vend	12"x12" Gray/Orange w/Black Spots VFT +Mastic		✓
-115	38	Room 001: Lounge/Vend	"		✓
-116	38	Room 001: Lounge/Vend	"		✓
-117	39	Room 095: Corridor	18"x18" Gray VFT +Mastic		✓
-118	39	Room 008: Storage	"		✓
-119	39	Room 092: Vestibule	"		✓
-120	40	Room 024A: Studio	Gray Spray Applied Fireproofing	✓	

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ENVIRONMENTAL CONSULTANTS

ASBESTOS INSPECTION BULK SAMPLING LOGSHEET

Date: 5/10/2021
Staff: Derrick Klein
Project #: MD20187

Project Location: Montgomery College - Macklin Tower
51 Mannakee Street, Rockville, Maryland 20850

Sample #	Ha #	Sample Location	Material Identification: Color/Description	Friable/Nonfriable: CHECK F	Friable/Nonfriable: CHECK NF
MT-51021-121	40	Room 024A: Studio	Gray Spray Applied Fireproofing	✓	
-122	40	Room 024A: Studio	↓	✓	
-123	41	Room 095: Corridor	Dark Gray Vinyl Cove Base w/Mastic		✓
-124	41	Room 017: Conference	↓		✓
-125	41	Room 092: Vestibule	↓		✓
-126	42	Room 090: Corridor	Brown Vinyl Cove Base w/ Mastic		✓
-127	42	Room 090: Corridor	↓		✓
-128	42	Room 001: Lange/Vend	↓		✓
-129	43	Room 090: Corridor	18" x 18" Gray/Red w/Black Spots VFT + Mastic		✓
-130	43	Room 090: Corridor	↓		✓
-131	43	Room 090: Corridor	↓		✓
-132	44	Room 600: Corridor	Black Vinyl Threshold Strip		✓
-133	44	Room 3030: Corridor	↓		✓
-134	44	Room 001: Lange/Vend	↓		✓
-135	45	Room 190: Corridor	18" x 18 Orange VFT + Mastic		✓
-136	45	Room 190: Corridor	↓		✓
-137	46	Room 190: Corridor	18" x 18 Marble Pattern VFT + Mastic		✓
-138	46	Room 190: Corridor	↓		✓
-139	47	Room IE 1: Elevator 1	Yellow Textured VFT + Mastic		✓
-140	47	Room IE 2: Elevator 2	↓		✓

BOGGS ENVIRONMENTAL CONSULTANTS

ASBESTOS INSPECTION BULK SAMPLING LOGSHEET

Date: 5/10/2021

Staff: Derrick Klein

Project #: MD20187

Project Location: Montgomery College - Macklin Tower
51 Mannakee Street, Rockville, Maryland 20850

			Material Identification	Friable/ Nonfriable	
Sample #	Ha #	Sample Location	Color/Description	CHECK F	CHECK NF
MT-51021-141	48	Room 2C3 Corridor	Purple + Orange VSG + Mastic 1		✓
-142	48	Room 2C3: Corridor			✓
-143	49	Room B2 Electrical	Tan Ceiling Insulation Pin Mastic 1		✓
-144	49	Room B1: Mechanical			✓
-145	50	Room 214: Elite Training	12"x12" Pink w/Black Spots VFT + Mastic 1		✓
-146	50	Room 214: Elite Training			✓
-147	51	Room 610: Mechanical	Black Tar Sealant 1		✓
-148	51	Room 304B: Mechanical			✓
-149	52	Room 212C: Office	12" x12" Black w/White Spots VFT + Mastic 1		✓
-150	52	Room 212C: Office			✓
-151	53	Room 2E3 Elevator 3	Red Textured VFT + Mastic 1		✓
-152	53	Room 2E3: Elevator 3			✓
-153	54	Room 015: Break Room	Wood Pattern VSG + Mastic 1		✓
-154	54	Room 015: Break Room			✓

EMSL Analytical, Inc.
10752 & 10768 Baltimore Avenue Beltsville, MD 20705
Tel/Fax: (301) 937-5700 / (301) 937-5701
http://www.EMSL.com / beltsvillelab@emsl.com

