Stopping the Flood Beneath Baltimore's Streets

The city's failure to comply with a federal sewage consent decree, and how delay harms homeowners and the Inner Harbor

ENVIRONMENTAL INTEGRITY PROJECT

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THE ENVIRONMENTAL INTEGRITY PROJECT

The Environmental Integrity Project (http://www.environmentalintegrity.org) is a nonpartisan, nonprofit organization established in March of 2002 by former EPA enforcement attorneys to advocate for effective enforcement of environmental laws. EIP has three goals: 1) to provide objective analyses of how the failure to enforce or implement environmental laws increases pollution and affects public health; 2) to hold federal and state agencies, as well as individual corporations, accountable for failing to enforce or comply with environmental laws; and 3) to help local communities obtain the protection of environmental laws.

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Executive Summary

In 2002, the U.S. Justice Department sued Baltimore over a chronic problem: the city's leaky, overloaded sewer system was routinely and illegally releasing tens of millions of gallons of raw human waste into urban streams, the Inner Harbor, and Chesapeake Bay. To settle the lawsuit, then Mayor Martin O'Malley signed a consent decree with the Environmental Protection Agency (EPA) and the Maryland Department of the Environment (MDE) that required the city to pay a $600,000 penalty and repair its sewer system to "eliminate all" overflows and spills by January 1, 2016.[1]

Since the settlement, Baltimore has more than tripled water and sewer bills for city residents and raised more than $2 billion to pay for construction projects required by the consent decree, as well as the ongoing operation of the city's sewage treatment and collection system.[2] The Baltimore Department of Public Works reports that it has spent more than $700 million so far upgrading its sewer system to comply with the consent decree.[3]

But after 13 years, with the final deadline for fixing the problem just weeks away, the city is only about half finished with the required work.[4] Overflows of raw human waste into city streams and the Inner Harbor continue at a rapid rate – with more than 400 overflows and spills reported so far this year totaling at least 42 million gallons.[5] That volume is likely higher because of widespread underreporting by the city.[6] Baltimore has repeatedly broken the terms of the federal consent decree – with 1,258 violations for sewage overflows between 2009 and 2013 alone resulting in an additional $829,450 in penalties, according to EPA.[7]

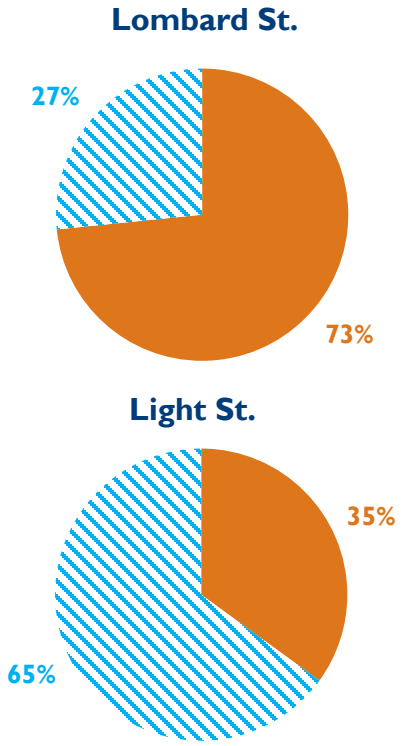
Most significantly, Baltimore continues to deliberately pipe raw sewage mixed with stormwater into the Jones Falls, the largest tributary to the Inner Harbor, dumping at least 335 million gallons over the last five years.[8] This waste flows from two sewage system relief pipes that the city was ordered to close by February 2010, but has left open, without permission from EPA.[9] The city often does not report the overflows from these two pipes to the public or news media, as required by law, according to a review of city records provided under the Maryland Public Information Act.[10]

Because of the continued overflows, levels of fecal bacteria in the Inner Harbor – where adults kayak and children and their parents play in dragon boats – exceed safe levels for limited water contact recreation at least 35 percent of the time (using a conservative estimate. See Figure 1).[11] Levels of *Enterococcus* bacteria in the harbor – an indicator of potentially dangerous pathogens – have spiked to more

than 400 times safe levels, according to city water quality monitoring data.[12]

City homeowners also suffer from the continuing sewage overflows, as wastewater frequently backs up into their basements and ruins their properties. Baltimore residents have filed 413 claims with the city for financial damages caused by sewage overflows over the last three years, but the city has only paid 9 percent (38 total) of these claims.[13] The problem has been particularly bad in Northwest Baltimore's Grove Park and West Arlington neighborhoods, where residents filed 34 damage claims more than a year ago, all of which have been denied or remain unanswered.[14]

FIGURE 1. BACTERIA SAMPLING RESULTS: PERCENT OF RESULTS ABOVE (IN ORANGE) AND BELOW (IN BLUE) WATER QUALITY CRITERIA FOR INFREQUENT FULL-BODY CONTACT (SALTWATER)

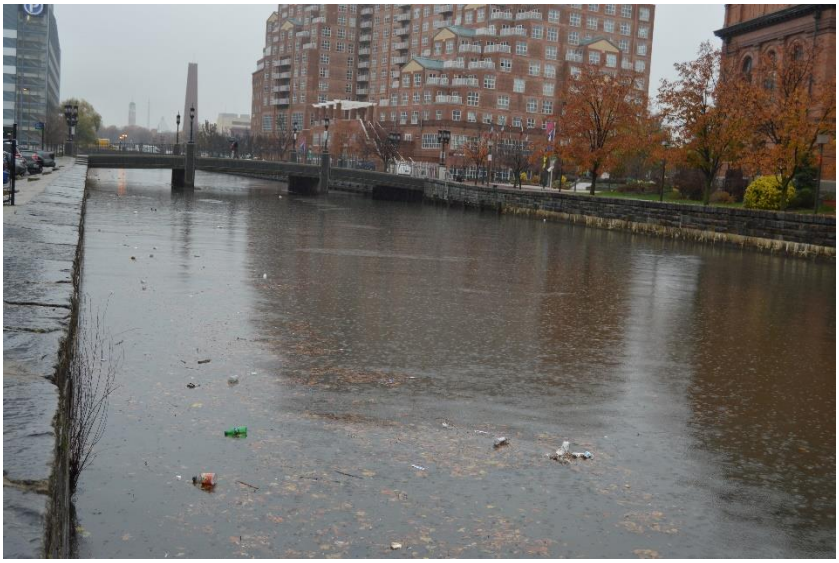


As the court-mandated deadline for fixing this problem approaches, Baltimore is negotiating with EPA and MDE for an amendment to the consent decree that would grant the city an extension of perhaps a decade or more. More time to complete the project may well be needed – but so is more vigorous oversight by EPA and MDE of the city's slow progress on this more than billion-dollar project. The federal and state agencies need to ensure that the investments of ratepayers are well spent, and that city homes and waterways are protected from sewage overflows.

This report by the Environmental Integrity Project is based on data and public records from the city, EPA, and MDE, as well as interviews with homeowners, city officials, and outside experts. The report makes the following recommendations:

- If EPA and MDE agree to an extension of the deadline, it should not be later than January 1, 2020. Extending the deadline a decade or more will mean too much stress and hardship for homeowners. The Waterfront Partnership of Baltimore has called for a "fishable, swimmable" harbor by 2020.[15] That will be impossible if the city continues to pipe sewage into the harbor after 2020.
- Baltimore must close the two remaining sewage outfalls (SSO #67 and SSO #72) on the Jones Falls that the city uses to relieve pressure from its overloaded system.
- EPA and MDE should require Baltimore to report the discharges from the two Jones Falls outfalls to the public and news media, as required by law, and post health warning signs downstream at boating docks on the Inner Harbor. This idea of signs at the Inner Harbor has been endorsed by a Johns Hopkins University water quality expert, Edward Bouwer.[16]

- EPA and MDE should include in any revised consent decree a firm deadline for completion of a major sewer line project (called the "hydraulic restriction project" at the Back River Wastewater Treatment Plant) that needs to be finished before the city can close SSO #67 and SSO #72.[17]
- Baltimore should be more transparent about how much money it is collecting and spending on the project by publishing financial details online for city ratepayers to examine.



