FLUSHING CREEK PUBLIC COMMENT RESPONSE SUMMARY

Public Letters Received:

1. Email from Mariana. October 30, 2015. Flushing Bay.
2. Email from Marne Asia. October 30, 2015. How much Flushing can the Flushing Bay take.
3. Email from Cody Ann Hermann. October 30, 2015. Flushing Creek LTCP.
4. Greater Flushing Chamber of Commerce. October 30, 2015. DEP's Long Term Control Plan for Flushing Creek.
5. Empire Dragon Boat Team NYC. October 27, 2015. Comments on Proposed Final Recommendations – Flushing Creek CSO Long Term Control Plan.
6. Guardians of Flushing Bay. October 29, 2015. Comments on Proposed Final Recommendations – Flushing Creek CSO Long Term Control Plan.
7. Friends of Flushing Creek. October 20, 2015. Comments on Flushing Creek LTCP Final Recommendations.
8. School of Earth and Environmental Sciences. October 30, 2015. Comments on Flushing Creek LTCP.

1. What are the goals of the Long Term Control Plan (LTCP) program?

Response:

- *As stated in the Goal Statement in Section 1 of the LTCP, the goal of each LTCP is to identify appropriate CSO controls necessary to achieve waterbody- specific water quality standards, consistent with EPA's 1994 CSO Policy and subsequent guidance. Where existing water quality standards do not meet the Section 101(a)(2) goals of the Clean Water Act, or where the proposed alternative set forth in the LTCP will not achieve existing water quality standards or the Section 101(a)(2) goals, the LTCP will include a Use Attainability Analysis examining whether applicable waterbody classifications, criteria, or standards should be adjusted by the State. The Use Attainability Analysis will assess the waterbody's highest attainable use, which the State will consider in adjusting water quality standards, classifications, or criteria and developing waterbody-specific criteria.*

2. Why was there a difference in the level of information presented for Flushing Bay and Flushing Creek during the September 2015 public meeting? Will the two LTCPs be coordinated?

Response:

- *Although the Flushing Creek LTCP was submitted to NYSDEC in December 2014 and the Flushing Bay LTCP was submitted to NYSDEC in December 2016, DEP closely coordinated its development of the two LTCPs. The September 30, 2015 Public Meeting had two objectives: (1) to provide detailed information on the LTCP recommendation for Flushing Creek, and (2) to serve as the kick-off meeting for developing the Flushing Bay LCP. DEP conducted a second public meeting on October 26, 2016 to present the Flushing Bay alternatives under evaluation.*

- *Both LTCPs evaluated different CSO control scenarios to assess water quality impacts to each other. The receiving water model which assessed water quality impacts in the LTCP for Flushing Bay included water quality impacts to Flushing Creek, thus accounting for the influences of the water quality impacts of both the Creek on the Bay, and vice versa. As set forth in the LTCPs, CSO controls in Flushing Bay have no impact on the attainment of fecal coliform criteria in Flushing Creek on either a recreation season or annual basis. In addition,*

fecal coliform water quality standards are achieved at all stations in Flushing Bay with no CSO controls applied to Flushing Creek CSOs, indicating no impact of Flushing Creek CSO control on Flushing Bay.

3. The notices for the public meetings were not translated into Chinese, Korean or Spanish.

Response:

- *Public notices were advertised in Chinese in the Chinese World Journal and in Korean in the Korea Times New York from Friday, September 11, 2015 through Thursday, September 17, 2015. A Spanish publication was added for the public notice announcing the Flushing Bay alternatives meeting held on October 26, 2016.*

