

## NEW YORK – NEW JERSEY HARBOR & ESTUARY PROGRAM (HEP) CITY OF ELIZABETH AND VILLAGE OF RIDGEFIELD PARK, NEW JERSEY

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### Background

The New York-New Jersey Harbor & Estuary Program (HEP) convenes partners responsible for managing the New York-New Jersey Harbor Estuary to help accelerate progress towards cleaner water, restored fish and wildlife habitat, improved public access, more efficient maritime activities, and robust community engagement. In 2019, 21 municipalities in New Jersey, 17 of which are within the Harbor Estuary, and 4 utilities with active Combined Sewer Overflow (CSO) permits, were completing their Long-Term Control Plan (LTCP) permit requirements. While the typical hydrologic year used to evaluate CSO control alternatives was selected to be a conservative representation of annual precipitation over a broad historic period, the LTCP requirements do not explicitly require permittees to assess impacts associated with future weather and receiving water conditions outside of historical observations. To provide resources to expand the range of climate change impacts considered, HEP partnered with two New Jersey municipalities, the City of Elizabeth (Elizabeth) and the Village of Ridgefield Park (Ridgefield Park), to assess the risk of sea level rise impacts to their respective CSO outfalls.

### Challenges

Projections developed by the Rutgers University Science and Technical Advisory Panel indicate that sea level in the New York-New Jersey Harbor Estuary is expected to rise between 0.9 and 2.1 feet by 2050, with a worst-case projection of up to 6 feet by 2100. Many of New Jersey's CSO outfalls are already underwater during higher tidal periods, and increased precipitation and high intensity storms will lead to greater volumes of polluted stormwater directly entering the Harbor Estuary. Greater volumes of stormwater will likely increase the number and volume of discharges from combined sewers when sewage treatment plants reach capacity. In addition, water systems in New Jersey do not necessarily maintain ownership of all the infrastructure within the system, which can affect planning and implementation of controls. Both Elizabeth and Ridgefield Park considered the prospective impacts of sea-level rise on street and residential flooding.

The City of Elizabeth focused on a tidally influenced outfall in a low-lying area adjacent to the Elizabeth River. When wet weather events and high tides coincide, localized flooding within the outfall's drainage area can occur. Sea level rise is expected to increase the backpressure condition on the outfall pipe, increasing the likelihood of upstream localized flooding. Flooding can damage houses, cars, and other property; hinder traffic flows; and require cleanup after floodwaters have subsided.

Ridgefield Park focused on an outfall located in a low-lying area adjacent to the confluence of the Hackensack River and Overpeck Creek. As tidally influenced water level has risen in this area, the extent to which the outfall is submerged throughout the tidal cycle has increased. When the drainage area for the outfall floods, portions of an important roadway and its neighboring side streets can become flooded. This flooding hinders traffic flow, and police or Department of Public Works (DPW) workers may be needed to detour vehicles.

# Case Study: Water and Wastewater Utilities Planning for Resilience

## Planning Process and Regional Workshop

To better understand the vulnerability of CSO outfalls in Elizabeth and Ridgefield Park to potential climate-related impacts and to evaluate the risk reduction benefits of CSO control alternatives, HEP worked with consultants from both municipalities to use the U.S. Environmental Protection Agency’s (EPA’s) Climate Resilience Evaluation and Awareness Tool ([CREAT](#)). CREAT is a risk assessment application that helps municipalities and utilities adapt to extreme weather events by better understanding current and long-term weather conditions. HEP then hosted a regional workshop for New Jersey CSO permit holders and partners – state officials, municipal engineers, planners, utility operators, and their consultants – to discuss the climate-related threats in the region and examine the economic losses associated with sea level rise at CSO outfall locations. Representatives from Elizabeth and Ridgefield Park shared how they used CREAT to think critically about their potential climate impacts, possible adaptation options, and monetized risk reduction plans. These conversations will help inform all stakeholders about how climate-related threats can be considered during LTCP implementation and future permit conditions.

## Resilience Strategies and Priorities

Using the results of their CREAT assessments, Elizabeth and Ridgefield Park were able to evaluate the costs of several potential flood management strategies that, if implemented, could further strengthen the operational resilience of their systems.

RESILIENCE STRATEGIES FOR THE CITY OF ELIZABETH	
TYPE	
Current Measures	“Duckbill” style tide gate for tidal flow that serves to prevent backflow from entering the system
	Prior system modifications that included a sewer pipe upgrade, emergency overflow modification, and pump station rehabilitation
Potential Adaptive Measures	Satellite storage tank to reduce street and residential flooding by detaining CSO volume and slowly releasing it to the treatment plant
	Green infrastructure (e.g., bioswales and/or permeable pavement) to reduce overflow volume for the outfall drainage area
RESILIENCE STRATEGIES FOR THE VILLAGE OF RIDGEFIELD PARK	
TYPE	
Current Measures	Flap style tide gate that serves to prevent backflow into the system
Potential Adaptive Measures	Satellite storage tank to reduce street and residential flooding by detaining CSO volume and slowly releasing it to the treatment plant
	End-of-pipe treatment, which will reduce street flooding by expediting stormwater drainage through pumping of CSO flow to treatment, thus reducing sewer surcharges

# Case Study: Water and Wastewater Utilities Planning for Resilience

## Contact Information

For more information regarding the City of Elizabeth's resilience planning, contact Anthony Gagliostro, Principal Project Manager at Mott MacDonald, at [anthony.gagliostro@mottmac.com](mailto:anthony.gagliostro@mottmac.com).

For more information regarding the Village of Ridgefield Park's resilience planning, contact John Dening, Senior Project Engineer at Mott MacDonald, at [john.dening@mottmac.com](mailto:john.dening@mottmac.com).

For more information regarding the CREAT Regional Workshop, contact Rosana DaSilva, Water Quality Manager of the New York - New Jersey Harbor & Estuary Program at [rosana@hudsonriver.org](mailto:rosana@hudsonriver.org).