Baltimore intentionally pipes millions of gallons of sewage mixed with stormwater into the Jones Falls, the Inner Harbor's largest tributary

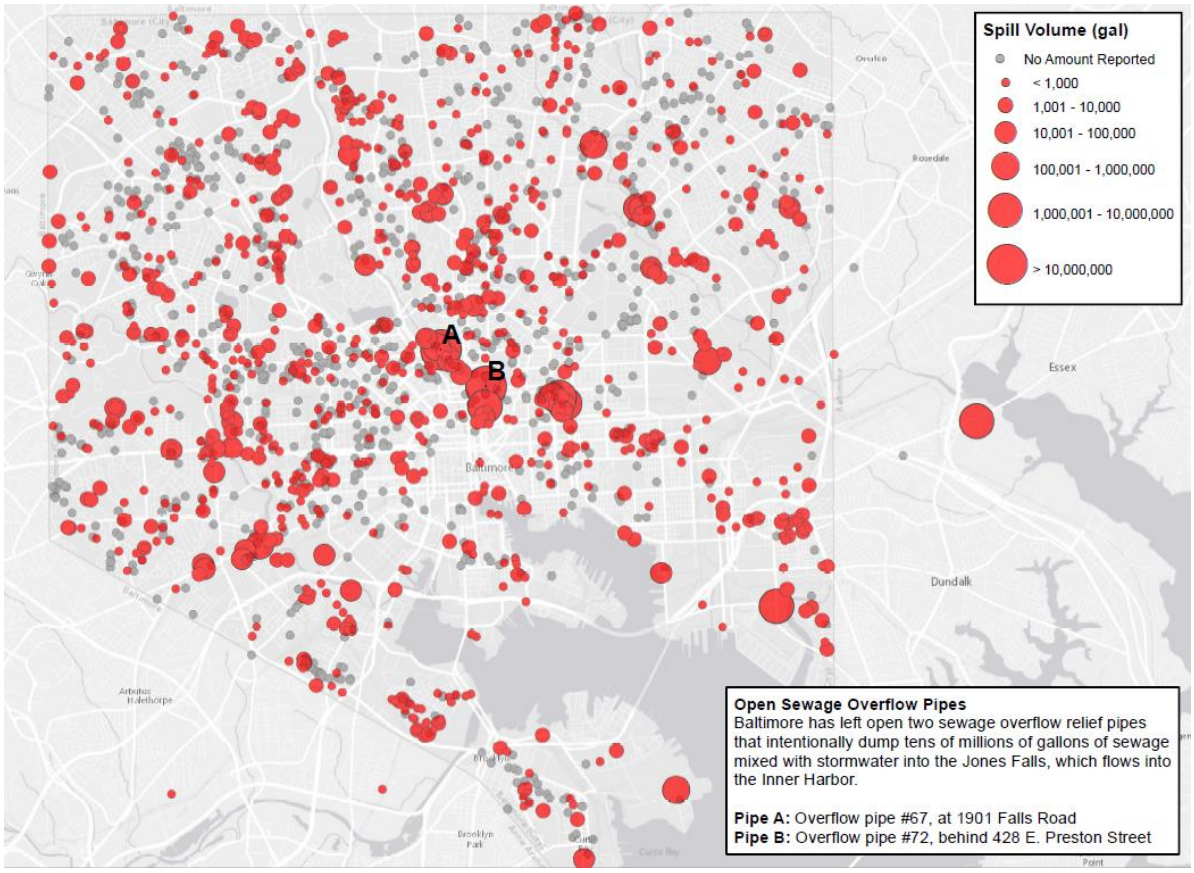
There is no question that it is challenging to overhaul an aging urban sewer system, and that Baltimore is a city of limited resources and many competing needs. But some of these suggestions – such as more transparency and better public notification – require little or no money. Allowing homes to be damaged by raw sewage will only further erode the city's tax base. The Inner Harbor generates over $2 billion[18] a year in tourism and business activity, but untreated human waste, with its odors and pathogens, continues to drag down the harbor's potential.

Baltimore has already raised water and sewer rates in part to fix this broken system, with the annual bill for a typical city household of four people more than tripling since 2002 from $518 to $1,657 in 2015, according to the Baltimore Comptroller's Office (although the city's Department of Public Works uses a lower estimate).[19] It is only fair that Baltimore be more open about the project's progress and costs with residents who are shouldering this financial burden. EPA and MDE must ensure that the funds are being spent efficiently to comply with the federal Clean Water Act and rapidly achieve a healthier harbor and Chesapeake Bay.

Background

Historically in Baltimore, raw human waste and all manner of debris was dumped directly into the Jones Falls and Inner Harbor. By 1900, the Jones Falls, as it entered the harbor, was an "odorous, poisonous water hole."[20] During the rebuilding of the city after the Great Baltimore Fire of 1904, city voters approved funding for a massive construction project – progressive, for its day– to separate many of the city's sewer lines from its stormwater pipes, reducing the amount of sewage flushed by rain water into the harbor.[21] Over the decades, however, this 1,400 mile underground network of pipes and tunnels decayed, leaked, and was hacked by illegal connections. Illicit pipes from homes and businesses injected feces, urine and other pollutants into drains meant for rainwater, which tainted city streams.[22] Cracks in pipes allowed rain to seep into the sewer lines, overwhelming the capacity of the system on wet days and leading to volcanic eruptions from manholes. At least 350 million gallons of sewage mixed with rainwater have poured from beneath Baltimore's streets into city waterways in 2,778 reported incidents over the last five years.[23]

FIGURE 2. TOTAL REPORTED SEWAGE OVERFLOWS, 2011-2015



The National Picture

Baltimore is far from the only community with this problem. In fact, some old Eastern cities have it worse because they have combined sewer and stormwater systems. Starting in the 1990s, EPA began to file lawsuits against the worst polluters, forcing municipalities to sign consent decrees that compelled them to separate and upgrade their pipes and stop spewing human waste into waterways. Since 1998, EPA has signed 47 of these consent decrees – including Baltimore City, Baltimore County, Washington D.C., the Washington Suburban Sanitary Commission, Pittsburgh, and Wilmington, Delaware.[24] The timetable for the Baltimore City consent decree, signed in 2002, was average in length, at 13 years, with a projected cost of about $1 billion, slightly higher than the national average of $709 million.[25] About 76 percent of the time with these consent decrees, EPA reports that cities and counties have met their deadlines, according to a September 2015 report of the EPA Office of Inspector General.[26]

Some of these projects have been extremely successful. Boston, for example, experienced a dramatic reduction of sewage and fecal bacteria in Boston Harbor and the Charles River because of improvements compelled by a federal consent decree.[27] Other cities have struggled and asked for extensions or amendments. In March 2012, for example, EPA approved an extension of the deadline of Atlanta's 1999 consent decree from 2014 to 2027 because the city faced a financial crisis, was suffering from serious drinking water problems it also had to fix, and already had some of the highest water and sewer rates in the country.[28] In May, EPA endorsed a modification of Washington D.C.'s consent decree to allow the city five more years to comply and more flexibility to use projects that absorb stormwater with plants, trees, and other "green infrastructure."[29]

Progress of Baltimore's Project

Baltimore's 2002 consent decree established a list of sewer line repair and replacement projects the city had to complete by specific deadlines. The agreement also required the city to submit quarterly reports to EPA and MDE documenting its progress. According to the most recent quarterly report, on October 30, 2015, Baltimore had completed 56 percent (31 of 55) of the projects in advance of the January 1, 2016, deadline.[30] So far, the city reports that it has replaced (or lined with a plastic material to prevent leaks) 163 miles of sewage pipes, or about 39 percent of its goal of 420 miles.[31] The city also has eliminated 60 of its 62 sewage overflow pipes that release waste into waterways; increased the capacity of the Jones Falls Pumping Station from 33 million to 55 million gallons a day; designed and constructed a new pumping station on the Stony Run;

Sewage and polluted stormwater in Baltimore's Harbor from Harris Creek in Canton

separated the city's remaining combined sewer and stormwater pipes; and completed an inspection and assessment of its eight neighborhood sewer drainage areas, including evaluation of leaks and identification of structural improvements that each area needs.[32] However, now that these eight sewer studies have been completed, the bulk of the work required by the consent decree in these areas – for example, lining and replacing more miles of leaky sewer lines – has yet to begin.[33]

Officials in the Department of Public Works say they have spent more than $700 million so far on the projects.[34] A 2013 audit of the city's wastewater fund estimates that the projects will ultimately cost more than $1 billion to eliminate sewer overflows.[35] Records available online show that the Maryland Board of Public Works has approved over $100 million in low cost loans from the state's revolving loan fund for system upgrades to stop sanitary sewer overflows.[36]

Reaction by Government Officials

Wazir Qadri, engineer supervisor at the Baltimore Department of Public Works, said the timetable established by the 2002 consent decree – although agreed to by the city – turned out to be more ambitious than the city could accomplish.[37] "Looking at the magnitude of the

consent decree, I would say it was unrealistic," Qadri said of the deadline. "We need more time to do the work, because this system is a big system."

MDE Secretary Ben Grumbles said: "Our goal is to eliminate sewer overflows – and progress has been made in Baltimore City, but everyone knows this can be a challenging and expensive problem to solve. The Department of the Environment is working with EPA and the city on an amended consent decree that takes into account the logistical challenges while insisting on continued environmental progress."[38]

EPA Spokesman David Sternberg said EPA is considering the city's request for an extension and new deadline for the consent decree, which would have to be approved by the U.S. District Court for Maryland. "EPA and MDE have aggressively overseen the 2002 federal Consent Decree with the City of Baltimore which specifically addresses the control of sanitary sewer overflows in the City," Sternberg said.[39] "The consent decree allows the EPA and MDE to assess stipulated penalties for failure to comply with different elements of the decree. To date Baltimore has paid almost $1.7 million in stipulated penalties (in addition to the $600,000 penalty imposed by the decree itself)."