EMSL Order: 192500955
Customer ID: TIDE50
Customer PO:
Project ID:

Attention: KATHERINE KONG
Tidewater, Inc.
6625 Selnick Drive
Suite A
Elkridge, MD 21075
Project: MONT. COLLEGE LIBRARY

Phone: (410) 540-8700
Fax: (410) 997-8713
Received Date: 02/10/2025 10:11 AM
Analysis Date: 02/11/2025
Collected Date: 02/10/2025

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
021025-01A *192500955-0001*	STAIR 3 EXT. VENT/ CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**
021025-01B *192500955-0002*	STAIR 3 EXT. VENT/ CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**
021025-02A *192500955-0003*	STAIR 3 EXT. VENT/ FLASHING CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**
021025-02B *192500955-0004*	STAIR 3 EXT. VENT/ FLASHING CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**
021025-03A *192500955-0005*	STAIR 3 EXT. DOOR/ CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**
021025-03B *192500955-0006*	STAIR 3 EXT. DOOR/ CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**
021025-04A *192500955-0007*	STAIR 4 EXT. VENT/ CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**
021025-04B *192500955-0008*	STAIR 4 EXT. VENT/ CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**
021025-05A *192500955-0009*	STAIR 4 EXT. DOOR/ CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD NVLAP Lab Code 200293-0

Initial report from: 02/11/2025 10:08:37

EMSL Analytical, Inc.
10752 & 10768 Baltimore Avenue Beltsville, MD 20705
Tel/Fax: (301) 937-5700 / (301) 937-5701
http://www.EMSL.com / beltsvillelab@emsl.com

EMSL Order:	192500955
Customer ID:	TIDE50
Customer PO:	
Project ID:	

Attention:	KATHERINE KONG Tidewater, Inc. 6625 Selnick Drive Suite A Elkridge, MD 21075	**Phone:**	(410) 540-8700
		Fax:	(410) 997-8713
		Received Date:	02/10/2025 10:11 AM
		Analysis Date:	02/11/2025
		Collected Date:	02/10/2025
Project:	MONT. COLLEGE LIBRARY		

Test Report: Asbestos Analysis of Bulk Materials via AHERA Method 40CFR 763 Subpart E Appendix E supplemented with EPA 600/R-93/116 using Polarized Light Microscopy

			Non-Asbestos		Asbestos
Sample	**Description**	**Appearance**	**% Fibrous**	**% Non-Fibrous**	**% Type**
021025-05B *192500955-0010*	STAIR 4 EXT. DOOR/ CAULK GRAY	Gray Non-Fibrous Homogeneous		5% Ca Carbonate 95.0% Non-fibrous (Other)	**None Detected**

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Samples analyzed by EMSL Analytical, Inc. Beltsville, MD NVLAP Lab Code 200293-0

Initial report from: 02/11/2025 10:08:37

EMSL Analytical, Inc.
10752 & 10768 Baltimore Avenue Beltsville, MD 20705
Tel/Fax: (301) 937-5700 / (301) 937-5701
http://www.EMSL.com / beltsvillelab@emsl.com

EMSL Order:	192500955
Customer ID:	TIDE50
Customer PO:	
Project ID:	

Attention:	KATHERINE KONG Tidewater, Inc. 6625 Selnick Drive Suite A Elkridge, MD 21075	**Phone:**	(410) 540-8700
		Fax:	(410) 997-8713
		Received Date:	02/10/2025 10:11 AM
		Analysis Date:	02/11/2025
Project:	MONT. COLLEGE LIBRARY	**Collected Date:**	02/10/2025

The samples in this report were submitted to EMSL for analysis by Asbestos Analysis of Bulk materials via EPA/600 (0513) Method using Polarized Light Microscopy. The reference number for these samples is the EMSL Order ID above. Please use this reference number when calling about these samples.