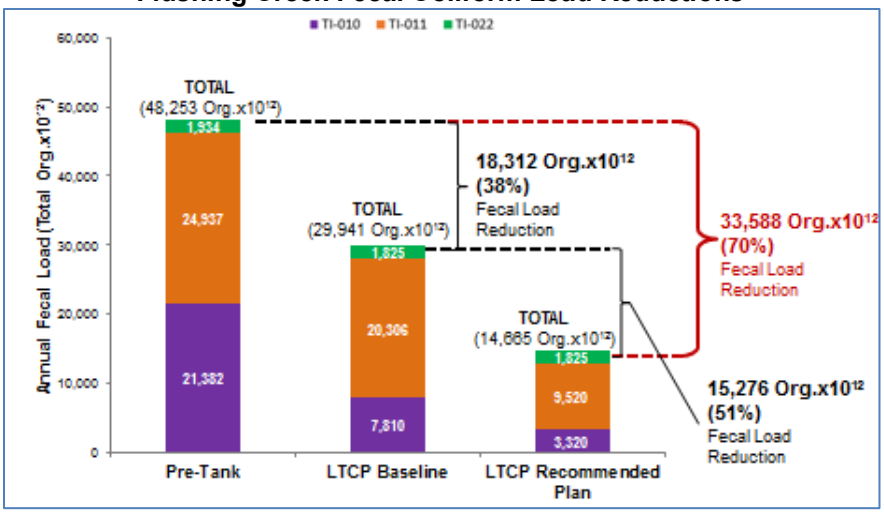
4. The water quality in Flushing Creek has been bad for a long time, and it is now time to fix it.

Response:

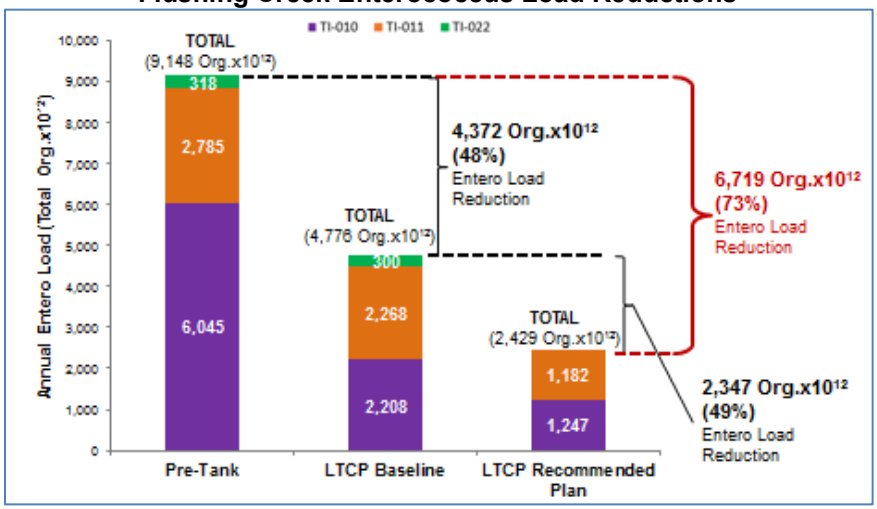
- *DEP has been actively working to improve water quality in Flushing Creek. Over the past decade, DEP has committed more than $400 million to reduce pollution and improve water quality in Flushing Creek. Water quality improvement projects include the construction and operation of a 28 million gallon underground CSO storage tank, with an additional 15 million gallons of storage in the sewers conveying flow to the tank and 40 MGD pump station. These projects result in 800 MG of annual capture. In addition DEP has added green infrastructure investments on streets, sidewalks, and City-owned property; and conveyance enhancements to allow more flow to the Tallman Island Waste Water Treatment Plant (WWTP).*

- *The 43 MG storage capacity has had a significant impact in reducing average annual bacteria loads to Flushing Creek, and the LTCP Recommended Plan to provide seasonal disinfection with dechlorination at Outfalls TI-010 and TI-011 will result in further reductions in bacteria loads. As indicated in the figures below, the LTCP Recommended Plan will result in a 70 percent fecal coliform and 73 percent enterococcus reduction in annual bacteria load from the Pre-Tank conditions.*

Flushing Creek Fecal Coliform Load Reductions



Flushing Creek Enterococcus Load Reductions



5. How does rainfall affect CSOs, and how is rainfall data used in LTCPs?

Response:

- *Not every rainfall causes a CSO event. For Flushing Creek, approximately 0.1 inches of rainfall over a period of one hour may typically cause a CSO outfall to discharge.*