Causes of Delay

One reason Baltimore missed the deadline was that the city, EPA, and MDE spent almost a decade haggling over the scope of the project.[40] When the city entered into the consent decree, much of the city's sewer system had never been mapped or inspected and city engineers did not even know what was underground.[41] City engineers and contractors used video equipment to survey the system. And then with the maps they created, the city designed plans for a series of pipe replacements and linings that could upgrade the system to handle about three inches of rain in a 24 hour period. EPA rejected the city's plans, however, saying that the city should design the system with enough capacity for five inches of rain in 24 hours, or else the sewage overflows would continue. Dana Cooper, Chief of Legal and Regulatory Affairs at the Baltimore Department of Public Works, said: "We turned in our last plans in 2008, and then did not get a response (from EPA) until 2011, at which point they said, 'Go back to the drawing board." In the end, the agencies compromised on designing the system for about four inches of rain, with some modifications.

David Sternberg, the spokesman for EPA, said it is not true that EPA delayed the process.[42] "The plan was contingent on eight sewershed studies that were being performed by the city of Baltimore," he said. "Our decision came just seven months after all the sewershed studies were completed."

Another delay came from the fact that officials with the city Department of Public Works discovered – well into the planning process – that a century-old, 12-foot diameter sewage pipe that feeds into the city's Back River Wastewater Treatment Plant had either sunk too far into the ground over many decades or been built wrong. The result was that the main pipe entering the plant is about four feet too low. That restricts the size of the opening and causes a pool of sewage four feet deep that routinely backs up 10 miles under the city, according to the Baltimore Department of Public Works.[43]

Because of the massive sewage backup caused by this "hydraulic restriction," the city's sewer system cannot handle all the sewage and rainwater that pours into it. This makes the system more prone to overflow into waterways and basements when it rains. City officials decided they could not shut down the system's last two remaining sewage overflow pipes – SSO #67 near 1901 Falls Road, and SSO #72 behind 428 E. Preston St – because city engineers need these pipes open to relieve pressure from this ongoing underground backup. "The sewage has got to go somewhere," said Cooper of the Baltimore Department of Public Works.[44] "So we could plug those up, but then the most likely place the sewage is going to go is into people's basements. And we don't want that to happen. So we have to remove that hydraulic restriction, first."

Baltimore intentionally pipes sewage into the Jones Falls from outfall SSO #67 beside the Jones Falls biking trail near 1901 Falls Road

Removing the hydraulic restriction at the Back River Wastewater Treatment Plant is not listed as a mandatory project in the consent decree. But city officials say they cannot proceed without fixing this problem.[45] Because re-routing and replacing the deeply-buried pipe would be too difficult, the city is planning to build a pumping station to pump sewage around the restriction and construct 36-million gallon holding tanks to capture overflow. The city put this "hydraulic restriction" project out to bid in the summer of 2015, but the offers came in at about $450 million – $100 million more than the city was willing to pay, according to Cooper of the Department of Public Works.[46] So the city has gone back to the drawing board yet again and has hired a consultant to study other alternatives that might be more affordable.[47] Meanwhile, as the city deliberates its next move, outfalls SSO #67 and SSO #72 continue to remain open – flooding the Inner Harbor with human waste.

The consent decree ordered the city to close these two pipes by February 2010. In 2011, the city requested an extension from EPA to keep the outfalls open until June 29, 2019, to allow "adequate time for the city to complete the hydraulic restriction project." However, EPA has not yet granted or denied permission for this.[48]

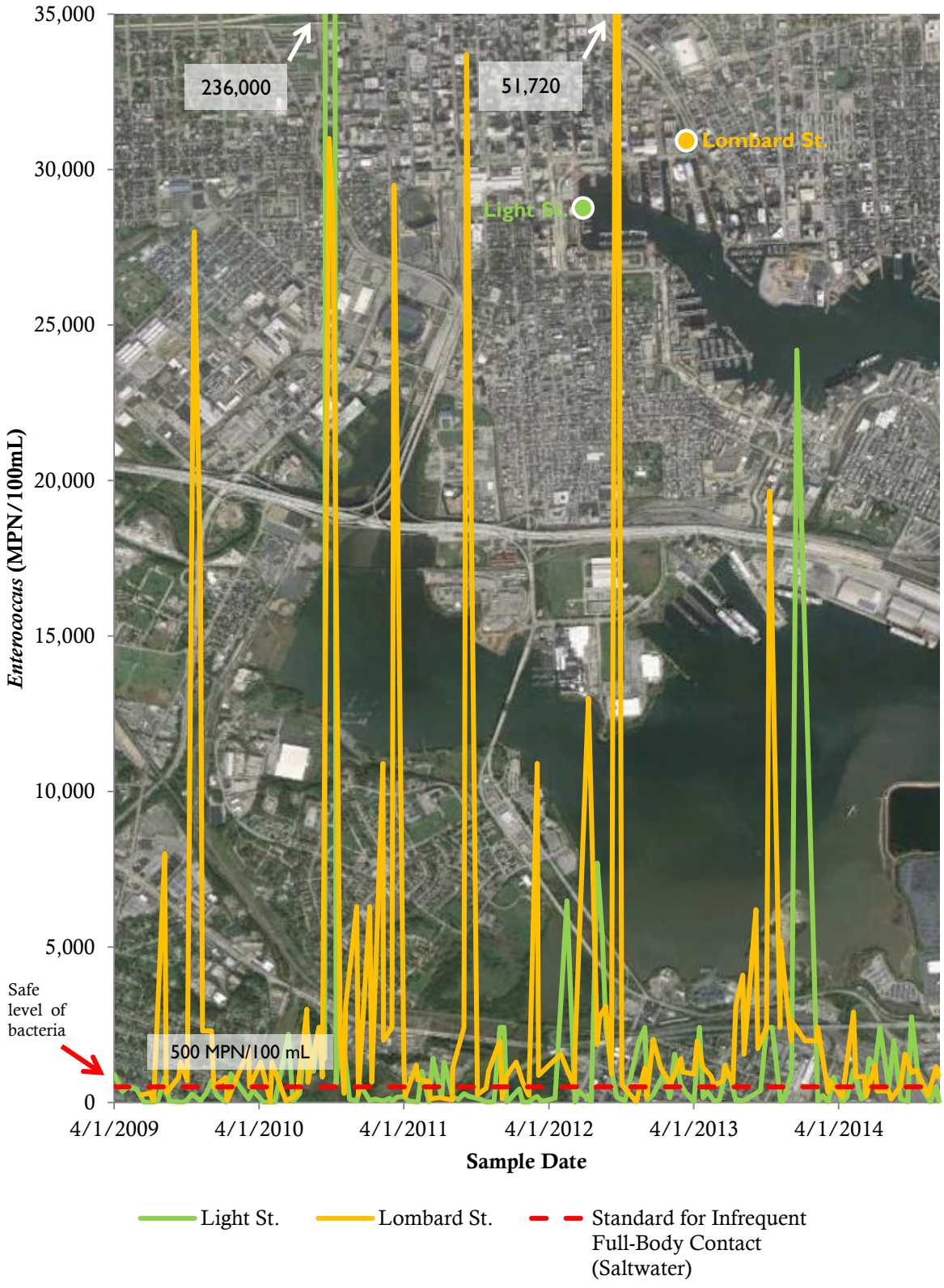
Bacteria Levels

Because the city continues to pipe raw sewage into the Jones Falls, fecal bacteria levels in the Inner Harbor remain very high. The consent decree was supposed to reduce this bacteria in the harbor. But water quality monitoring by Baltimore show consistently unhealthy levels of *Enterococcus* bacteria and no significant improvement between 2009 and 2014.[49] At the Inner Harbor near Light Street, water sampling between April 1, 2009 and December 10, 2014, found that 35 percent of 128 samples had *Enterococcus* bacteria at concentrations that exceeded 500 MPN/100 mL (a conservative standard for infrequent body contact recreation in saltwater). Fifty-six percent of samples exceeded the standard for fresh water (151 MPN/100 mL). The harbor is about two thirds fresh and one third saltwater, so experts say an appropriate standard is likely between 500 MPN/100 mL and 151 MPN/100 mL.[50]

At the city's water quality monitoring station on the Jones Falls near Lombard Street (right before the river empties into the Inner Harbor), 92 percent of 124 water samples taken between June 2009 and December 2014 had levels of *Enterococcus* higher than the fresh water standard.[51] The average sampling results from the Lombard and Light Street sampling locations was 3,078 MPN/100 mL (far higher than either the fresh or saltwater standards) with a high of 236,000 MPN/100 mL, which is 472 times higher than the most conservative standard (the saltwater standard).