Report Comments:

Sample Receipt Date:	02/10/2025	Sample Receipt Time:	10:11 AM
Analysis Completed Date:	02/11/2025	Analysis Completed Time:	10:06 AM

Analyst(s):

Joseph Centifonte

Joe Centifonti PLM (10)

Samples Reviewed and approved by:

Emily Baker

Emily C. Baker Asbestos Laboratory Manager
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method") but augmented with procedures outlined in the 1993 ("final") version of the method. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. Non-friable organically bound materials present a problem matrix and therefore EMSL recommends gravimetric reduction prior to analysis. Unless requested by the client, building materials manufactured with multiple layers (i.e. linoleum, wallboard, etc.) are reported as a single sample. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Beltsville, MD NVLAP Lab Code 200293-0

Initial report from: 02/11/2025 10:08:37

OrderID: 192500955

Asbestos Chain of Custody (Air, Bulk, Soil)

EMSL Order Number / Lab Use Only: 192500955

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077
PHONE: (800) 220-3675
EMAIL: CinnAsblab@EMSL.com

EMSL ANALYTICAL, INC.
TESTING LABS • PRODUCTS • TRAINING

If Bill-To is the same as Report-To leave this section blank. Third-party billing requires written authorization.

Customer Information		Billing Information	
Customer ID:	TIDE50	Billing ID:	TIDE50
Company Name:	Tidewater Inc	Company Name:	Tidewater Inc
Contact Name:	Katherine Kong	Billing Contact:	tidewaterap@tideh2o.net
Street Address:	6625 Selnick Drive	Street Address:	6625 Selnick Drive
City, State, Zip:	Elkridge, MD 21075	City, State, Zip:	Elkridge, MD 21075
Country:	USA	Country:	USA
Phone:	410-540-8700	Phone:	410-540-8700
Email(s) for Report:	kai.kong@tideh2o.net	Email(s) for Invoice:	tidewaterap@tideh2o.net

Project Information

Project Name/No: Mont. College Library
Purchase Order:
EMSL LIMS Project ID: (If applicable, EMSL will provide)
US State where samples collected: MD
State of Connecticut (CT) must select project location: ☐ Commercial (Taxable) ☐ Residential (Non-Taxable)
Sampled By Name: K. Kong
Sampled By Signature:
No. of Samples in Shipment: 10

Turn-Around-Time (TAT)

☐ 3 Hour ☐ 4-4.5 Hour AHERA ONLY ☐ 6 Hour ☐ 24 Hour ☐ 32 Hour ☐ 48 Hour ☒ 72 Hour ☐ 96 Hour ☐ 1 Week ☐ 2 Week

TEM Air 3-6 Hour, please call ahead to schedule, 32 Hour TAT available for select tests only; samples must be submitted by 11:30 am.

Test Selection

PCM Air
- ☐ NIOSH 7400
- ☐ NIOSH 7400 w/ 8hr. TWA

PLM - Bulk (reporting limit)
- ☒ PLM EPA 600/R-93/116 (<1%)
- ☐ PLM EPA NOB (<1%)
- ☐ POINT COUNT
  - ☐ 400 (<0.25%) ☐ 1,000 (<0.1%)
- POINT COUNT w/ GRAVIMETRIC
  - ☐ 400 (<0.25%) ☐ 1,000 (<0.1%)
- ☐ NIOSH 9002 (<1%)
- ☐ NYS 198.1 (Friable - NY)
- ☐ NYS 198.6 NOB (Non-Friable - NY)
- ☐ NYS 198.8 (Vermiculite SM-V)

TEM - Air
- ☐ AHERA 40 CFR, Part 763
- ☐ NIOSH 7402
- ☐ EPA Level II
- ☐ ISO 10312*

TEM - Bulk
- ☐ TEM EPA NOB
- ☐ NYS NOB 198.4 (Non-Friable-NY)
- ☐ TEM EPA 600/R-93/116 w Milling Prep (0.1%)

Other Test (please specify)

TEM - Settled Dust
- ☐ Microvac - ASTM D5755
- ☐ Wipe - ASTM D6480
- ☐ Qualitative via Filtration Prep
- ☐ Qualitative via Drop Mount Prep

Soil - Rock - Vermiculite (reporting limit)*
- ☐ PLM EPA 600/R-93/116 with milling prep (<0.25%)
- ☐ PLM EPA 600/R-93/116 with milling prep (<0.1%)
- ☐ TEM EPA 600/R-93/116 with milling prep (<0.1%)
- ☐ TEM Qualitative via Filtration Prep
- ☐ TEM Qualitative via Drop Mount Prep

*Please call with your project-specific requirements.

