

The New York City
Municipal Water Finance Authority



Fiscal Year 2024 CO-CONSULTING ENGINEERING REPORT

March 2024

March 8, 2024

Philip Wasserman
Executive Director
New York City Municipal Water Finance Authority
255 Greenwich Street
New York, NY 10007

Re: New York City Municipal Water
Finance Authority
Fiscal Year 2024 Co-Consulting Engineering Report

Dear Mr. Wasserman:


AECOM USA, Inc. (AECOM) and Macan Deve Engineers, DPC. (MDE) herewith submit the Fiscal Year (FY) 2024 Co-Consulting Engineering Report on the operation of the Water and Sewer System of the City of New York (hereinafter referred to as The System). This Report addresses the condition and operation of The System as it presently stands, as well as the adequacy of capital and operating programs for FYs 2024 and 2025.

It is the joint opinion of AECOM and MDE that The System condition is adequate, our highest rating, and that it continues to be managed by the New York City Department of Environmental Protection (NYCDEP) in a professional and prudent manner. The current capital budget allocations for FY 2024 are adequate for the immediate needs of The System. The budget allocations for FY 2025 are currently under review by NYCDEP and budget modifications may be included in the Executive Budget due for release in April 2024. The opinions provided herein reflect the joint opinion of AECOM and MDE.

The information presented herein is based on the Preliminary Budget released on January 16, 2024. It is important to note that budgetary planning will continue past the date of this Report and revisions may be made. It is our opinion, however, that meaningful observations and conclusions can be drawn at this time, although the final budget allocations may change during the budget finalization process.

We are not required to update this Report for events and circumstances occurring after the date of this Report.

Very truly yours,


Eileen Proffitt, P.E.
NY Metro Water, AECOM
Co-Consulting Engineer for
Municipal Water Finance Authority




William Pfrang, P.E. BOEE
MDE
Co-Consulting Engineer for
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**THE NEW YORK CITY MUNICIPAL WATER
FINANCE AUTHORITY**

**FISCAL YEAR 2024 CO-CONSULTING
ENGINEERING REPORT**

PREPARED BY:

AECOM and MDE

March 2024

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1.0 EXECUTIVE SUMMARY

This Report addresses the condition of The System and the adequacy of the capital program and operating budgets for Fiscal Years 2024 and 2025 as presented in the New York City Department of Environmental Protection (NYCDEP) Preliminary Budget released on January 16, 2024.

The NYCDEP is charged with the responsibility of the overall operation and maintenance of the vast water and wastewater infrastructure serving New York City (NYC). The NYCDEP protects public health and the environment for all New Yorkers by supplying high quality drinking water, collecting, treating, and discharging wastewater and stormwater, and reducing air, noise and hazardous materials pollution in NYC. The scope of this report focuses on the water, wastewater, and stormwater system infrastructure, and programs. NYCDEP remains vigilant in providing operation and maintenance of water and wastewater infrastructure comprising significant capital assets and providing near term and long-term planning for future needs. NYCDEP has implemented new programs and continues the planning for and building of additional infrastructure to meet more stringent regulatory requirements (Biological Nitrogen Removal (BNR) for wastewater resource recovery facilities (WRRFs), Combined Sewer Overflow (CSO) treatment facilities, and water treatment facilities). While providing these infrastructure improvements, NYCDEP is also tasked to maintain its water and wastewater infrastructure to comply with strict regulations and avoid critical failure of processes and assets. Considering climate change, it is essential for NYCDEP to continue its efforts to maintain resilient and sustainable water, wastewater and stormwater systems. NYCDEP must manage risks and prioritize competing needs of The System to achieve its objectives. In addition to these competing needs, NYCDEP continues to face many challenges due to staffing vacancies and must manage risk associated with delivery of a large capital program, and operating and managing a large and complex system. Considering the magnitude of the overall infrastructure, the operational service required, and the ongoing challenges due to staffing shortages, it is our opinion that:

- The System continues to be managed in a professional and prudent manner with an appropriate regard for the level of service afforded to the users within the available funding.
- The physical condition of The System receives an “adequate rating”, our highest rating. Due to the size and complexity of The System, NYCDEP will require future capital investments for the following: continuous replacement and/or repair of aging infrastructure in a systematic and cost-effective manner; implementation of infrastructure to meet regulatory mandates; additional projects/programs to continue to address climate change impacts to The System.
- NYCDEP capital and expense budget projections for Fiscal Year (FY) 2024 satisfy the immediate needs for The System. This includes regulatory mandated¹ projects, which comprise approximately 32.5% of the capital budget for FY 2024.
- NYCDEP capital budget projections for FY 2025 are currently under review for the mandated Hillview Reservoir Improvements project and its overall impact on the FY 2025 project funding. The contractor bids received for this project were significantly higher than the engineer’s estimate and the funding allocation. NYCDEP is performing further analysis

¹ Mandates and mandated projects throughout this report refer to projects required due to negotiated Consent Orders or agreements or other regulatory requirements between NYCDEP and regulatory agencies.

of the construction bids and evaluating next steps to proceed with the Hillview Reservoir Improvements. Any necessary capital budget modifications are expected to be reflected in the Executive Budget to be released in April 2024. Currently, the regulatory mandated projects comprise approximately 52.4% of the capital budget for FY 2025. Expense budget projections for FY 2025 are currently being evaluated based upon the projected new needs of The System and may require adjustment when the evaluation is complete.

- NYCDEP capital planning is an ongoing iterative process addressing priorities and needs of The System. The NYCDEP capital planning is considered to be responsive to the long-term requirements of The System.
- Over the last year, the total number of vacancies has decreased by 294 due to increased hiring. Overall, there are 713 vacancies, and NYCDEP is at approximately 89% of approved allocations. NYCDEP continues to face significant staffing challenges due to high rates of attrition and slow hiring practices, and has been actively recruiting. NYCDEP is prioritizing staffing issues to fill vacancies and retain engineering and support staff to support capital program delivery. NYCDEP has aggressively been hiring operations staff at the in-city WRRFs this past year which has led to achieving full headcount for WRRF operations. Water treatment operations are also fully staffed.

2.0 PURPOSE AND SCOPE OF THE REPORT

The purpose of this report is to provide engineering information pertinent to the condition of The System serving NYC and the adequacy of the proposed Capital Improvement Program (CIP) funds. In 1984, the NYC Municipal Water Finance Authority (The Authority) was formed following studies and analyses used in developing the information included in the Municipal Water Finance Authority Official Statements under the captions: “CAPITAL IMPROVEMENT AND FINANCING PROGRAM — Preliminary Ten-Year Capital Strategy, Current Capital Plan and the Capital Improvement Program”, “THE SYSTEM — The Water System”, and “THE SYSTEM — The Sewer System”. AECOM (formerly Metcalf & Eddy) provided engineering services related to the NYC Water and Wastewater Operations Evaluation Study (Study) in 1983, and has continued to provide services to The Authority since its origin in 1984. Since July 2021, Macan Deve Engineers, DPC (MDE) has been working with AECOM as Co-Consulting Engineers to The Authority. MDE is an established small Women Business Enterprise (WBE) engineering and architectural firm. AECOM and MDE have jointly performed ongoing evaluations of the condition of The System, which has included independently reviewing the capital and operating programs pertaining to water and wastewater, reviewing select pertinent studies associated with the long-term development of The System, and conducting Due Diligence interviews with key individuals responsible for managing the activities of the NYCDEP.

This report addresses the issues listed below:

- present physical condition of The System,
- FY 2024² capital budget and FY 2025 projected capital budget for The System,
- FY 2024 expense budget and FY 2025 projected expense budget related to operation and maintenance of The System,
- overview of the Preliminary Four-Year Current Capital Plan for FYs 2025 to 2028 and,
- management of The System.

² The NYCDEP Fiscal Year begins on July 1 and ends on June 30. FY 2024 began on July 1, 2023 and ends on June 30, 2024.

3.0 METHODOLOGY FOR ANALYSIS

The analyses conducted by AECOM and MDE were accomplished utilizing the following methods:

- Due Diligence interviews with representatives of the NYCDEP and communications with representatives of The Authority,
- Review of documents related to the ongoing budgetary process,
- Review of the status of ongoing major programs and review of select reports and presentations provided by NYCDEP,
- Information gathered from visiting operating facilities and major ongoing construction projects,
- Consideration of national and local trends in the water and wastewater industry (federal, state and local regulations, resource recovery, aging infrastructure, resiliency, climate change impacts, energy programs).