Streams that run through parks in city neighborhoods also often have high bacteria levels in part from sewage overflows (although waste from dogs and other animals also contributes). For example, about 38 percent of 73 water samples collected at Gwynns Falls Parkway, and 56 percent of 73 samples collected at Powder Mills between November 2008 and December 2014 had levels of *E. coli* bacteria above standards for infrequent water contact recreation (576 MPN/100 mL).[52]

FIGURE 3. BACTERIA COUNTS AT LOMBARD STREET AND LIGHT STREET SAMPLING LOCATIONS, APRIL 2009-DECEMBER 2014



Expert Opinion

The Environmental Integrity Project shared the city's water quality monitoring data with Ed Bouwer, Ph.D., an expert on water quality at Johns Hopkins University and Chair of the Department of Geography and Environmental Engineering. Bouwer said the fecal bacteria counts are so consistently high that Baltimore should start erecting signs at the Inner Harbor warning of a health threat to kayakers and other boaters who might get wet.[53]

Ed Bouwer, PhD
Johns Hopkins University

"These exceedances are really high," Bouwer said. "And I don't think anyone is really aware of the problem. I've seen kayakers on the water, and they have no idea. It would certainly be prudent to do that [for the city to raise health warning signs] because then people would be able to avoid direct contact with the water."

The consent decree already requires the city to post temporary health warning signs whenever there is a sewage spill or overflow within 50 feet of a waterway or 100 feet of a public recreation area.[54] Baltimore has not posted warning signs at the Inner Harbor, perhaps because the most frequent overflow site on the Jones Falls is about two miles north.

Bouwer said that *Enterococcus* bacteria itself in the harbor may not pose a health risk, but it indicates the presence of feces that likely contain dangerous pathogens like *Shigella*, *Salmonella*, *Cryptosporidium*, *Giardia*, and viruses.[55] He added that it will be impossible for the city to attain the Baltimore Waterfront Partnership's goal of a "fishable, swimmable" harbor by 2020 if the city continues to pipe raw sewage into the harbor after that date. "No, certainly not," Bouwer said. "We are a long way from having a swimmable situation."

Under-reporting of Sewage Volume

In addition to being required to file quarterly reports with EPA and MDE, Baltimore is supposed to immediately report large sewage overflows to the state environmental agency, which maintains an online public database of overflows.[56] However, about 55 percent of the time over the last five years (in 1,453 out of 2,663 incidents), when the city files reports for sewage overflows or spills to MDE, it does not report any volume of overflow.[57] In these cases, the city enters a "zero" as the number of gallons – although it acknowledges that an overflow happened. This suggests that the city significantly under-estimates the amount of sewage released into the Inner Harbor and Chesapeake Bay. The consent decree establishes penalties based on the volume of the city's reported overflows, and so under-reporting reduces the fines the city must pay to EPA and MDE.

Cooper, of the Baltimore Department of Public Works, said that it is often difficult for the city to estimate the volume of overflows or spills because people frequently call reports of spills in to the city's 311 customer service center. "By the time our crew gets out there, often the overflow has stopped," said Cooper.[58] "They can see that it overflowed, because they can see some debris – toilet paper, whatever. But it's stopped – so there is no way to estimate gallons per minute, which is how we normally calculate volume. So usually these are just reported as 'evidence of overflow.' This is an issue that EPA has brought up with us, and so we are working with our crews to start estimating."

Sewage overflowing into street during a rain storm

Inadequate Reporting to the Public

The consent decree requires Baltimore to "immediately provide notice to the public (through the local news media and other means) of the unpermitted discharge" of sewage.[59] Maryland law requires cities and counties to report to the public all sewage overflows of 10,000 gallons or more, as well as all overflows into waterways that are used for boating, fishing or swimming. But despite these requirements, city and state records show that Baltimore issued press releases to notify the public only about 19 percent of the time for spills of 10,000 gallons or more over the last five years.[60]

Overall, the city issued 29 press releases for 151 overflows of more than 10,000 gallons from January 1, 2011 through Sept. 30, 2015, according to records from the city and data from MDE's sewage online overflow database.[61] The vast majority of the unreported events were at outfalls SSO #67 and SSO# 72 on the Jones Falls, which are designed to pipe sewage mixed with rainwater into an Inner Harbor tributary. The city issued only three press releases for 106 overflows of more than 10,000 gallons over the last five years from these two locations. (See listing in APPENDIX).

Sewage overflows and spills in Maryland are normally reported to an online sewage overflow database that is maintained by the Maryland Department of the Environment and accessible to the public. In total, the city released about 335 million gallons of sewage mixed

with rainwater from SSO #67 and SSO #72 in 119 incidents from 2011 to 2015, according to city metering data.[62] But in 97 percent of these incidents involving 99 percent of the volume, the city did not report the overflows to the public database on the MDE website. By contrast, the city reported about 22 million gallons of sewage spills and overflows to the MDE database over this time period. That suggests about 15 times more gallons of overflows were not reported to the public than were reported to the public.

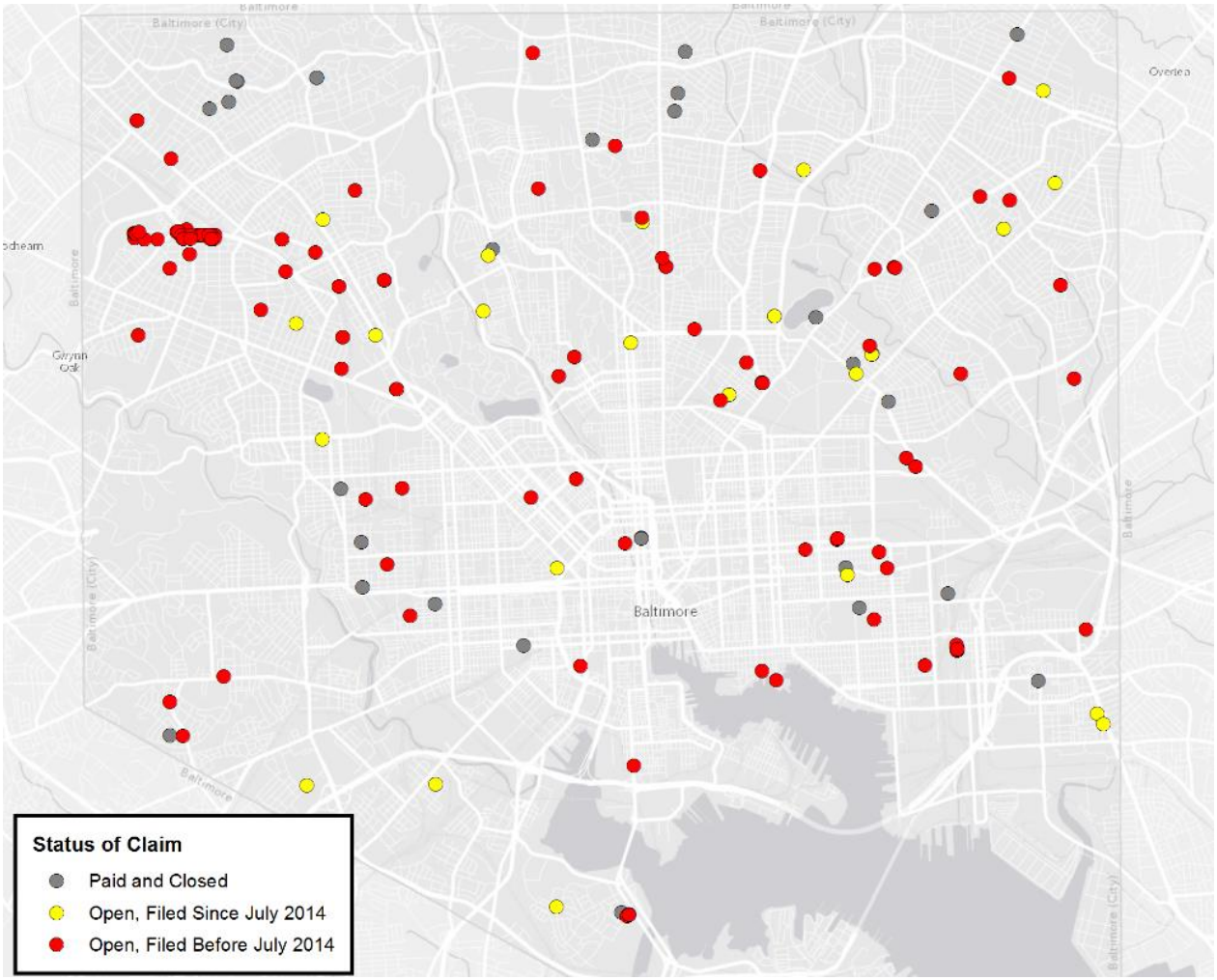
Cooper said the city doesn't report the sewage overflow from these two pipes because these locations are where the city intentionally releases sewage mixed with stormwater.[63] "Since the beginning of the consent decree, they (SSO #67 and SSO #72) have always been treated differently from other overflows because they are operating as designed," Cooper said.

