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Residential Sewage Backups in Baltimore

In Baltimore, Maryland, residents of the city are battling flooded homes, tainted drinking water, and financial strain in the face of sewage back-ups caused by outdated sewage disposal systems in their city. Heavy rainfall and improper management of runoff has exacerbated the stress on the sewage system and is contributing to the worsening conditions for the community. In addition to facing adverse physical conditions, residents have largely been left to their own devices to make cleanup efforts and have received little, if any, compensation from the local government. This crisis has been particularly difficult for low-income residents, who lack the money needed for cleaning efforts and do not qualify for or were otherwise unaware of reimbursement options from the government. The people of Baltimore deserve better support than an inaccessible and unhelpful reimbursement program and the issue at hand demands permanent change that addresses the root of the problem. The Office of Environmental Justice should implement green infrastructure for stormwater runoff and sewage disposal in Baltimore in order to provide residents with relief and improve the health of the city.

History of Baltimore's Sewers

The shortcomings of Baltimore's sewage system have placed enormous stress upon Baltimore locals. The antiquated infrastructure has caused sewage back-ups in residents' homes, often resulting in flooding and contaminated drinking water. According

to the Chesapeake Bay Foundation, “Century-old pipes leak stormwater into the sewer system and sewage into the stormwater system. Illegal connections mix sewage with stormwater. Overflows occur with alarming frequency after a heavy rain. Even in dry weather, the system leaches sewage into the storm drains” (*Baltimore City Sewage Overflow*). It is clear that current stormwater management is amplifying the effects of a deficient sewer system. The subsequent sewage backups have caused public health risks and put financial strain on an already low-income community who have been tasked with cleanup.

Baltimore’s sewer system was constructed over a century ago. In 1911, construction of the sewer system was created and is still in place today. The pipes within the system were designed to suit the population size and the magnitude of storms (Ezell). Needless to say, Baltimore’s population has increased drastically since 1911- from 558,485 in 1910 to 602,495 in 2018- and the pipes no longer adequately suit the needs of the growing community (*Baltimore City, Maryland Population 2020*). Inappropriately sized pipes break under pressure and lead to sewer overflows (Ezell). The overflows subsequently cause building backups and backups within residential homes. Because the sewer infrastructure is so outdated, residents are now facing the dangers of backups within their homes.

Baltimore’s Response

Rather than addressing the problem by amending the sewers or offering direct clean up services for residents, the city’s government has set up a reimbursement program to assist in covering costs of cleanup efforts made by residents themselves. However, the reimbursement plan only offers $2500, only covers costs for cleanup, and is

only available to individuals who are able to report flooding within 24 hours of flooding occurring (*Environmental Integrity Environmental Justice*). This plan fails to take into account the costs of property damages caused by the backups or acknowledge those who were unable to apply for reimbursement within 24 hours. While it is difficult for any resident to clean such a hazardous incident, cleanup is particularly difficult for low-income residents who cannot afford to replace essential infrastructure, such as water heaters, that may have been damaged because of the sewage floods (*Environmental Integrity Environmental Justice*). In a city where a third of the population earns less than $25,000 annually, it is unrealistic to expect residents to have the means to spend their money on residential damages caused by the shortcomings of the sewer system (Heaps). The people of Baltimore are unequipped to handle a hazmat situation without external assistance.

Beyond the technical failures, the reimbursement is ineffective in nature because it is not accompanied by any actual help with cleanup. The city's response to the crisis has been insufficient at best; the majority of residents cannot access the reimbursement program. In the first year of the program, the city received 4632 reports of flooding related to sewage backups, but only 74 of those households were able to file for reimbursement. Of those 74 families, only ten actually received reimbursement (Bettenhausen). The program itself deals with a portion of the consequences of the problem rather than the problem itself.

The Impacts of Sewage Backups on Residents

Residents are facing physical risks in addition to the extensive costs associated with cleaning up sewage flooding. In addition to the financial burden of individual

cleanup efforts, the people of Baltimore are experiencing “horror stories of sewage rising two feet high and ‘geysers’ of waste spewing from toilets” (Bliss). Although there has been no comprehensive study on the effects of this specific case on Baltimore residents, it is worth noting that exposure to raw sewage and wastewater has been linked to gastrointestinal illnesses (*Document Display | NEPIS | US EPA*). Residents whose homes have been affected by the backups cannot afford to wait for their insurance companies to clean up for them and had no choice but to clean themselves in order to avoid elongated exposure to such hazardous conditions. One of these residents, Craig Bettenhausen, details the ways in which Baltimore’s response to the sewage crisis has fallen short in his article for the Baltimore Sun. The Department of Public Works suggests people “do it themselves” in their guide to sewage backups, despite raw sewage being a hazmat situation (Bettenhausen). Baltimore’s response to the crisis at hand has been insufficient and irresponsible at every level, and the people of Baltimore deserve justice in the form of a more compassionate solution.