The budgetary process for the current capital and expense budgets was not concluded by the time of this report's publication. It is anticipated that the Executive Plan will be released in April 2024. Observations and conclusions presented herein are therefore based on budget data as it stood on the date of this report. It is our opinion that these observations and conclusions are meaningful with respect to The System. It should be noted, however, that these observations and conclusions are subject to change based on the final outcome of the budgetary process.

4.0 MANAGEMENT AND OPERATION OF THE NYCDEP SYSTEM

NYCDEP Strategic Plan

NYCDEP has embarked on a new Strategic Planning effort in calendar year 2023 that includes a benchmarking analysis and evaluation of operational performance. The Strategic Plan will address future capital planning within NYCDEP in addition to the significant challenges due to climate change and the associated economic impacts to The System. It is anticipated that NYCDEP will release the Strategic Plan within the next few months.

Organization Structure

Rohit Aggarwala is New York City's Chief Climate Officer and NYCDEP Commissioner, with overall responsibility for NYCDEP. The NYCDEP is currently organized into the following Offices and Bureaus as shown in **(Figure 4-1)**³. NYCDEP has undergone some organizational changes the past year as described below.

³ Organizational chart provided by NYCDEP in February 2024.

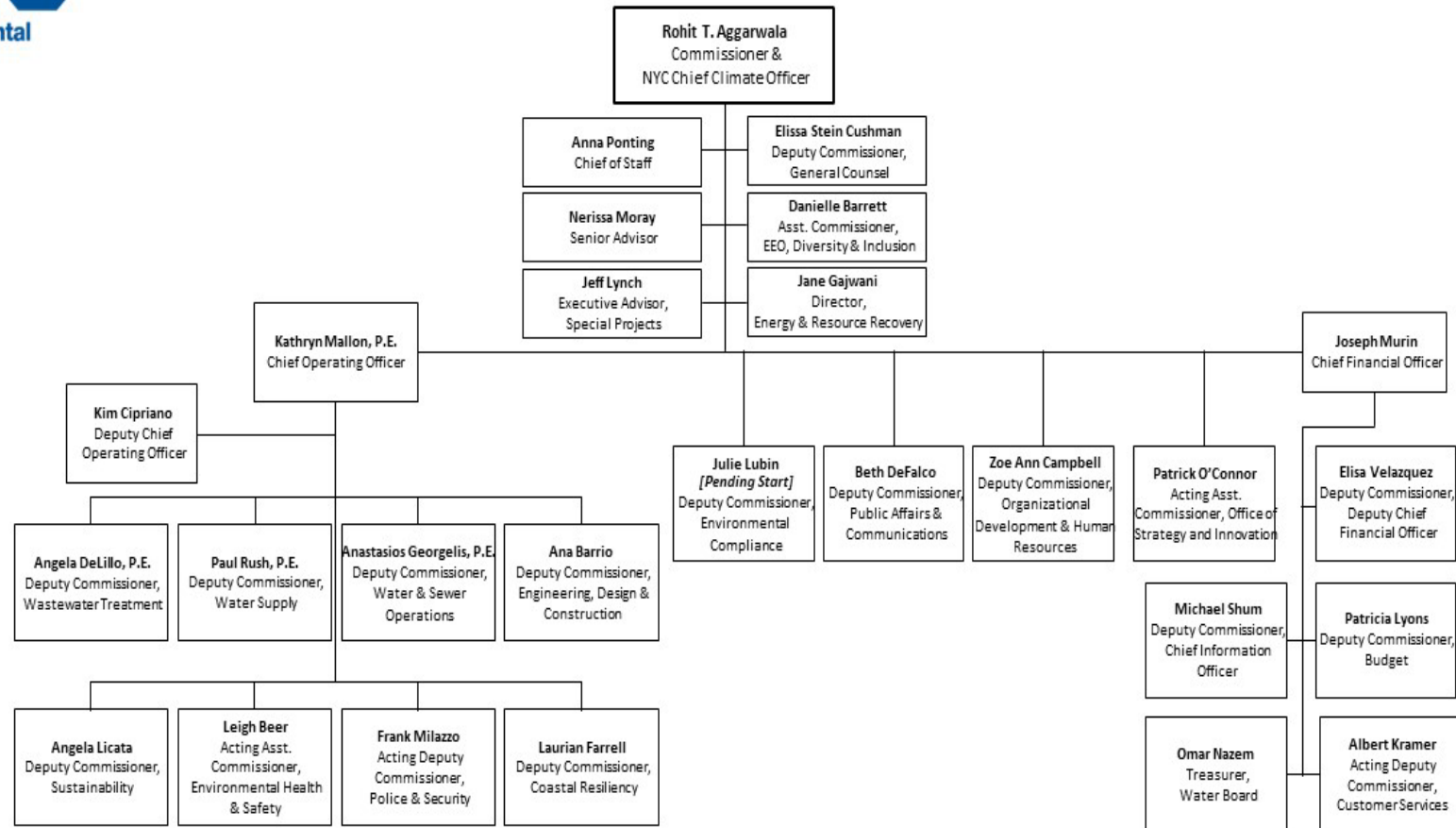


Figure 4-1: NYCDEP Executive Level Organizational Chart

The following offices and bureaus report directly to the Commissioner:

- the Chief Operating Officer (COO) is responsible for administering and coordinating the activities of NYCDEP's engineering and operational bureaus. The following offices and bureaus report directly to the COO: Bureau of Wastewater Treatment (BWT); Bureau of Water Supply (BWS); Bureau of Water and Sewer Operations (BWSO); Bureau of Engineering, Design, and Construction (BEDC); Sustainability; Environmental Health & Safety (EH&S); Bureau of Coastal Resiliency (BCR); and Police and Security (BPS).
- the Chief Financial Officer (CFO) is responsible for the budget and finance functions. Additional functions include contracts and procurement, information technology, development of rate setting recommendations, and treasury functions. The CFO oversees the Budget Office; the Office of Agency Chief Contracting Officer (ACCO); Information Technology (BIT), Bureau of Customer Services (BCS); as well as the water and sewer charges collections and treasury functions encompassed by the Water Board.
- the Office of Energy and Resource Recovery (OERR); the Chief of Staff; Senior Advisors; Public Affairs and Communications; EEO, Diversity and Inclusion; General Counsel/Legal Affairs; Organizational Development and Human Resources; the Bureau of Environmental Compliance (BEC); and the Office of Strategy and Innovation (OSI). The BEC is made up of the Division of Air & Noise Policy, Permitting and Enforcement and the Asbestos Control Program.
- The Office of the Agency Chief Engineer (OACE) has been reorganized and renamed the Office of Strategy and Innovation (OSI) and it is still undergoing full development. The OSI will be charged with innovation and implementation of the long-term strategic plan for NYCDEP, in close coordination with planning, operations and capital project delivery. Some of the other responsibilities under OACE have been realigned to other Bureaus within NYCDEP.

The Bureaus and Offices that pertain to The System operations and capital planning/implementation are described in more detail below:

- The three Operating Bureaus consist of the BWS, the BWSO, and the BWT. The Deputy Commissioner of each Operating Bureau reports to the COO. The key responsibilities of each operating bureau are described as follows:
 - BWS is responsible for the delivery of high-quality drinking water to New York City and its responsibilities include the management, operation and maintenance of the Croton Water Filtration Plant (WFP), Catskill/Delaware Ultraviolet (Cat/Del UV) Disinfection Facility, Hillview Reservoir, Jerome Park Reservoir, Chlorination and Fluoridation at Kensico Reservoir Shaft 18, Pleasantville Alum Plant and all associated dams, aqueducts, shafts, waterworks and support systems. BWS is currently undergoing a reorganization. BWS conducts extensive monitoring of water quality, both within the city's distribution system and throughout the upstate watersheds. BWS is also responsible for the overall management and implementation of the city's Watershed Protection Program and for complying with NYC's Filtration Avoidance Determination (FAD) program. Once the water leaves the Hillview Reservoir and Croton WFP, it enters the distribution system that is operated and maintained by BWSO.
 - BWSO is responsible for the operation and maintenance of the portions of the city's drinking water distribution system that are within city lines, the wastewater collection system, and Bluebelts. BWSO field operations are responsible for the following: (1)

that residences and businesses have an adequate supply of potable water (joint responsibility along with BWS), (2) that there is sufficient water for fire protection, and (3) that the wastewater collection system is properly functioning. BWSO coordinates closely with the New York City Department of Design and Construction (NYCDDC), since NYCDDC has the responsibility for the construction of the water mains and sewers that BWSO operates and maintains. BWSO also maintains close coordination with other agencies, such as NYCDOT and MTA. BWSO is heavily focused on stormwater management issues and has an ongoing program to alleviate chronic flooding in Southeast Queens. BWSO has been implementing an online permitting system for water, sewer and stormwater connections, known as the Permitting and Review Information System (PARIS).