Baltimore only sporadically posts temporary health warning signs as required by the consent decree for sewage overflows and does not keep good records of how often it posts. The city has permanent signs erected near some city streams that warn residents that "urban streams are subject to pollution and runoff," but these signs do not inform residents of specific overflow events.

Damage to Homes

From July 1, 2012 to July 1, 2015, Baltimore's Law Department received 413 claims from homeowners about damage to their properties from sewage overflows.[64] The claims represented only a portion of the overflow incidents experienced by city residents, however. This is because many people simply notify Baltimore through the city's 311 complaint hotline and are not provided information on how to submit claims, or they are discouraged from submitting claims because the city has either denied or failed to respond to past claims submitted by residents. Of the 413 claims that were submitted by city residents over the last three years, only 38 claims have been paid by the city (9 percent). Meanwhile, Baltimore has denied 223 of the claims submitted (54 percent) while 152 claims remain open and unpaid (37 percent). In addition, 122 of these open claims are more than one year old.

FIGURE 4. OPEN AND PAID CLAIMS OF FINANCIAL DAMAGE RELATED TO SEWAGE OVERFLOWS

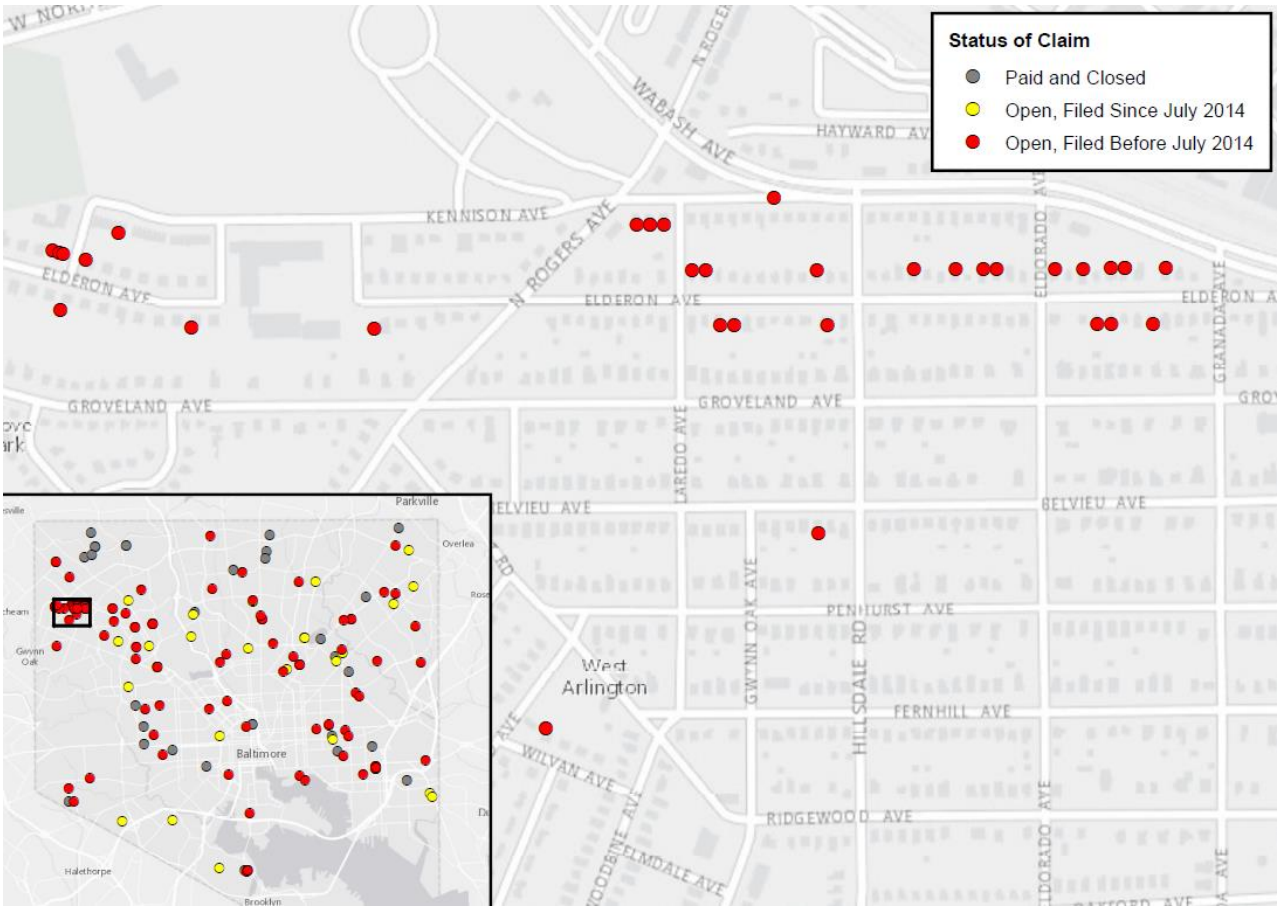


Baltimore's high denial rate for claims is troubling, given that the city's failure to upgrade its sewer line system could be contributing to the overflows. The city also claims that its work on consent decree projects could have increased the flooding of basements. Cooper, of the city's public works department, said that when the city closed 60 of its 62 sewage outfall pipes that had been used to relieve pressure in the system during rain storms, the result was that pressure increased, leading to the system being overwhelmed and more homes being flooded with sewage.[65] "We didn't really know the right order to do things in, necessarily," Cooper said. "And so when we closed those 60 overflows, that actually increased the number of basement backups that we saw in the city – again, because the sewage has to go somewhere."

A cluster of the claims for sewage floods are from residents of Northwest Baltimore – especially the Grove Park, West Arlington, and Glen neighborhoods. Many residents there

have complained about damage to their homes, emotional stress, and exposure to bacteria. Although the state's median household income is $75,538, and city's is about $39,386, the median household income in Grove Park and Glen is approximately $29,000 – making it harder for local residents to afford repairs and cleanup from sewage overflows.

FIGURE 5. SEWAGE OVERFLOW CLAIMS IN THE GROVE PARK AND WEST ARLINGTON NEIGHBORHOODS OF BALTIMORE



Experiences of Homeowners

In Grove Park and West Arlington, the sewage overflow problem has been particularly acute – with 34 claims filed by city residents for sewage overflow damage between July 1, 2012 and July 1, 2015, and all either denied by the city or unaddressed for more than a year.

"I told my husband, 'No, you cannot go down there. It is a health hazard.' So we had to wait it out. But by the time we waited it out, everything was destroyed. I've lost a lifetime of my photos – my collection of albums – everything."

Doris and Charles Brightful,
residents of Northwest Baltimore

Doris and Charles Brightful of the 5600 block of Elderon Avenue submitted claims to the city after sewage poured up out of their basement toilet in April 2014 and September 2015, destroying their furniture, television, and hot water heater. However, the city has yet to respond to their 2014 claim and recently denied their 2015 claim, forcing the Brightfuls to pay at least $4,500 to replace their appliances and repair their basement and bathroom.

"When that last sewage overflow came, it was so strong that the manhole cover in the street – heavy as it is – flew several feet up into the air," said Doris Brightful, a 79-year-old retired nurse.[66] "Our basement was just flooded with sewage. But me being a nurse, I told my husband, 'No, you cannot go down there. It is a health hazard.' So we had to wait it out. But by the time we waited it out, everything was destroyed. I've lost a lifetime of my photos – my collection of albums – everything."

After the flood, on the basement wall above the reeking black slime, hung a "Congressional Achievement Award" presented to Brightful by Congressman Elijah Cummings, honoring her service of 13 years as president of the union of city health nurses. Nearby was a

The Brightfuls' basement, before and after a sewage overflow in September 2015

proclamation from Mayor Kurt Schmoke, who designated Oct. 11, 1996, as "Doris Brightful Day" in Baltimore. Mayor Schmoke's proclamation said: "Doris Brightful has made caring for others her life's work. And after graduating as the first black nurse from St. Agnes Hospital, she spent 36 years practicing nursing at several fine institutions – including University Hospital, Sinai hospital, and the Baltimore Health Department."

Brightful said she is angry that Baltimore refused to lift a finger to help her and her neighbors when they were flooded with sewage from the city's overloaded pipes. She said city workers refused to help them pump wastewater out of their homes.

"It's just been overwhelming – we're trying to take one thing at a time," Brightful said. "Every time it rains really hard, we're petrified. Because we don't know what's going to come up out of those sewers."

In the Glen neighborhood, Brenda Johnson of the 3800 block of Glen Avenue, a retired city public school teacher, suffered two sewage floods in her basement in 2010 and 2011.[67] Sewage erupted like a geyser from her toilet and shower drain for hours in the first incident. "It was horrendous, and it took forever for us to get it cleaned up," she said.