Sustainable Runoff Management as a Solution for Residential Sewage Backups

The issue of sewage backups in Baltimore demands a solution that does not merely address a fraction of the financial consequences. The improper management of stormwater runoff often results in the clogging of storm drains, leading to local flooding (*Stormwater Management - an Overview).* New stormwater runoff infrastructure would decrease the backups currently happening and prevent backups from continuing to occur in the future. Systems such as rain gardens, porous pavements, and green roofs would address the improper management of stormwater runoff, resulting in a reduction of sewer

overflows. Most importantly, this infrastructure would provide the residents of Baltimore with much needed relief from sewage backups.

Rain gardens are one form of green runoff management. Rain gardens are planted basins that are designed to collect runoff and increase filtration through soil. Rain gardens can provide the same aesthetic appeal as regular gardens, but with the added benefit of filtering out pollutants from runoff. Rain gardens help to mitigate the effects of excess stormwater on sewer systems by reducing the amount of runoff that enters the sewers in the first place by increasing infiltration of stormwater into the ground after storms (*Rain Gardens – Naturally Resilient Communities*). When designed properly, rain gardens enhance the natural ecosystems of their location by increasing biodiversity, distribution of vegetation, and providing habitats for native species (*StormwaterPA - Grass Roots Movement*). While rain gardens can be very effective for offsetting stress on sewer systems and enhancing the aesthetic appeal of the communities they are located in, they work most successfully when used in concordance with other green infrastructure, such as porous pavement and green roofs.

Green roofs are another tool that can be helpful in offsetting the impacts of stormwater runoff on local sewage systems. Like rain gardens, green roofs provide aesthetic appeal in addition to functionality. The purpose of green roofs is also to reduce the quantity of stormwater that enters the sewers while improving the quality of water. A study done by the EPA on green roofs as a means of controlling stormwater runoff found that green roofs are capable of removing up to 50% of the annual rainfall volume from a roof through evapotranspiration and retention (US EPA). By reducing such a large

portion of runoff that would have otherwise entered the sewers, green roofs could play a large role in attenuating residential sewage backups in Baltimore.

In smaller areas or areas that otherwise cannot accommodate green roofs or rain gardens, permeable pavements may be a suitable option for processing stormwater runoff. Pervious concrete, porous asphalt, and permeable interlocking concrete pavers can serve as a more sustainable alternative to surfaces that are traditionally impervious, such as parking lots and residential sidewalks. Similar to green roofs and rain gardens, permeable pavements serve to reduce runoff quantities as well as to decrease the amount of total suspended solids and total phosphorous loads entering the receiving bodies of water or sewers (*Overview for Permeable Pavement - Minnesota Stormwater Manual*). Permeable pavements may be the most sensible option for the more densely populated, urban areas of Baltimore because they would replace preexisting surfaces and therefore not require any additional space. When used in combination with rain gardens and green roofs, permeable pavements are a useful resource for reducing the stress of stormwater on an already outdated sewer system.

Sustainable Runoff Systems in Action: Cases of Successful Integration of Green Infrastructure

Green runoff infrastructure has been proven as a viable solution to problems associated with faulty sewage disposal. Systems such as permeable pavement surfaces and green roofs can help to decrease quantities of runoff and therefore reduce strain on the sewer systems. In Philadelphia, the city government tested green infrastructure as a

solution for their sewage overflows. The "Green City Clean Waters" summary report details Philadelphia's plan to implement green infrastructure such as bioretention and green roofs in order to reduce strain on underground sewage infrastructure (*City of Philadelphia: Green City, Clean Waters*). Although the plan is still early in its trajectory, the city has already seen vast environmental, economic, and social improvements since its birth in 2011. As of 2016, the initiative has "reduced pollution from stormwater runoff and combined sewer overflows by more than 1.5 billion gallons annually" (*5 Down, 20 to Go: Celebrating 5 Years of Cleaner Water and Greener Neighborhoods | Philadelphia Water Department*). By constructing rain gardens on Parks and Recreation properties, stormwater tree trenches along public streets, and porous pavements at public schools, the city was able to reclaim their sewer system and provide their residents with access to fresh, clean water. By integrating similar structures, Baltimore could endure similar benefits.