- BWT is responsible for the operation and maintenance of the 14 in-city Wastewater Resource Recovery Facilities (WRRF), the city's 96 wastewater pump stations, interceptors, CSO regulators, biosolids dewatering facilities, fleet of marine vessels, laboratories, and the control of discharges from combined sewer overflows. The following directorates report directly to the Deputy Commissioner: Capital Planning/Delivery; Wastewater/Resource Recovery Operations; and the newly formed Digital Transformation. Digital Transformation consist of three divisions: IT support, SCADA Development and Support, and Industrial Asset Management. BWT continues to further drive decision-making through data driven analytics. Because of the energy-intensive nature of its facilities, BWT coordinates closely with OERR. Seven Area Facility Managers (two WRRFs per Facility Manager) provide senior leadership in the operation of the 14 WRRFs. The Area Facility Managers report to the Director of Plant Operations. Working with the Chief Operators of the individual plants, the Area Facility Managers provide overall operational consistency. Each Area Facility Manager has an assigned Reliability Centered Maintenance Engineer (RCME) who coordinates maintenance operations. BWT recently hired an Emergency Manager which will coordinate and manage emergencies within BWT.
- BEDC is responsible for the delivery of the Capital Improvement Program. BEDC is organized into the following directorates: Water System Capital Program, Wastewater Capital Program, Special Projects (including design build and in-city water supply projects), and In-House Design (IHD). Within IHD, there are two groups - the Design Service Division and the Engineering Services Division. BEDC has a Sustainability Group that incorporates sustainability into BEDC projects by integrating Climate Resiliency Design Guidelines into Standard Operating Procedures. BEDC is responsible for project delivery consisting of the design and construction of capital improvement projects, including major water transmission facilities, water treatment facilities, WRRFs, wastewater pumping stations, and stormwater/CSO facilities. BEDC implements many of these projects with contract services for planning, design, construction and construction management, along with the IHD group.
- The Bureau of Sustainability at NYCDEP is responsible for the development and implementation of environmental policy and strategy, including water quality. The Sustainability Group includes the Bureau of Environmental Planning and Analysis (BEPA) and Hazardous Materials and Superfund Planning & Analysis, and the Office of Green Infrastructure. Implementing, coordinating and tracking the many elements of the Green Infrastructure Plan occurs within BEPA. The Green Jobs/Green Infrastructure Maintenance are part of BEPA. BEPA is also responsible for conducting environmental reviews for NYCDEP, providing technical assistance for the preservation of natural resources, conducting long range planning (population/employment, consumption and demand/flow), conducting strategic planning to provide appropriate forecasting, trend analysis, regulatory review, scientific modeling, and research. BEPA continues the work of the climate change task force and helps NYCDEP plan for the new growth stimulated by rezoning throughout the city. The Hazardous Materials and Superfund Planning & Analysis group coordinates

Superfund Programs. The Water Quality and Long Term Control Plan (LTCP) group has seamlessly transitioned from OACE into the Sustainability group.

- OERR is responsible for the coordination of energy management for all operating bureaus and overall NYCDEP energy initiatives. OERR works closely with NYC Department of Citywide Administrative Services (DCAS). OERR guides and oversees NYCDEP's energy, biosolids and residuals, organics/food waste, resource recovery, and greenhouse gas (GHG) policy, planning, research and studies. OERR coordinates closely with the designated liaisons within each operating bureau. OERR advises on energy and GHG related expense and capital funding, in addition to seeking outside funding sources for projects, such as those available through DCAS. OERR is managing the development of the Energy and Carbon Neutrality (ECN) Plan. The NYCDEP appointed the Director of OERR as the Agency Chief Decarbonization Officer.
- The creation of a new NYCDEP bureau, the Bureau of Coastal Resiliency (BCR) occurred in April 2023 with the release of PlaNYC and a Deputy Commissioner for BCR was announced in October 2023. The BCR is still in the early stages of developing staffing needs and standing up a new bureau within NYCDEP. The BCR will lead and coordinate the planning, implementation, operation, and maintenance of the coastal resilience infrastructure. The BCR will maintain close coordination with BWSO, BWT, and Sustainability within NYCDEP. BCR will also partner with other city agencies such as the NYCDDC and NYCDOT, and other partners such as Economic Development Corporation (EDC) and United States Army Corp of Engineers (USACE) to coordinate citywide resiliency projects. The BCR will replace the Mayor's Office of Climate and Environmental Justice (MOCEJ) as a point relationship for all citywide coastal resiliency projects. The majority of the BCR will be city tax levy funded, with a few utility funded positions. The BCR will serve an important public facing role with community outreach for coastal resiliency.

5.0 OVERVIEW OF THE SYSTEM

NYCDEP is charged with the operation, maintenance and management of a vast complex system of water, wastewater and stormwater infrastructure.

5.1 Water Supply System

NYC water is supplied from three upstate watersheds (Delaware, Catskill and Croton), which extend 125 miles north of NYC, consisting of 18 collecting reservoirs (in the Delaware, Catskill, and Croton Systems), three controlled lakes (in the Croton System), and three additional balancing and distribution reservoirs (Kensico, Hillview and Jerome Park Reservoirs) as shown in **Figure 5-1**. The NYC water supply system has a total available storage capacity of 570 billion gallons. NYCDEP maintains operational flexibility to vary the water supply from all three water systems, as it deems necessary.

NYCDEP also owns wells in Queens; however, this groundwater supply system has not been providing water to the NYC distribution network since 2007 and the upstate surface water supply is the primary source water for NYC.

Croton System

The Croton water supply system, NYC's oldest water supply, was put into service in 1842 with the construction of the Old Croton Aqueduct delivering water to the city. It has continued to expand and now includes several reservoirs (New Croton, Croton Falls Main, Cross River, West Branch, Titicus, Amawalk, East Branch, Muscoot, Bog Brook, Middle Branch, Boyds Corner, Croton Falls Diverting), all of which feed into the New Croton Aqueduct.

The Croton System delivers water by gravity from the New Croton Reservoir through the New Croton Aqueduct to the Jerome Park Reservoir in the Bronx. The water is then sent to the Croton WFP, which came online in May 2015. The Croton WFP has a maximum capacity of 290 million gallons per day (MGD) and is divided into Plant A and Plant B (each plant has 145 MGD capacity). The water treatment processes consist of chemical addition, dissolved air flotation (DAF), and filtration followed by ultraviolet (UV) disinfection. The Croton WFP is located beneath Van Cortlandt Park in the Bronx. It is the largest underground water filtration plant in the United States. The Croton WFP is also the largest stacked DAF filter plant in the United States. After treatment, the water is conveyed through concrete lined pressure water tunnels to the distribution service areas. Use of the Croton WFP varies based upon NYCDEP's operational needs. The Croton WFP provides NYCDEP with a valuable and flexible resource.

The Catskill System

The Catskill system was put into service in 1915 and provided water to all five boroughs by 1917. The Catskill system is made up of the Schoharie Reservoir and the Ashokan Reservoir, which feed water to the city by gravity via the Catskill Aqueduct. The capacity of the Catskill Aqueduct is approximately 600-620 MGD. The balancing reservoir at Kensico, and the distribution reservoir at Hillview were implemented as part of the Catskill system. The System also includes City Tunnel No.1 which conveys water from Hillview Reservoir by gravity to the city and was put into operation in 1917. City Tunnel No.