"The city should have already had this problem fixed by now, because they've had enough time. They should also already have enough money if everybody has been paying into the water and sewage fund, like we have…They need some supervision"

Brenda and George Johnson,
residents of Northwest Baltimore

She filed a claim with the city for damages but was denied. "The city came out and basically said it wasn't their fault," Johnson said.

Johnson is frustrated that the city has tripled her water and sewer bills, but has not used the money she paid to upgrade the sewer system in her own neighborhood to stop the frequent overflows. "The city should have already had this problem fixed by now, because they've had enough time," Johnson said. "They should also already have enough money if

everybody has been paying into the water and sewage fund, like we have. Obviously, if the city has not gotten the job done in the last 13 years, they need some supervision. I would like to see a real time line with a real end date for this project."

Sewage poured out of the Johnsons' toilet for hours during an overflow incident

Kurt Heinrich, chief solicitor with the Baltimore City Law Department, said the city's denial rate for claims is high because sewage overflows are often the fault of either rain storms or property owners who do not maintain the privately-owned pipes between their homes and the edge of their property. Some people flush grease or other junk down the toilet, which also causes problems.[68] "There are many, many reasons that sewer backups occur in people's homes," Heinrich said. "The fact that a backup occurs, does not mean there is liability for the city."

Heinrich added that although city workers may have, in the past, pumped sewage out of people's basements, they don't help with that anymore because of budget limitations.

Not all municipalities leave sewage overflows to homeowners to clean up. In Montgomery and Prince George's counties, for example, the Washington Suburban Sanitary Commission (WSSC) promptly cleans up sewage overflows without regard to fault.[69] "We view cleaning up these back-ups as a public health issue," said Jerry Irvine, public affairs manager for WSSC. "So we work to clean-up the overflow as quickly as possible, without determining what caused the back-up to occur."

Conclusion

Repairing and upgrading Baltimore's sewage system is an urgent need because the frequent overflows (averaging more than one a day) are a public health threat, damage people's homes, and foul the city's centerpiece: the Inner Harbor. Although the city struggles with limited funds to tackle an array of major problems – from crime to troubles in its public schools – Baltimore over the last 13 years has collected more than $2 billion for consent decree projects and the operation of its sewage collection and treatment system. That

money, by law, is supposed to be separated into a fund set aside strictly for the city's sewer system, and not used for general city operations.[70] So the question is not whether the city can afford to fix its sewer system. The question is whether the city is spending efficiently the ratepayer money it already has collected to remedy major violations of the federal Clean Water Act.

As EPA, MDE and the court weigh whether to grant Baltimore an extension and amendments to the consent decree, officials should consider making the following requirements of the city:

1) If EPA and MDE extend the deadline for completing the work, the new target date should be no later than 2020. That is the date a Baltimore coalition, the Baltimore Waterfront Partnership, has long publicly advocated as a deadline to make the Inner Harbor "fishable and swimmable." Although the city may ask for years more time than this, homeowners like Doris Brightful and Brenda Johnson do not deserve to live in endless fear that their real-estate values. peace of mind, and physical health will be jeopardized by the city's negligence. A 2020 deadline would also help Maryland comply with federal pollution limits for the Chesapeake Bay, called the Chesapeake Total Maximum Daily Load (or TMDL).

2) Baltimore needs to comply with the terms of the existing consent decree and close the two sewage outfalls (SSO #67 and SSO #72) on the Jones Falls that the city continues to use to pipe tens of millions of gallons of sewage mixed with rainwater into the Inner Harbor.

3) To eliminate these two outfalls, Baltimore needs to fix the sewer line hydraulic restriction problem at the Back River Wastewater Treatment Plant. EPA and MDE should list this as a mandatory project in the revised consent decree and include a firm deadline for completion.

4) Until the two sewage outfalls (SSO #67 and SSO #72) are closed, EPA and MDE should require Baltimore to report sewage overflows of more than 10,000 gallons from these locations to the public, as required by law.

5) Downstream from the Jones Falls at the Inner Harbor, Baltimore should post health warning signs when there are major sewage overflow incidents. The city should make sure the warning signs are visible at the launch points for kayakers and on the docks where people rent paddle boats and small sail boats.

5) The Baltimore Department of Public Works should post on its website details about how it is spending money on consent decree projects, including: a) the amount of money the city has raised for consent decree projects through rate increases since 2002; b) the amount of money the city has spent on consent decree projects; c) an accounting of individual projects and contractors by the amount paid to each to date; d) how much more money the city anticipates it will need to complete the consent decree projects; and e) an estimate of the

additional percentage the city expects it will have to raise water and sewer rates to fully comply with the consent decree.

6) When citizens report large sewage overflows into their homes during rain events, Batlimore officials should respond rapidly to decontaminate the homes and remove any public health threat. The city should make a quick determination of cause and not leave claims lingering for more than a year.

EPA and MDE may also be considering a variety of other modifications to Baltimore's consent decree to allow the city more flexibility, not only in terms of deadlines, but also in terms of what types of projects are required. In this discussion, it is important that officials keep their attention focused on the primary goal: Improving the city's underground infrastructure, so that the flood beneath Baltimore's streets does not continue to erode residents' quality of life and foul the waterfront gathering place that is the Inner Harbor.

Human waste in waterways is a marker of living conditions in developing nations. It is not what America, the people of Baltimore – or people anywhere – should tolerate.

APPENDIX: Metered sewage overflow events - Outfall SSO #67 Located near 1901 Falls Road - Discharges to Jones Falls				
Date	**Volume (Million Gal)**	**Durations (hrs:min)**	**More than 10,000 gal?**	**Press release?**
4/16/2011	0.109	03:35	Y	N
8/14/2011	1.113	03:35	Y	N
8/15/2011	0.337	02:20	Y	N
8/21/2011	0.570	03:15	Y	N
8/27 - 8/28/2011	5.280	16:50	Y	N
9/7 - 9/9/2011	13.100	48:25	Y	N
9/23/2011	1.296	07:55	Y	N
11/22 - 11/23/2011	3.277	17:30	Y	**Y**
12/7 - 12/8/2011	3.705	10:10	Y	**Y**
12/27/2011	0.407	03:25	Y	N
6/1 - 6/2/2012	1.585	6:10	Y	N
7/19 - 7/20/2012	0.017	0:20	Y	N
8/26/2012	1.2	6:40	Y	N
10/29 - 10/30/2012	13.825	35:05	Y	N
12/21/2012	0.018	1:20	Y	N
12/26/2012	0.312	2:40	Y	N
1/30/2013	4.022	11:15	Y	N
5/11/2013	<0.001	0:05	N	N
6/7, 6/10 - 6/11, 6/13/2013	1.629	27:10	Y	N
10/10/2013	0.118	1:50	Y	N
10/11/2013	0.579	6:55	Y	N
11/26 - 11/27/2013	0.105	1:35	Y	N
12/29/2013	0.132	2:20	Y	N
1/11/2014	0.064	3:30	Y	N
2/3/2014	0.351	4:55	Y	N
2/5/2014	0.01	2:15	Y	N
3/29 - 3/30/2014	3.065	18:55	Y	N
4/15/2014	0.691	11:30	Y	N
4/29 - 5/1/2014	10.528	42:40	Y	N
5/16/2014	1.406	7:40	Y	N
6/19/2014	0.517	2:15	Y	N

Date	Volume (Million Gal)	Durations (hrs:min)	More than 10,000 gal?	Press release?
8/12/2014	2.368	9:40	Y	**Y**
1/24/2015	0.039	1:00	Y	N
3/4 - 3/5/2015	0.542	3:50	Y	N
3/10/2015	0.108	2:40	Y	N
3/14/2015	0.484	4:55	Y	N
4/20/2015	2.184	6:55	Y	N
05/18 - 05/19/2015	0.479	2:50	Y	N
6/23/2015	0.696	2:35	Y	N
6/27/2015	3.682	8:45	Y	N
8/24/2015	0.646	3:15	Y	N
9/10/2015	0.357	2:35	Y	N
9/29 - 9/30/2015	0.777	2:20	Y	N
Total Events			**43**	
Total Volume (Million Gallons)			**81.7***	
Events Over 10,000 gal			**42**	
Total Press Releases			**3**	