- *Rainfall data is used in the calibration of the detailed sewer system models used to predict CSO overflow frequency and volume. The calibration process involves comparison of model-predicted flow conditions versus conditions measured in the sewer system by installed flow meters. To do this comparison, the models are run with the actual measured rainfall during the period that the flow meters were installed, using either the closest rainfall gauges to the area being modeled, or radar-based rainfall distributions.*

- *Once the sewer system models are calibrated, they are used to assess the performance of CSO control alternatives. For this step, DEP has established a "typical" rainfall year based on an analysis of historical rainfall records. Specifically, DEP evaluated a comprehensive range*

of historical rainfall data from 1969 to 2010 at four rainfall gauges (Central Park, La Guardia Airport, JFK Airport, and Newark Airport). The 2008 JFK rainfall was determined to be the most representative of average annual rainfall across all four gauges. Figure 1 shows the annual rainfall at JFK for 1969 through 2014. Previous CSO planning for the Waterbody/Watershed Facilities Plans (WWFP) DEP used the 1988 JFK rainfall as the typical year. As indicated in Figure 1, the JFK 2008 rainfall currently DEP used for the LTCP typical year includes almost six inches more rainfall than JFK 1998, and is more consistent with recent rainfall trends.

- *DEP determines the average annual performance of the CSO control alternatives by running the collection system model with the 2008 JFK rainfall. DEP has developed receiving water models to predict impacts of CSO discharges on receiving water quality. These models are recalibrated with Harbor Survey and LTCP sampling data. The calibrated sewer system models provide inputs (CSO and stormwater flows) into the receiving water models. The preferred alternative for each LTCP is also evaluated with a 10-year model run to address elevated rainfall due to climate change and to better project future water quality conditions accounting for year-to-year variability in rainfall.*

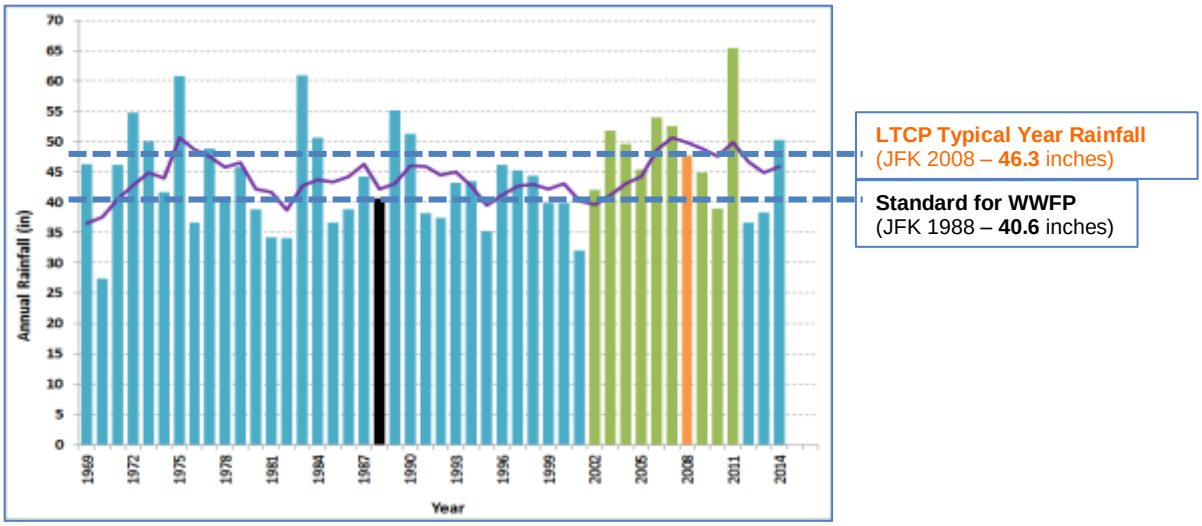


Figure 1. Annual JFK Rainfall

6. What is the magnitude of the CSO volume in Flushing Bay and Flushing Creek relative to the rest of the City?

Response:

- *Based on 2008 typical year LTCP baseline conditions, Flushing Creek and Flushing Bay receive a total of 2.5 billion gallons per year (BGY) of untreated CSO (1.3 BGY to the Bay and 1.2 BGY to the Creek). The total CSO volume discharged to all waterbodies within NYC's jurisdiction in the 2008 typical year LTCP baseline conditions is approximately 20 BGY. Therefore, the percentage of CSO discharged annually to Flushing Creek and Flushing Bay is approximately 12% of the citywide CSO discharges.*

7. The plan for Flushing Creek needs to reduce the CSO volume.

Response:

- *As noted in the response to Comment 4, DEP has been actively working to improve water quality in Flushing Creek. Over the past decade, DEP has committed more than $400 million to reduce pollution and improve water quality in Flushing Creek. Water quality improvement projects include the construction and operation of a 28 million gallon underground CSO storage tank, with an additional 15 million gallons of storage in the sewers conveying flow to the tank and 40 MGD pump station. These projects result in 800 MG of annual capture. In addition DEP has added green infrastructure investments on streets, sidewalks, and City-owned property; and conveyance enhancements to allow more flow to the Tallman Island Waste Water Treatment Plant (WWTP).*

- *The approved Flushing Creek LTCP project is to provide disinfection at the existing CSO storage tank facility, located near the head end of Flushing Creek, and at outfall TI-011 near the mouth of the creek. Disinfection reduces the amount of pathogen bacteria in the treated discharge. Implementation of seasonal disinfection at the existing CSO storage tank facility and at outfall TI-011 will cost-effectively reduce the annual loading of pathogen bacteria to the Creek by approximately 88% during the recreational season (May 1st to October 31st), and by 50% on an annual basis. Section 8 of the December 2014 CSO LTCP for Flushing Creek presented the evaluation of opportunities to further reduce CSO volume to Flushing Creek. Opportunities to reduce CSO volume to Flushing Creek were limited by issues of siting, hydraulics, and cost effectiveness.*

8. Why didn't the Flushing Creek LTCP include more green infrastructure?

Response:

- *New York City's Green Infrastructure (GI) Program is one of the largest in the country, with a strategy to utilize GI where it provides the highest benefits for water quality as well as other co-benefits. Rain gardens (formerly called bioswales) are an efficient GI solution because the City has control over the right-of-way areas where the rain gardens are installed. GI design proceeded first in parts of the City without CSO tanks, and for this reason GI in the Flushing Bay tributary area was implemented before the Flushing Creek tributary area, which has a CSO facility. The LTCP development and the GI program are on parallel paths, but under independent schedules. However, under the LTCP, the DEP looks for additional GI opportunities to complement the existing GI program where available. In the Flushing Creek drainage area, DEP is installing rain gardens in areas that drain to the following CSO outfalls: TI-022, TI-011 and TI-010. DEP provides an update on the GI program in the Annual GI Report.*

- *DEP is currently in construction on more than 800 right-of-way rain gardens in the Flushing Bay drainage area, adjacent to Flushing Creek, has installed more than 3000 GI installations in streets and sidewalks citywide. In addition to green infrastructure in the right-of-way, DEP works in partnership with other NYC agencies to install green stormwater retrofits on public property. DEP is working with the Department of Education, School Construction Authority, and the non-profit Trust for Public Land on a rain garden and synthetic turf field at a Flushing Creek Public School 185Q as part of the Schoolyards to Playgrounds program; construction began in September 2015. In addition, DEP has added green infrastructure to the construction of a*

parking lot at the Flushing Town Hall in coordination with the Department of Cultural Affairs and the Department of Design and Construction.

9. Will new development make the CSO problem worse?

Response:

- *The LTCPs being developed by DEP take into account population growth and planned development through the year 2040. Where specific major developments that would affect existing infrastructure and/or flows are well defined, the collection system model can be adjusted to reflect the expected configuration of the development. Title 15, Chapter 31, part 3 of the Rules of the City of New York requires that new developments manage on-site stormwater. This requirement will help mitigate the potential impacts of new development on wet weather flows.*

10. Why is chlorination the preferred disinfection technology and why were other disinfection technologies such as ultraviolet light, enzymes and ozone not considered?