1 is a deep rock tunnel which connects into the water supply distribution network via a series of riser shafts.

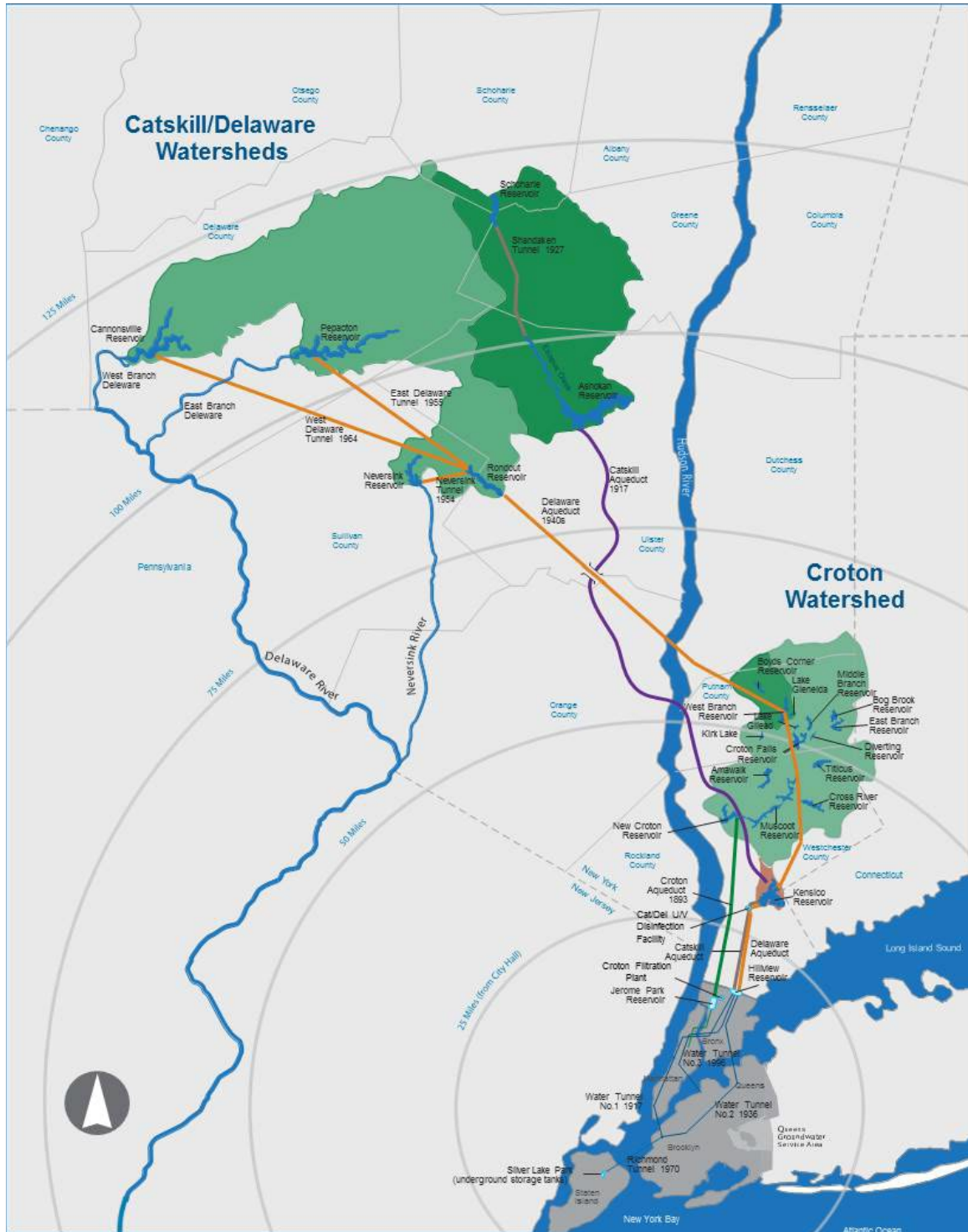


Figure 5-1: New York City Water Supply System

The Catskill Aqueduct is, for most of its length, a near surface aqueduct, with pressure tunnels only where the aqueduct alignment encounters low terrain, the most significant being the Hudson River valley where the pressure tunnel is about 1,100 feet below river level. The near surface portions of the aqueduct have recently been cleaned to improve capacity. Some of the pressure tunnels have been inspected and investigated for methods to reduce leakage and repairs, and plans are underway to inspect the remaining pressure tunnel portions of the aqueduct.

The Delaware System

Construction of the Delaware system began in 1937. The Delaware watershed was put into service in phases and is comprised of four reservoirs - Cannonsville Reservoir completed in 1964, Pepacton Reservoir completed in 1955, Neversink Reservoir completed in 1954 and Rondout Reservoir completed in 1950. The Rondout Reservoir receives water by gravity from the other reservoirs in the Delaware System. Delaware water is conveyed by gravity to Kensico Reservoir by the Delaware Aqueduct, via Shafts 17 and 18. The Delaware Aqueduct continues to Hillview Reservoir via the Eastview site and was connected into the balancing storage at Hillview by two new gate chambers with connecting conduits to the existing chambers at the reservoir. At that time City Tunnel No. 2 was constructed, which is a deep rock tunnel connected to the city distribution network by a series of riser shafts. The Delaware Aqueduct is a deep concrete lined pressure tunnel which passes about 600 feet below the Hudson River. Over the years, leakage has developed at some sections of the pressure tunnel, most notably at the Hudson River crossing. Construction of a bypass tunnel at the Hudson River has been completed which will allow the leaking portion of the aqueduct to be taken out-of-service once the connections to the Delaware Aqueduct are completed. This major capital construction repair project will be discussed later in the report, in Section 7.5.

Filtration Avoidance of Catskill and Delaware Water Supplies

Water from the upstate reservoirs is conveyed by gravity through an extensive system of tunnels and aqueducts. The 92-mile Catskill Aqueduct conveys water from the Ashokan Reservoir to the Kensico Reservoir and the 85-mile Delaware Aqueduct conveys water from the Rondout Reservoir to the West Branch Reservoir and then to the Kensico Reservoir. Because of the high-quality water in the upstate reservoirs and well-protected water supply, the US Environmental Protection Agency (USEPA) granted NYC a waiver from the federal requirement to filter drinking water originating from surface water supplies. The USEPA then transferred authority of the Filtration Avoidance Determination (FAD) to New York State Department of Health (NYSDOH) in 2008. As a result of this waiver, the Delaware and Catskill watersheds do not require filtration and the watersheds are protected by the FAD, which specifies disinfection requirements and identifies watershed source protection requirements to maintain its high level of water quality. Water entering the distribution system is treated with chlorine (disinfectant), fluoride, food-grade phosphoric acid (to create a protective film on pipes to reduce the release of metals such as lead from household plumbing) and sodium hydroxide (to raise the pH and reduce corrosivity). BWS disinfects Catskill and Delaware water systems at Kensico Reservoir Shaft 18 and additional chlorine disinfection occurs prior to entering the distribution system at Hillview Reservoir.

A condition of the FAD required NYCDEP to provide UV treatment to Catskill and Delaware water. Accordingly, a UV facility was completed in 2012 at the 153-acre Eastview site which is on the alignment of both the Delaware Aqueduct and the Catskill Aqueduct. The Cat/Del UV Facility, which treats water from the Kensico Reservoir, feeds water to NYC through the Hillview Reservoir. The Cat/Del UV Facility was designed to have a nominal capacity of 2.4 Billion Gallons per Day (BGD) and is the largest UV facility in the United States. Operational tests have indicated that the facility can pass about 2.6 BGD. At present the UV facility at Eastview can only be supplied via the Delaware Aqueduct from Shaft 18 on the Kensico Reservoir. Hydraulic limitations prevent the use of the Catskill Aqueduct for this purpose. In order to provide system redundancy, NYCDEP has designed an additional tunnel from the Kensico Reservoir to the UV facility at Eastview. This is referred to as the Kensico Eastview Connection (KEC) Tunnel, and is further discussed later in the report, in Section 7.5.