* Total Volume does not include incidents reporting "<.001" or no volume

Source: Baltimore Department of Public Works

Metered sewage overflow events - Outfall SSO #72 Located behind 428 E. Preston St - Discharges to Jones Falls				
Date	**Volume (Million Gal)**	**Durations (hrs:min)**	**More than 10,000 gal?**	**Press release?**
2/2/2011	0.011	02:05	Y	N
3/6/2011	0.440	06:00	Y	N
3/10/2011	0.111	01:20	Y	N
4/16 - 4/17/2011	3.386	12:55	Y	N
7/7/2011	0.006	01:30	N	N
7/19/2011	0.041	01:30	Y	N
7/25/2011	0.384	03:05	Y	N
8/13/2011	0.116	04:20	Y	N
8/14/2011	0.947	07:40	Y	N
8/15/2011	1.804	07:35	Y	N
8/21/2011	2.581	06:45	Y	N
8/27 - 8/28/2011	0.563	01:40	Y	N
9/6/2011 (am)	0.004	01:10	N	N
9/6/2011 (pm)	1.422	04:55	Y	N
9/23/2011	7.814	10:45	Y	N
10/29/2011	3.011	11:30	Y	N
11/22 - 11/23/2011	14.381	30:40	Y	N
12/7 - 12/8/2011	- -	19:00 (est.)	-	N
12/23 - 12/24/2011	0.674	07:35	Y	N
12/27/2011	4.080	08:40	Y	N
1/12/2012	0.133	04:25	Y	N
2/29 - 3/1/2012	0.628	10:10	Y	N
4/22/2012	0.168	02:50	Y	N
6/1 - 6/2/2012	5.038	7:55	Y	N
7/19- 7/20/2012	0.314	3:05	Y	N
8/26/2012	6.71	10:35	Y	N
10/29 - 10/30/2012	40.121	15:05	Y	N
12/21/2012	1.839	5:50	Y	N
12/26/2012	2.732	5:40	Y	N
1/16/2013	0.056	2:10	Y	N
1/30/2013	1.146	10:35	Y	N
6/7, 6/10 - 6/11, 6/13/2013	12.422	34:40	Y	N
10/10/2013	0.234	2:30	Y	N
10/11/2013	1.72	6:10	Y	N
11/26 - 11/27/2013	1.287	4:50	Y	N
12/14/2013	0.114	2:10	Y	N

Date	Volume (Million Gal)	Durations (hrs:min)	More than 10,000 gal?	Press release?
12/23/2013	0.001	1:35	Y	N
12/29/2013	1.834	5:05	Y	N
1/11/2014	3.122	8:05	Y	N
2/3/2014	4.626	9:00	Y	N
2/5/2014	2.827	11:40	Y	N
2/14/2014	<0.001	0:35	N	N
2/21/2014	0.007	1:45	N	N
3/29 - 3/30/2014	18.349	26:00	Y	N
4/15/2014	7.992	13:40	Y	N
4/29 - 5/1/2014	45.835	49:55	Y	N
5/16/2014	7.077	9:35	Y	N
6/13/2014	<0.001	0:10	N	N
6/19/2014	2.061	3:50	Y	N
8/12/2014	10.601	12:40	Y	N
9/24 - 9/25/2014	0.156	2:35	Y	N
10/15/2014	0.12	2:15	Y	N
10/22/2014	0.526	4:45	Y	N
11/17/2014	0.007	1:30	N	N
11/26/2014	0.331	3:20	Y	N
1/24/2015	1.171	4:30	Y	N
3/4 - 3/5/2015	3.195	7:20	Y	N
3/10 - 3/11/2015	2.762	8:00	Y	N
3/14/2015	5.143	12:10	Y	N
3/27/2015	0.168	3:25	Y	N
4/20/2015	6.026	9:45	Y	N
05/18 - 05/19/2015	3.433	6:30	Y	N
6/23/2015	2.33	4:15	Y	N
6/27/2015	4.329	5:00	Y	N
8/25/2015	0.027	4:00	Y	N
9/10/2015	0.678	3:05	Y	N
9/29 - 9/30/2015	2.468	3:40	Y	N
Total Events				**67**
Total Volume (Million Gallons)				**253.6***
Events Over 10,000 gal				**60**
Total Press Releases				**0**

* Total Volume does not include incidents reporting "<.001" or no volume

Source: Baltimore Department of Public Works

NOTES

[1] United States of America and State of Maryland v. Mayor and City Council of Baltimore, Civil Action No. JFM-02-1524, Consent Decree. Link:
http://publicworks.baltimorecity.gov/Portals/publicworks/documents/ConsentDecree.pdf
[2] City of Baltimore Wastewater Utility Fund annual financial statements, 2002 to 2014. Baltimore City Comptroller's Office spreadsheet, "Water and Sewer Rate Increases Since 1998 And Effect on the Typical City Household."
[3] November 13, 2015, interview with Dana Cooper, chief of legal and regulatory affairs at the Baltimore Department of Public Works
[4] City of Baltimore Sanitary Sewer Overflow Consent Decree, Civil Action No. JFM-02-1524, Quarterly Report No. 52, for calendar quarter ending September 30, 2015. Submitted to EPA and MDE on October 30, 2015.
[5] Figures represent spills and overflows reported both to the Maryland Department of the Environment online database of reported sewage overflows and spills, January 1 2015 through September 30 2015, as well as not reported to the MDE database, but provided to the Environmental Integrity Project by the Baltimore Department of Public Works as a spreadsheet of metered discharges from outfalls SSO #67 and SSO #72. For MDE database:. Link:
http://www.mde.state.md.us/programs/Water/OverFlow/Pages/ReportedSewerOverflow.aspx
[6] When the city reports to the Maryland Department of the Environment online database of sewage spills and overflows (see note 3), the city did not list a gallon amount when it reported an overflow 55 percent of the time between 2010 and 2015.
[7] Annual penalty letters sent by EPA Region III to Baltimore City Department of Public Works, 2009 to 2013.
[8] Spreadsheet of overflows at SSO 67 and SSO 72 (metered sewage outfalls) provided on November 13, 2015 in response to a Maryland Public Information Act Request.
[9] City of Baltimore Sanitary Sewer Overflow Consent Decree, Civil Action No. JFM-02-1524, Quarterly Report No. 52, for calendar quarter ending September 30, 2015. Submitted to EPA and MDE on October 30, 2015.
[10] To determine when the city did not notify the public or news media, as required by the consent decree and Maryland state law (COMAR) 26.08.10.08.08, EIP compared the spreadsheet of overflows from SSO 67 and SSO 72 provided by the Baltimore Department of Public Works (see note above) with the results of a Maryland Public Information Act request that asked for copies of all press releases and public notifications issued by the city for sewage overflows from 2010 to 2015.
[11] Sampling data from the Baltimore Department of Public Works, Stream Impact Sampling program. Results for 2014 obtained through an information request submitted in November, 2015 and online at http://www.cleanwaterbaltimore.org/stream-impact-sampling. Data examined was for April 1, 2009, to December 10, 2014, at the Light Street location on the Inner Harbor, where 35 percent of 128 samples over this time period had enterococcus bacteria at concentrations that exceeded 500 MPN/100 ml (a conservative standard, for infrequent body contact recreation in salt water). The Inner Harbor is a mixture of fresh and salt water. The standard for fresh water is 151 MPN/100 ml. Fifty-six percent of the samples at the Light Street location on the harbor exceeded that threshold. An appropriate standard for body contact recreation in the harbor's brackish water likely lies somewhere between 500 MPN and 151 MPN.
[12] Ibid.
[13] Information about claims to Baltimore city current as of July 1, 2015, and obtained from a Maryland Public Information Act request.
[14] City data on claims from a Maryland Public Information Act request and current as of July 1, 2015.
[15] Baltimore Waterfront Partnership "Swimmable and Fishable by 2020" goal on website:
http://baltimorewaterfront.com/healthy-harbor/
[16] Interview on December 4, 2015, with Edward Bouwer, Chairman of the Department of Geography and Environmental Engineering at Johns Hopkins University.
[17] City of Baltimore Sanitary Sewer Overflow Consent Decree, Civil Action No. JFM-02-1524, Quarterly Report No. 52, for calendar quarter ending September 30, 2015. Submitted to EPA and MDE on October 30, 2015.