Response:

- *Chlorination is a proven technology utilized by utilities throughout the country for pathogen reduction. Disinfection of CSO outfalls will present challenges to DEP that will be specific to each outfall and waterbody where disinfection will be utilized. The approved LTCP includes both chlorination and dechlorination. An Environmental Assessment Statement (EAS) will be prepared during the design process and the analyses will be performed in accordance with the CEQR Technical Manual. This process will review many things including natural resources and the effect of chlorine on ecology. In the event a significant adverse impact is identified and can't be mitigated, and Environmental Impact Statement (EIS) would be prepared, which involves scoping and a public hearing.*

- *DEP considered the efficacy of UV, however given the amount of turbidity in the CSO discharge from the Flushing Creek tank and TI-011, UV would not be effective. DEP also considered ozonation but eliminated this alternative due to its high cost.*

11. When using sodium hypochlorite during disinfection, how will toxicity be controlled?

Response:

- *DEP is intending to use flow meters and/or TRC meters to control the chlorine dose and will also use a similar methodology to control the sodium bisulfite dose for dechlorination. These methods will be developed during the planning and design phase of each contract and will build upon standard industry practices being used at other CSO disinfection facilities.*

12. Disinfection doesn't address other pollutants such as nutrients, toxic chemicals and trash in CSO which affect the quality of the water.

Response:

- *Nutrients and toxics in CSOs have not been a focus of the CSO Program because they have not been identified as sources of impairment for the waterbody. The design of the disinfection facility will include floatables control using underflow baffles. Specifically, underflow baffles are proposed at Diversion Chamber No. 3 adjacent to the Flushing Creek Storage Tank, and at Regulator TI-R09 upstream of outfall TI-011. More detailed evaluations will be undertaken*

during the disinfection system design phase to confirm the feasibility of these concepts. Underflow baffles have been proven to be an effective approach for capturing floating material and debris in combined sewage. Chlorine is also an oxidizer so there will also be some reduction in the organic discharges but the primary goal of disinfection to reduce the bacterial loading.

13. The receiving water model cannot accurately predict pollution concentrations because it does not account for groundwater or re-suspension of bacteria from sediments.

Response:

- *Resuspension of bacteria in sediment is not anticipated to be an important source of bacteria relative to the wet weather concentrations measured in the CSO and stormwater. If resuspension does occur, it would be a persistent background source that would occur as a function of the tidal flow. During periods of peak tidal flood and ebb velocity, there is an increase in the shear force on the bottom sediments and bacteria resident in the sediment that could potentially be re-suspended. As part of the sampling program conducted to support the LTCP modeling work, DEP collected samples for three or four consecutive days following a wet weather event. Over the course of these sampling days, bacteria concentrations consistently decreased for the sampling conducted in Flushing Bay and Flushing Creek.*

- *In addition, the dry weather sampling DEP conducted showed relatively low dry weather bacteria concentrations in many areas, except where other specific sources such as illicit connections were suspected. If sediment re-suspension of bacteria were a significant issue, more evidence would have been expected to be seen from the sampling data.*

- *With regard to groundwater, DEP acknowledges that the East River Tributaries Model used for Flushing Creek and Flushing Bay does not directly include groundwater inflow. However, in the setting of the East River and most of the tributaries, a six-to-seven foot tide occurs twice a day. That tidal action creates a significant amount of mixing and in the case of the tributaries, it creates a significant mechanism that flushes pathogens out into the more open waters. Such a large tidal prism would dominate flows from groundwater inflow.*

- *In each of the tributaries (including Flushing Creek), the model calibration process included an analysis of a conservative tracer to help assess whether the model appropriately represents the tidal mixing and the freshwater inflows. In the case of Flushing Creek, approximately 5 cfs of base flow was added into the model to reduce the salinity levels in the creek to match the levels observed in the sampling data. This added flow would represent groundwater inflow plus dry weather base flow from Willow and Meadow Lakes (if any exists). This added flow is on the order of what the groundwater inflow would be expected to be. Thus, in the Flushing Creek model, the impact of groundwater flow has been accounted for.*