Connection to the Distribution System

Both the Kensico Reservoir and the Hillview Reservoir serve as balancing reservoirs for the water system, handling the daily and hourly fluctuations of water demand. Located downstream of the UV facility at Eastview, the Hillview reservoir is an uncovered reservoir and does not comply with Federal Regulations that require finished water reservoirs to be covered. Under a 2019 Consent Decree, NYCDEP is undertaking planning studies to evaluate alternative ways of achieving compliance. The Hillview Reservoir will be further discussed later in the report, in Section 7.5.

Water from the Hillview Reservoir is conveyed by gravity to the city through three tunnels as indicated on **Figure 5-2**. City Tunnel No. 1 was constructed as part of the Catskill system, and City Tunnel No. 2 as part of the Delaware system. City Tunnel No. 3, which is partially in operation and partially under construction, first came into operation in 1996. All three tunnels are deep concrete lined tunnels which connect into the surface distribution network by a series of riser shafts.

Most of the water from the Croton WFP is pumped into the city tunnels, with some water conveyed by gravity to the lower supply areas. The water distribution system from the three city tunnels consists of a network of approximately 7,000 miles of water mains, as well as valves, fire hydrants, distribution facilities, gatehouses, pump stations, water quality monitoring stations, laboratories and maintenance and repair yards.

The average daily NYC water delivered for FY 2023 was 1,004 MGD⁴, which provides for approximately 8.3 million residents of NYC, and transients consisting primarily of tourists and daily commuters. It should be noted that the current average daily water delivery in NYC is about 36% less than the average delivery levels experienced in the 1990s, due to long-term conservation trends. If the conservation measures currently in place remain effective, there will be no immediate need for NYC to develop additional long-term water sources to meet normal demand. The Water System also provides potable water (108 MGD⁵) to upstate consumers in parts of Westchester, Putnam, Ulster, and Orange Counties (population approximately one million people).

⁴ Water delivery data provided by NYCDEP BWS

⁵ Water delivery data provided by NYCDEP BWS



Figure 5-2: New York City Water Conveyance Infrastructure

5.2 Wastewater System

The NYCDEP wastewater treatment system is comprised of 14 in-city WRRFs that discharge into receiving bodies surrounding NYC, as indicated in **Figure 5-3**. The in-city WRRFs are operated by BWT. In addition, seven upstate WRRFs and one community septic system which are necessary to protect the NYC upstate watersheds are operated by BWS. The in-city WRRFs have an average design capacity of 1.8 BGD and are currently treating an average flow of 1.3 BGD of wastewater consisting of municipal sewage and some stormwater from combined sewers.



Figure 5-3: New York City Wastewater Resource Recovery Facilities and Drainage Areas

The NYC sewage collection system is divided into 14 sewersheds, which correspond to each of the 14 WRRFs. The sewage collection system comprises approximately 152 miles of intercepting sewers and

7,500 miles of sewer pipes of varying size and material, which are classified as sanitary, storm or combined sewers. Much like many other older cities, the NYC collection system consists primarily of combined sewers (approximately 60% of NYC land area is served by combined sewers). During dry weather, the combined sewers carry municipal wastewater to the WRRFs. During a wet weather event, rainwater from surface water runoff is also collected in the combined sewers. Most of the flow is sent to the WRRFs while combined sewer flow discharges to the receiving water as combined sewer overflow (CSO) during major wet weather events. Approximately 426 permitted CSO outfalls are located along the shoreline of NYC, along with four CSO retention facilities (Paerdegat, Alley Creek, Spring Creek, Flushing Bay) that provide screening, settling and storage of the CSO before discharging. The combined sewage remaining in the CSO facilities after the wet weather event is then directed to the WRRFs for treatment.

The in-city WRRFs provide secondary treatment in accordance with their State Pollutant Discharge Elimination System (SPDES) permits. Eight of the WRRFs are also required to provide nitrogen removal to meet Total Maximum Daily Load (TMDL) regulatory requirements that have been set to protect the Upper East River and Jamaica Bay receiving waters. Four of the Upper East River WRRFs and four of the Jamaica Bay WRRFs are currently operating in Step Feed Biological Nitrogen Removal (BNR) mode. Step Feed BNR is a biological nutrient removal process designed to eliminate excessive nitrogen in the effluent discharge. The primary effluent is introduced at multiple points along the aeration tanks to optimize the biological removal process. The aeration rate in the individual aeration tank zones is varied to enhance nitrogen removal.

The liquid biosolids produced during both secondary and BNR wastewater treatment processing are transported by five NYCDEP-owned, inner-harbor sludge vessels to centralized biosolids dewatering facilities. Dewatering facilities are currently located at six WRRFs, however, BWT is planning to consolidate dewatering operations for some facilities. NYCDEP sends a portion of biosolids to a facility operated by the New Jersey Passaic Valley Sewage Commission (PVSC) for processing. Dried biosolids and other treatment by-products are collected by third-party contractors who take responsibility for final disposal.

Additional NYCDEP infrastructure that supports the wastewater system includes 96 wastewater pump stations, two in-stream aeration facilities, 497 flow regulators, 150,000 stormwater catch basins, and six laboratories. Wastewater samples are analyzed at laboratories to provide process control and reporting to meet SPDES requirements.

The wastewater treatment facilities are referred to as WRRFs, highlighting a focus on the opportunities to recover valuable resources from municipal wastewater. Recovered resources include reclaimed water which can be used to meet non-potable water demand, wastewater biosolids suitable for agricultural reuse, and methane gas which can be used as a green energy source. The wastewater industry has adopted this change from wastewater treatment to resource recovery, focusing on the products and benefits that can be extracted from the wastewater beyond simply removing pollutants from the effluent flow.

6.0 CLIMATE CHANGE

6.1 NYC Sustainability Plan - PlanNYC

NYCDEP continues to further implement sustainability in planning, design, and construction of new facilities and in everyday operations of current facilities. Many sustainability-focused local laws have been passed in NYC over the past several years that impact all aspects of NYCDEP operations. Aggressive goals have been set for energy and carbon neutrality that impact many city agencies. Therefore, NYCDEP continues to evaluate current and future facility operations and long-term planning.



Figure 6-1: PlaNYC Sustainability Report, April 2023

PlaNYC, Getting Sustainability Done, was released by NYC in April 2023. New York City's long-term strategic climate plan highlights efforts the city is taking to protect New Yorkers from climate impacts. *PlaNYC, Getting Sustainability Done* is the 5th in a series of climate action plans released by NYC, starting in 2007. The Plan involves a multi-agency citywide approach to implementation of sustainability measures. PlaNYC addresses sustainability, resilience, the circular economy, energy and climate change impacts in NYC. NYCDEP was a major contributor to the PlaNYC. The main objectives of the Plan include: protecting NYC from climate threats, improving quality of life, and building the green economic engine.

NYCDEP is committed to many ambitious climate and resilience goals as part of the recent PlaNYC, including the following:

- Flooding - Creation of the Bureau of Coastal Resilience (BCR), a first-of-its-kind city entity that will lead citywide coastal resilience efforts. The BCR will coordinate closely with partner agencies including NYCDDC, NYC Parks, NYCDOT, NYCDCP, EDC, and other entities involved with coastal resiliency in implementing a multilayered strategy for flood resilience.
- Protecting Waterways - Reduction of CSOs by more than four billion gallons per year by 2045 and development of a strategy to end the discharge of untreated sewage into the NY Harbor by 2060.
- Waste and Circular Economy - Collection of organic materials to turn into energy and reusable assets, on citywide basis.

NYCDEP's innovative renewable biogas-to-grid project at DEP's Newtown Creek WRRF became operational in June 2023. Under the NYCDEP and National Grid partnership, NYCDEP sends anaerobic digester gas (ADG) to a digester gas conditioning system that is owned and operated by National Grid. The renewable natural gas is added to National Grid's natural gas distribution network. This project improves local air quality, reduces citywide greenhouse gas emissions, reduces fossil fuel consumption,

and supplements the citywide natural gas supply. The Newtown Creek WRRF has been accepting food waste from NYC public schools, NYC residents, the green markets, and commercial establishments for several years, in partnership with Waste Management, Inc. (WM). The pre-processed food waste delivered by WM is added to the digesters to increase the production of ADG. NYCDEP is currently co-digesting approximately 250 tons per day (tpd) of NYC food waste with biosolids generated from WRRF operations. The estimated capacity for co-digestion of food waste at Newtown Creek is approximately 500 tpd. Food waste co-digestion and biogas-to-grid projects are also being planned at the Hunts Point WRRF as part of the new digesters project. NYCDEP is evaluating other WRRFs for food waste co-digestion and biogas-to-grid opportunities.