[18] Waterfront Partnership of Baltimore, Baltimore's Inner Harbor: Economic Impact, Importance, and Opportunities for Investment (Oct. 31, 2013), http://baltimorewaterfront.com/wp-content/uploads/2015/06/Economic-Impact-Study.pdf.
[19] The Baltimore City Comptroller's office provided different numbers in a spreadsheet, "Water and Sewer Rate Increases Since 1998 And Effect on the Typical City Household," which shows the water and sewer bill for a typical household in the city rising from $518 per year in 2002 to $1,657 in 2015. This is based on a typical "family of four" household in Baltimore, according to Comptroller Joan Pratt. The Baltimore Department of Public Works in 2013 shifted to a different standard, a "typical Baltimore consumer," with a much lower water consumption rate. The Baltimore Department of Public Works estimates that a "typical Baltimore City quarterly bill" for water and sewer is $223.10 per quarter, or $892.40 per year. This number is from the Baltimore City Department of Public Works website: http://publicworks.baltimorecity.gov/Bureaus/WaterWastewater/CustomerSupportandServices/Rates.aspx.
[20] Baltimore City Department of Public Works website, quoting from a Baltimore newspaper around 1900. Link: http://publicworks.baltimorecity.gov/Bureaus/WaterWastewater/SurfaceWater/HistoryoftheSystem.aspx
[21] Ibid.
[22] Timothy B. Wheeler, "Sewage Leaks Foul Baltimore streams, Harbor. Chronic Seepage from Aging Pipes Worse than Storm Overflows," The Baltimore Sun, December 10, 2011.
[23] Data from Baltimore City Department of Public Works for metered outfalls SSO #67 and SSO #72, and from Maryland Department of the Environment sewage overflow database: http://www.mde.state.md.us/programs/Water/OverFlow/Pages/ReportedSewerOverflow.aspx. A review off the city and state records found that about 97 percent of the overflow incidents from SSO #67 and SSO #72 registed by the city's meters for these outfalls, involving more than 99 percent of the total gallons of overflows from Baltimore, were not reported to the MDE database. Four overflows registered by the meters from SSO #67 and SSO #72 involving 158,278 gallons were also in the MDE database. EIP removed these four double counted incidents from the total.
[24] U.S. EPA Office of Inspector General report, "Protecting America's Waters: EPA Needs to Track Whether its Major Municipal Settlements for Combined Sewer Overflows Benefit Water Quality," Sept. 16, 2015. Other locations from interview on 12/3/15 with Nathan Gardner-Andrews, Chief Advocacy Officer for the National Association of Clean Water Agencies.
[25] U.S. EPA Office of Inspector General report, "Protecting America's Waters: EPA Needs to Track Whether its Major Municipal Settlements for Combined Sewer Overflows Benefit Water Quality," Sept. 16, 2015
[26] Ibid.
[27] Ibid.
[28] EPA Press Release, "Atlanta Will Get More Time to Complete Sewer Upgrades/City, state and federal government reach proposed agreement to extend the deadline to 2027," May 31, 2012. Link: http://yosemite.epa.gov/opa/admpress.nsf/a21708abb48b5a9785257359003f0231/0d7c29db2b49a1b485257a0f0067c420!OpenDocument
[29] U.S. Department of Justice press release, "Strategy to Reduce District of Columbia's Sewer Overflows will Include Green Infrastructure," May 20, 2015. Link: http://www.justice.gov/opa/pr/strategy-reduce-district-columbia-s-sewer-overflows-will-include-green-infrastructure
[30] City of Baltimore Sanitary Sewer Overflow Consent Decree, Civil Action No. JFM-02-1524, Quarterly Report No. 52, for calendar quarter ending September 30, 2015. Submitted to EPA and MDE on October 30, 2015.
[31] November 13, 2015, interview with Wazir Qadri, engineer supervisor at the Baltimore Department of Public Works.
[32] November 11, 2015, email from EPA's spokesman David Sternberg.
[33] Ibid.
[34] November 13, 2015, interview with Dana Cooper, chief of legal and regulatory affairs at the Baltimore Department of Public Works.
[35] City of Baltimore Wastewater Utility Fund Financial Statements, June 30, 2013 and 2012.
[36] The data was obtained based on the list of projects approved by the Board of Public Works, based on meeting records available online at http://bpw.maryland.gov/Pages/default.aspx. Baltimore sewer project approvals can be viewed in summaries of meeting records from April 15, 2009; May 1, 2013; July 24, 2013; April 16, 2014; October 29, 2014, and April 15, 2015. In addition, about $5.6 million in federal grants and

$7.5 million in state grants went into the consent decree projects, according to a November 24, 2015, email from Jeffrey Raymond,spokemsan for the Baltimore Department of Public Works.
[37] November 13, 2015, interview with Dana Cooper, chief of legal and regulatory affairs at the Baltimore Department of Public Works.
[38] Emailed statement from Maryland Environmental Secretary Ben Grumbles on November 17, 2015.
[39] Email from EPA spokesman David Sternberg on November 16, 2015.
[40] City of Baltimore Sanitary Sewer Overflow Consent Decree, Civil Action No. JFM-02-1524, Quarterly Report No. 52, for calendar quarter ending September 30, 2015. Submitted to EPA and MDE on October 30, 2015.
[41] November 13, 2015, interview with Wazir Qadri, engineer supervisor at the Baltimore Department of Public Works, and Dana Cooper, chief of legal and regulatory affairs at the Baltimore Department of Public Works.
[42] Email from EPA spokesman David Sternberg on November 16, 2015.
[43] Ibid.
[44] Ibid.
[45] Ibid.
[46] Ibid.
[47] Ibid.
[48] City of Baltimore Sanitary Sewer Overflow Consent Decree, Civil Action No. JFM-02-1524, Quarterly Report No. 52, for calendar quarter ending September 30, 2015. Submitted to EPA and MDE on October 30, 2015.
[49] Sampling data from the Baltimore Department of Public Works, Stream Impact Sampling program. Results for 2014 obtained through an information request submitted in November, 2015 and online at http://www.cleanwaterbaltimore.org/stream-impact-sampling. Data examined was for April 1, 2009, to December 10, 2014, at the Light Street location on the Inner Harbor, where 35 percent of 128 samples over this time period had enterococcus bacteria at concentrations that exceeded 500 MPN/100 ml (a conservative standard, for infrequent body contact recreation in salt water). The Inner Harbor is a mixture of fresh and salt water. The standard for fresh water is 151 MPN/100 ml. Fifty-six percent of the samples at the Light Street location on the harbor exceeded that threshold. An appropriate standard for body contact recreation in the harbor's brackish water likely lies somewhere between 500 MPN and 151 MPN.
[50] Interview on December 4, 2015, with Edward Bouwer, an expert on water quality at Johns Hopkins University and Chairman of the Department of Geography and Environmental Engineering.
[51] Sampling data from the Baltimore Department of Public Works, Stream Impact Sampling program. Results for 2014 obtained through an information request submitted in November, 2015 and online at http://www.cleanwaterbaltimore.org/stream-impact-sampling.
[52] Sampling data from the Baltimore Department of Public Works, Stream Impact Sampling program. http://www.cleanwaterbaltimore.org/stream-impact-sampling
[53] Interview on December 4, 2015, with Edward Bouwer, an expert on water quality at Johns Hopkins University and Chairman of the Department of Geography and Environmental Engineering
[54] Baltimore Sewage Overflow Emergency Response Plan, approved by EPA as part of the 2002 sewage consent decree.
[55] Ibid.
[56]Maryland Department of the Environment sewage overflow database:
http://www.mde.state.md.us/programs/Water/OverFlow/Pages/ReportedSewerOverflow.aspx
[57] Ibid
[58] November 13, 2015, interview with Dana Cooper, chief of legal and regulatory affairs at the Baltimore Department of Public Works.
[59] United States of America and State of Maryland v. Mayor and City Council of Baltimore, Civil Action No. JFM-02-1524, Consent Decree. Link:
http://publicworks.baltimorecity.gov/Portals/publicworks/documents/ConsentDecree.pdf
[60] To determine when the city did not notify the public or news media, as required by the consent decree and Maryland state law (COMAR) 26.08.10.08.08, EIP compared the spreadsheet of overflows from SSO 67 and SSO 72 provided by the Baltimore Department of Public Works (see note above) with the results of a Maryland Public Information Act request that asked for copies of all press releases and public notifications issued by the city for sewage overflows from 2010 to 2015.
[61] Results from documents and data provided by Baltimore Department of Public Works in response to a Maryland Public Information Act request. Numbers include both incidents reported to Maryland Department

of the Environment database and overflow estimates from city from SSO #67 and SSO #72. City officials suggested that their response to the Maryland Public Information Act request might not have included all press releases the city issued, so the actual number could be slightly different.

[62] Data from Baltimore City Department of Public Works for metered outfalls SSO #67 and SSO #72, and from Maryland Department of the Environment sewage overflow database: http://www.mde.state.md.us/programs/Water/OverFlow/Pages/ReportedSewerOverflow.aspx. A review of the city and state records found that about 97 percent of the overflow incidents from SSO #67 and SSO #72 registed by the city's meters for these outfalls, involving more than 99 percent of the total gallons of overflows from Baltimore, were not reported to the MDE database. Four overflows registered by the meters from SSO #67 and SSO #72 involving 158,278 gallons were also in the MDE database. EIP removed these four double counted incidents from the total.

[63] November 13, 2015, interview with Dana Cooper, chief of legal and regulatory affairs at the Baltimore Department of Public Works.

[64] City data on claims from a Maryland Public Information Act request and current as of July 1, 2015.

[65] November 13, 2015, interview with Dana Cooper, chief of legal and regulatory affairs at the Baltimore Department of Public Works.

[66] Interview with Doris and Charles Brighful on October 29, 2015.

[67] Interview with Brenda Johnson on December 1, 2015.

[68] Interview with Kurt Henrich, chief solicitor with the Baltimore City Law Department, on November 30, 2015.

[69] Email on December 3, 2015, from Jerry Irvine, public affairs manager for Washington Suburban Sanitary Commission.

[70] November 13, 2015, interview with Dana Cooper, chief of legal and regulatory affairs at the Baltimore Department of Public Works.

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