Green runoff infrastructure has also been implemented in sites as close to Baltimore as the Annapolis and Chesapeake Bay Visitors Center. The visitor center increased their site's permeability from 20% to 100%, impressively resulting in zero runoff from rain events. They were able to achieve this by implementing 10,000 square feet of permeable brick pavers in the parking lot. The permeable paving serves as a filter in which stormwater runs through before being discharged into rain gardens prior to entering the storm drains (*Stormwater Case Studies by State | Asla.Org*). Annapolis was able to successfully integrate multiple forms of green runoff management in order to reduce the quantity and improve the quality of runoff that entered sewers.

The implementation of green runoff infrastructure would have economic, social, and environmental benefits. It would reduce energy demands, lower maintenance costs for sewage systems, and increase the lifespan of existing infrastructure, thus saving money that would be spent on updating the entire sewer system ("Benefits of Green Infrastructure"). Green infrastructure such as rain gardens and green roofs would also have aesthetic appeal and possibly encourage residents to be active in their communities and get involved in sustainability efforts. Finally, these structures will cause an increase of biodiversity in rain gardens in addition to improving air and water quality. Certain structures of sustainable stormwater management, such as rain gardens, provide habitats for local species of animals and plants ("Benefits of Green Infrastructure"). Subsidizing sustainable runoff management will have social, economic, and environmental implications for Baltimore beyond just solving the problem of residential sewage backups.

Financial Implications of Green Runoff Management Infrastructure

While the opposition may claim that these efforts would be too expensive, there are variables that may be taken into consideration to reduce the costs of implementation. For example, a rain garden placed on a highway median would be more cost effective than an elaborate rain garden in front of city hall. Additionally, costs could be reduced by implementing green infrastructure in concordance with other planned projects. According to Andrew Potts, a watershed services technologist at CH2M, cities "can realize cost savings of 30% to 60% by integrating green projects with planned infrastructure improvements, such as road reconstruction, utility restoration, or roof replacements" ("The Real Cost of Green Infrastructure"). By doing this, the costs of green infrastructure

are only the costs beyond the projects that were already planned. While the implementation of green infrastructure may initially seem expensive, it is important to take an integrated approach to sustainability in order to reduce costs.

In addition to taking measures to reduce costs, it is important to note that the cost of maintaining a faulty sewer and runoff system is much greater than integrating a sustainable approach to runoff management. Beyond the initial costs of construction, rain gardens, green roofs, and permeable pavements are measures that require very little financial upkeep- far less than the upkeep of an already strained and outdated sewage disposal system. When compared with traditional infrastructure, green infrastructure approaches have revealed reduced costs for built capital, land acquisition, and repair and maintenance. An EPA study in 2007 found reduced total costs for eleven out of twelve green infrastructure projects when compared to their grey infrastructure counterparts (US EPA). This study exemplifies that reliance on sustainable runoff management can reduce structural costs throughout the entire stormwater management chain, ultimately benefitting the city's economy. Cities that have taken similar approaches to stormwater runoff have also seen the added economic advantage of an increase in jobs within the community. The case of Philadelphia's "Green City, Clean Water" initiative mentioned earlier resulted in a 14% growth in the city's job market (*5 Down, 20 to Go: Celebrating 5 Years of Cleaner Water and Greener Neighborhoods | Philadelphia Water Department*). When assessing the costs of sustainability, one must also assess the relative cost savings when compared to the less sustainable option.

Justice for Baltimore Residents

It would be overly simplistic and negligent to deny the residents of Baltimore relief from sewage backups and access to healthy water purely on a financial basis. Given the resources available to reduce costs, there is no excuse for allowing residents to continue living in the current conditions and to continue confronting sewage backups on their own without assistance from the government responsible for the crisis. The issue of sewage backups has had physical, emotional, and financial impacts on the people of Baltimore- their wellbeing cannot be quantified, so neither can the solution.

Residents of Baltimore City have suffered the effects of an ineffective water system long enough. It is time to implement more sustainable infrastructure to provide the people of Baltimore with the relief they deserve. Addressing the improper management of stormwater runoff is the only solution that would properly address the sewage backups in Baltimore and protect the safety and health of the residents as well as the environment. The implementation of green runoff infrastructure is the most sustainable solution that would provide the most social, economic, and environmental benefits to the city of Baltimore.

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