6.2 Greenhouse Gas Reduction and Energy Planning

In 2019, the New York City Council passed eight sustainability-focused local laws entitled the “Climate Mobilization Act”. Local Law 97 requires a 40% reduction in city government GHG emissions by 2025 from the 2006 baseline, and a 50% reduction by 2030. These aggressive reduction goals are interim measures that must be achieved in advance of the long-term energy and carbon neutrality target outlined in OneNYC2050, 80% citywide reduction in greenhouse gas emissions from FY 2006 baseline by 2050 (also known as “80 by 50”). Although the GHG and energy reduction targets are citywide, NYCDEP plays a major role since NYCDEP’s energy-intensive operations makes them the second largest municipal emitter of GHG and the third largest municipal energy consumer. Local Law 94 requires installation of green roofs or solar photovoltaic electricity generating systems on certain buildings. NYCDEP projects are evaluating these local law requirements.

The Energy and Carbon Neutrality (ECN) Plan is an aggressive multi-agency multi-phase plan to evaluate short-term (40% GHG emissions by 2025), mid-term (50% GHG emissions by 2030), and long-term (80% GHG emissions by 2050) goals for significant GHG reductions and energy usage throughout all NYCDEP operations. The main focus areas of the ECN Plan include: NYCDEP-wide Energy and Carbon Neutrality; Energy Neutrality at the 14 in-city WRRFs; Biosolids/Residuals Optimization; Energy, GHG and Biosolids Data Management; and Energy, GHG and Biosolids Demonstration Projects. Significant collaboration and coordination across all NYCDEP Bureaus, along with other city agencies and external stakeholders, is essential for a successful ECN Plan. Energy bureau liaisons within each Bureau coordinate with OERR. For NYCDEP to comply with the Climate Mobilization Act and to become carbon and energy neutral in the long-term, NYCDEP will need to make aggressive changes to all aspects of NYCDEP project implementation from prioritization, decision-making, planning, and design to construction, operation and maintenance.

NYCDEP continues to pursue achieving the reduction goals with the following three strategies: (1) eliminating fugitive digester gas emissions and maximizing production and beneficial reuse of digester gas, (2) expanding renewable energy options, and (3) continuing to find beneficial reuse for NYCDEP biosolids to avoid landfills emissions. All (14) WRRFs have been evaluated for fugitive emissions and job order contracts (JOCs) are being used to address fugitive emissions based upon the results of the findings. Biosolids Master Planning is ongoing to evaluate strategies beyond 2030, and to develop a roadmap for biosolids planning for 2050. The ECN Plan continues to evaluate carbon management and net energy neutrality of the NYCDEP operations. In order for the NYCDEP to become net energy neutral,

an analysis is required to evaluate energy efficiencies, energy generation and renewable energy initiatives. The results will form NYCDEP's strategic plan to achieve energy neutral operations.

With new systems and facilities coming online, OERR will assist in the planning of reliable sources of power, both from conventional and renewable sources. NYCDEP is evaluating the incorporation of energy efficiency with State-of-Good-Repair (SOGR) projects and energy conservation measures (ECMs). NYCDEP continues to look for synergies to coordinate SOGR upgrades with GHG reduction opportunities. For example, the energy-intensive centrifuges at the Newtown Creek WRRF will be replaced with gravity belt thickeners and will be funded by DCAS.

OERR continues to coordinate with DCAS for additional sources of funding or co-funding with NYCDEP for energy projects. Other energy projects that NYCDEP is implementing are cogeneration facilities and solar panels at NYCDEP facilities. A combined heat and power cogeneration facility is nearing construction completion at the North River WRRF and is anticipated to come online this summer. The cogeneration system can run on both digester gas from the plant and natural gas. The new cogeneration facility replaces old equipment that relies on traditional fuel oil; therefore, fuel oil will no longer be required at the North River WRRF. Solar panels (1.2-megawatt [MW] system) were installed at the Port Richmond WRRF in Staten Island in 2015. NYCDEP is currently working with NYPA and DCAS for solar installations at the Wards Island WRRF, Spring Creek CSO Facility, the Cat/Del UV Facility, Kingston office, and two upstate WRRFs (Pine Hill and Margaretville). These installations will contribute 12.3 MW to the NYC goal of 100 MW of solar power installed on public buildings by 2025.

NYCDEP completed a feasibility study to determine the viability of a hydroelectric facility at Cannonsville Dam. Based upon the study, design has been initiated on a 6-MW hydroelectric facility. This smaller revised plan qualifies for a license exemption from the Federal Energy Regulatory Commission. The facility will be licensed by NYC. The hydroelectric facility will use water that is continuously released downstream of the Cannonsville Reservoir. The proposed hydroelectric plant consists of two 3-MW generators inside a 4,400 square-foot powerhouse, adjacent to the West Delaware Release Chamber. The NYCDEP Current Capital Plan includes \$8 million in funding to support the installation of the Cannonsville Hydroelectric Facility, with additional funding provided by DCAS. NYCDEP's main priorities continue to be dam safety, maintaining operational control over the dams and the ability to meet flow management agreements. A feasibility study has also been completed for hydroelectric potential at Shaft 4, the Catskill Aqueduct and Delaware Aqueduct Interconnection and the Croton Lake Gatehouse. The Current Capital Plan includes almost \$13 million in funding for Shaft 4 valve replacement, and DCAS is providing additional funding this project.

NYCDEP OERR has collaborated with the New York State Climate Leadership and Community Protection Act Waste Advisory Panel, which allows NYCDEP to provide knowledge sharing and advocacy work on the state level. Since 2022, NYCDEP OERR has also been involved in peer networking to address and prepare for climate change with several utilities across the country as part of the U.S. Water Alliance Net Zero Plus Initiative.

6.3 Climate Change Adaptation

Introduction

NYCDEP has been actively focused on the effects of climate change on both the water supply and wastewater system, in particular the impact of rising sea levels and changes to the intensity and frequency of precipitation events throughout the upstate watershed and in-city.

The New York City Panel on Climate Change (NPCC) is an independent body that advises the city on climate risks and resiliency. In February 2015, the NPCC 2015 report titled *Building the Knowledge Base for Climate Resiliency* was released, which provides climate projections for temperature, precipitation and sea level rise through year 2100. The NPCC recommends setting up a climate change monitoring system, so that resiliency measures can be adapted as changes continue to evolve. The NPCC has identified that the city has been experiencing climate change impacts and expects those impacts to become more acute in the future. Some climate change impacts include extreme weather, coastal flooding and droughts that could impact the operation of the water and wastewater system.

The NPCC published an updated report in March 2019. In September 2020, the Mayor's Office of Climate Resiliency (MOCR) released *Climate Resiliency Design Guidelines* version 4.0. The Guidelines were developed based on the NPCC's regional climate projections that inform New York City resiliency policy.

NYCDEP has been planning and evaluating climate change adaptation requirements for over a decade, well before Superstorm Sandy impacted the NYC area. Adaptation refers to those actions that must be taken to allow NYCDEP facilities to meet their intended functions when considering projected sea level rise and more intense storm events. In May 2008, NYCDEP released its Climate Change Program Assessment and Action Plan. Following its release, the NYCDEP began studying the effects of climate change on the city's stormwater/wastewater collection system in more detail to determine what level of infrastructure and policy modifications are necessary to alleviate potential damage from more intense, more frequent storm events and projected rising sea levels. In May 2010, the NYC Panel on Climate Change released a report titled *Climate Change Adaptation in New York City: Building a Risk Management Response*, which among other important information, includes climate trends and projections for NYC, which NYCDEP has used for analysis and planning.