☐ Positive Stop - Clearly Identified Homogeneous Areas (HA) | Filter Pore Size (Air Samples): ☐ 0.8um ☐ 0.45um

Sample Number	Sample Location / Description	Volume, Area or Homogeneous Area	Date / Time Sampled (Air Monitoring Only)
021025-01A	Stair 3 ext. vent caulk gray		2/10/25
021025-01B	Stair 3 ext vent caulk gray		
021025-02A	Stair 3 ext vent flashing caulk gray		
021025-02B	Stair 3 ext vent flashing caulk gray		
021025-03A	Stair 3 ext door caulking gray		
021025-03B	stair 3 ext door caulking gray		
021025-04A	Stair 4 ext vent caulking gray		
021025-04B	Stair 4 ext vent caulking gray		

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

Method of Shipment:		Sample Condition Upon Receipt:	
Relinquished by: K. Kong	Date/Time: 2/10/25	Received by:	Date/Time
Relinquished by:	Date/Time:	Received by:	Date/Time

Controlled Document - COC-05 Asbestos R16 10/25/2021

☐ AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this Chain of Custody by reference in their entirety. Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.

25 FEB 10 AM 10:11

Page 1 of

OrderID: 192500955

EMSL ANALYTICAL, INC.
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Asbestos Chain of Custody (Air, Bulk, Soil)

EMSL Order Number / Lab Use Only

EMSL Analytical, Inc.
200 Route 130 North
Cinnaminson, NJ 08077

PHONE: (800) 220-3675
EMAIL: CinnAsblab@EMSL.com

Additional Pages of the Chain of Custody are only necessary if needed for additional sample information

Special Instructions and/or Regulatory Requirements (Sample Specifications, Processing Methods, Limits of Detection, etc.)

Sample Number	Sample Location / Description	Volume, Area or Homogeneous Area	Date / Time Sampled (Air Monitoring Only)
021025-05A	Stair 4 ext door caulking	Gray	2/10/25
021025-05B	Stair 4 ext door caulking	gray	↓

Method of Shipment:		Sample Condition Upon Receipt:	
Relinquished by: K. Key	Date/Time: 2/10/25	Received by:	Date/Time
Relinquished by:	Date/Time:	Received by:	Date/Time

Controlled Document - COC-05 Asbestos R16 10/26/2021

☐ AGREE TO ELECTRONIC SIGNATURE (By checking, I consent to signing this Chain of Custody document by electronic signature.)

EMSL Analytical, Inc.'s Laboratory Terms and Conditions are incorporated into this Chain of Custody by reference in their entirety. Submission of samples to EMSL Analytical, Inc. constitutes acceptance and acknowledgment of all terms and conditions by Customer.

Carrier, Danielle

From: Derrick A. Klein <dklein@boggsenvironmental.com>
Sent: Monday, May 17, 2021 5:01 PM
To: Carrier, Danielle
Cc: Richard C. Robinson
Subject: Re: Montgomery College - Macklin Tower, MD20187

EXTERNAL EMAIL*

Yes, I approve the additional 6 days on the turnaround time with the 5% discount we discussed on our phone conversation.

Thanks,
Derrick Klein

Sent from my Sprint Samsung Galaxy S10e.
Get Outlook for Android

From: Carrier, Danielle <Danielle.Carrier@eurofinset.com>
Sent: Monday, May 17, 2021, 4:54 PM
To: Derrick A. Klein
Subject: Montgomery College - Macklin Tower, MD20187

[EXTERNAL]
Derrick,

Per our phone conversation, we will add an extra 6 days to the TAT for project Montgomery College - Macklin Tower, MD20187.

Please confirm at your convenience.

Learn about our Combustion By-Product Testing

Best,

Dani Carrier
Client Account Manager
Senior PLM Analyst

Eurofins Built Environment CEI
730 SE Maynard Rd
Cary, NC 27511
USA

APPENDIX G

STAFF QUALIFICATIONS