Wastewater

After Superstorm Sandy significantly impacted the New York City area in October 2012, NYCDEP strengthened its work on climate change adaptation and resiliency. In December 2012, the Mayor's Office formed the Special Initiative for Rebuilding and Resiliency (SIRR). In June 2013, NYC released a comprehensive document entitled *A Stronger, More Resilient New York*, which covered citywide infrastructure impacts and community rebuilding and resiliency plans. Subsequently, NYCDEP released the *NYC Wastewater Resiliency Plan, Climate Risk Assessment and Adaptation Study* in October 2013. This Plan provided a comprehensive assessment of wastewater infrastructure at risk from future storms with proposed measures to protect equipment to reduce the risk of damage and loss of service. The study evaluated infrastructure at the NYCDEP WRRFs and wastewater pump stations to identify and

prioritize facilities most at risk for flood damage. The framework used for this study consisted of climate analysis, risk analysis and adaptation analysis. The possible adaptation strategies ranged in varying degrees of resiliency, effectiveness, and cost.

Watershed

Climate change adaptation evaluations are also taking place for other parts of The System. BWS is focused on climate change impacts on the water supply side using its Operation Support Tool (OST) models, the watershed protection program, and improving flexibility in operations with increased water supply interconnections. The OST is a computerized decision-making support system that BWS uses for water supply operations and planning. BWS is also conducting extensive research on the impact that climate change will have on the current and future water supply system. The Delaware River Basin Commission (DRBC) is conducting a study on the impacts of salinity, sea level rise, and the migration of the saltwater front in the Lower Delaware River. The salinity modeling is progressing. In May 2023, the Decree parties (New York City, State of Delaware, State of New Jersey, State of New York, and Commonwealth of Pennsylvania) signed an amendment to the 2017 Flexible Flow Management Program (FFMP), extending the agreement to 2028 and continuing the progress on the salt front studies.

The USACE, in partnership with the NYCDEP and the DRBC is performing a feasibility re-evaluation study to evaluate use of the Francis E. Walter Dam and Reservoir in White Haven, PA to help the Delaware River deal with future droughts, sea level rise, and saltwater intrusion because of climate change. Among other issues being evaluated, this study will examine reservoir management options that could release additional water under drought conditions to help repel salinity downstream. NYCDEP continues to stay engaged in the saltwater intrusion issue in the Delaware watershed and its impact on water storage needs.

Coastal Resiliency

Resiliency improvements are ongoing to protect facilities from sea level rise and increasing storm intensities due to changing weather patterns. Large inter-agency and multi-faceted coastal resiliency projects are underway throughout NYC. As described in Section 4.0, NYCDEP created a new Bureau of Coastal Resiliency. BCR will lead be the liaison with all citywide coastal resilience projects, including the Lower Manhattan Coastal Resiliency (LMCR), Eastside Coastal Resiliency (ESCR) projects, and the USACE Staten Island seawall project. Along with many other NYC agencies, NYCDEP will play a role in these coastal resiliency projects. BCR will coordinate with BWT, BWSO, Sustainability, and BEDC on coastal resiliency efforts. Additional funding will be required as these coastal resiliency programs progress and for additional resiliency projects throughout the city.

NYCDEP BCR is the lead responsible for the future operations and maintenance of these coastal resilience projects once construction is completed. Additional staff will be required for the future operations of these large citywide resiliency projects.

Storm Resiliency

NYCDEP's Green Infrastructure Program provides a comprehensive adaptive approach to stormwater management. The plan is based on implementing citywide green infrastructure improvements to reduce the volume of stormwater that reaches the engineered (grey infrastructure) stormwater collection system. NYCDEP continues to focus on climate change as it evaluates its stormwater management needs.

Climate change is causing more intense storms, more storm variability, and more intense precipitation events.

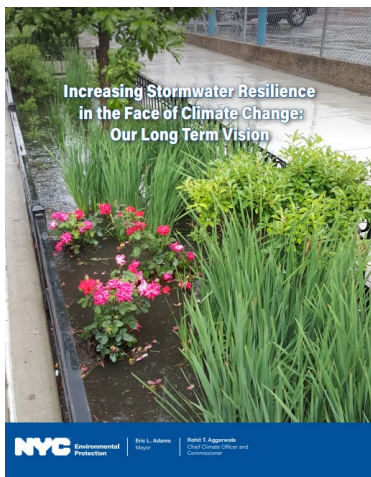


Figure 6-2: Stormwater Resilience: Long Term Vision Report

In July 2022, NYC released *Rainfall Ready NYC* Action Plan to address short-term measures to prepare the city for more extreme rainfall in the future. In September 2022, NYCDEP, along with other city agencies released a report entitled *Increasing Stormwater Resilience in the Face of Climate Change: Our Long Term Vision* (Figure 6-2), which focuses on two strategies to address stormwater resilience in light of more intense storms caused by climate change: (1) implementing programs to expand sewer capacity and improve the performance sewers, and (2) advancing the installation of a citywide network of blue and green infrastructure to catch stormwater before it reaches the sewer system.

FloodNet is a collaboration with communities, researchers, and NYC government agencies working to better understand the frequency, severity, and impacts of flooding in New York City. MOCEJ, coordinating with NYCDEP, launched FloodNet, a new network of flood sensors that will provide real-time information about where streets are flooded. Currently, 37 sensors have been deployed throughout NYC, with the goal of building out the network to a total of 500 sensors around the city by 2027.

Additional projects will be discussed further in this report in Section 7.6 Capital Improvement Program, including the expansion of the Cloudburst Initiative, expansion of the Bluebelt Program, and the Tibbetts Brook daylighting project. A stormwater mitigation strategy in the form of a white paper is under development and it is expected to be released late in 2024.

Ongoing Efforts

NYCDEP maintains strong involvement with the climate change science community on the city, state, national and international level. On the national level, NYCDEP maintains utility membership and actively engages with the Water Utility Climate Alliance (WUCA) and the National Association of Clean Water Agencies (NACWA). NYCDEP was one of the founding members of WUCA and today there are 12 water utility members across the US that share the mission of sharing knowledge and advancing resilient water practices. WUCA released a report entitled *Leading Practices in Climate Adaptation* that focuses on five leading practices - engage, understand, plan, implement, and sustain. Several NYCDEP

projects are highlighted in this report as examples of successful climate change adaptation implementation measures.

Climate change adaptation is a challenge facing all water and wastewater utilities and should be considered in short-term and long-term utility planning. There is uncertainty inherent in climate science due to the magnitude, variability, timing and frequency of localized events and their impacts on the overall System. However, despite the uncertainty of climate change prediction, rational capital investments must be considered to protect NYCDEP facilities. NYCDEP is evaluating climate change impacts for all new project elements and implementing climate resiliency measures. Some resiliency measures are stand-alone projects, and some are built into existing projects. NYCDEP anticipates that additional resiliency projects will be identified, and additional funding will be required.

6.4 Climate Budgeting

Climate budgeting, the first of its kind, will be conducted by Office of Management and Budget (OMB) and will be included in Executive Budget in April 2024 for all city agency projects.

7.0 CAPITAL IMPROVEMENT PROGRAM (CIP)

7.1 Overview

Budgeting is a lengthy and comprehensive process, especially for an agency operating such a large and complex system as the NYCDEP. NYCDEP budgeting is an ongoing, iterative process that considers significant and substantial needs including regulatory requirements; legal mandates; mayoral initiatives; state-of-good-repair (SOGR); energy projects; capacity enhancements; dependability; environmental, health, and safety (EH&S) compliance requirements; localized community drivers; security measures; increased storm intensity; and additional climate change adaptation/resiliency improvements. These many needs must be met within the funding limitations. NYCDEP seeks opportunities for synergies with project implementation such as addressing SOGR needs along with energy and resource recovery and flood resiliency requirements. Project schedules, cost estimate updates, procurement, market conditions, technical issues, regulatory updates, emergency events, recurring events, and legal issues may impact project prioritization and the overall budgeting process. NYCDEP is continuously evaluating projects to prioritize NYCDEP's most critical needs first. This challenging budget exercise requires NYCDEP to evaluate project elements and scheduling to efficiently address the most immediate needs. As the projects are fully developed, scheduling modifications are necessary within the 10-Year Capital Strategy. As such, the 10-Year Capital Strategy is constantly being adjusted and published every two years.

The NYCDEP CIP consists of the Preliminary Ten-Year Capital Strategy for FY 2024 through FY 2033 and the Current Capital Plan for FY 2024 through FY 2028. The Current Capital Plan was published on January 16, 2024, and is updated quarterly. The Current Capital Plan supersedes the Ten-Year Capital Strategy in the overlapping fiscal years. The Preliminary Ten-Year Capital Strategy is updated every two years and was last published in January 2023. The next Ten-Year Capital Strategy will be released in January 2025. The 2024 NYCDEP Strategic Plan will form the basis of next Ten-Year Capital Strategy. This report reviews the Current Capital Plan, including the capital budget for FY 2024, which ends on June 30, 2024, and the preliminary capital budget for FY 2025, which ends on June 30, 2025. Co-Consultants AECOM and MDE have reviewed the Preliminary Current Capital Plan and met with key individuals responsible for budgetary planning to provide an assessment of its adequacy. It is anticipated that the Mayor will issue the Executive Budget in late April 2024. Our findings are summarized in the following paragraphs.

FY 2024 Capital Budget

The FY 2024 capital budget is set at \$2.68 billion. Approximately 32.5% of the funding supports regulatory mandated projects, consisting primarily of the Gowanus Canal Superfund CSO tank, green and grey infrastructure, the FAD program, and one of the KEC contracts. Significant funding is also included for NYCDEP priority projects such as emergency contracts for water and sewer work, the Southeast Queens storm sewer buildout program, water distribution system and wastewater collection sewer work, and wastewater and water supply SOGR projects.

FY 2025 Preliminary Capital Budget

The FY 2025 preliminary capital budget is set at \$2.75 billion. Approximately 52.4% of the funding supports regulatory mandated projects, including the Hillview Reservoir Improvements project (modifications and chemical addition facilities). Two bids have been received for this project; however, these bids are both significantly higher than the engineer's cost estimate and the amount currently funded in the FY 2025 preliminary capital budget. NYCDEP is performing further analysis of the construction bids, and adjustments may be required in the Executive Budget scheduled for release in April 2024. Such adjustments may also need to take into account the budget provision for the tunnel and shaft contract for the KEC tunnel, which is currently out for bid. Additional mandated projects that are included in the FY 2025 capital budget include the KEC tunnel contract and green infrastructure projects. Significant funding is also included in FY 2025 for NYCDEP priority projects such as emergency contracts for water and sewer work, the Southeast Queens storm sewer buildout program, water distribution system and wastewater collection sewer work, wastewater and water supply SOGR projects.

Current Capital Plan for FY 2024 to FY 2028

Figure 7-1 shows the funding allocated per fiscal year in the Current Capital Plan, which consists of \$15.84 billion in capital commitment funding for FY 2024 through FY 2028. Mandated and other NYCDEP priority project funding is shown per fiscal year. Approximately 27.9% of the total funding for FY 2024 through FY 2028 is dedicated to regulatory mandated projects. As shown in **Figure 7-1**, the funding for mandated projects varies from year to year, pending Consent Decree milestones and requirements. Most of the mandated projects in FY 2024 through FY 2033 consist of the green and grey CSO-related infrastructure, Gowanus Superfund CSO tanks, the KEC tunnel, the Hillview Reservoir upgrades, chemical addition facilities and chamber modifications, the FAD program, and the TRC program. The majority of the remaining capital improvement program for FY 2024 through FY 2028 must be planned and budgeted based on its importance to the overall System and prioritization as determined by NYCDEP. These projects include extensive SOGR needs of the older assets in The System, City Tunnel #3 completion and activation, the Southeast Queens storm sewer buildout program, and BWSO water main replacement/installation and sewer work, and emergency contracts for emergency water and sewer work.

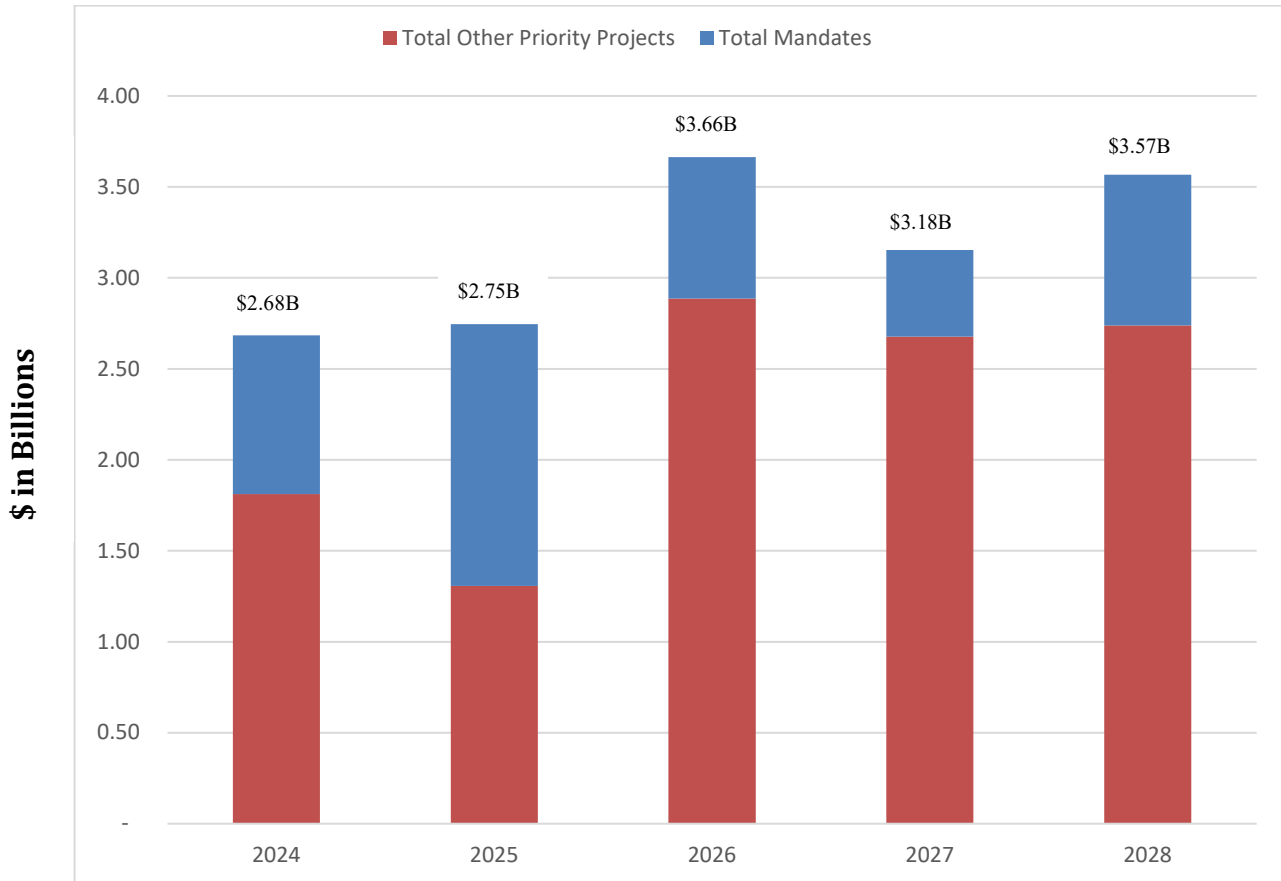


Figure 7-1: Current Capital Plan (\$ in billions) for FY 2024 – FY 2028

Figure 7-2 shows how the funding is allocated by each operating bureau for the CIP for FY 2024 – FY 2028. BWT’s funding is the largest part of the total Current Capital Plan and addresses SOGR needs for wastewater infrastructure (extensive work throughout the WRRFs and pump stations), the CSO Program, the Gowanus Superfund program and the TRC Program. BWSO’s funding is the second largest bureau budget, and covers water and sewer main replacement throughout the city, the Southeast Queens Stormwater Program, City Tunnel #3 completion, Bluebelts, emergency water and sewer contracts, and other BWSO SOGR projects. BWS’s funding addresses the Hillview Reservoir upgrades and modifications, KEC tunnel, SOGR needs for water supply infrastructure, FAD requirements, and other BWS projects. The OGI and BEPA’s funding covers the green infrastructure program and BEPA projects. The remaining funding includes projects within BEDC, BCS, Police and Security, Facilities Management, Fleet, Office of Information Technology, Department of Parks and Recreation and other bureaus.

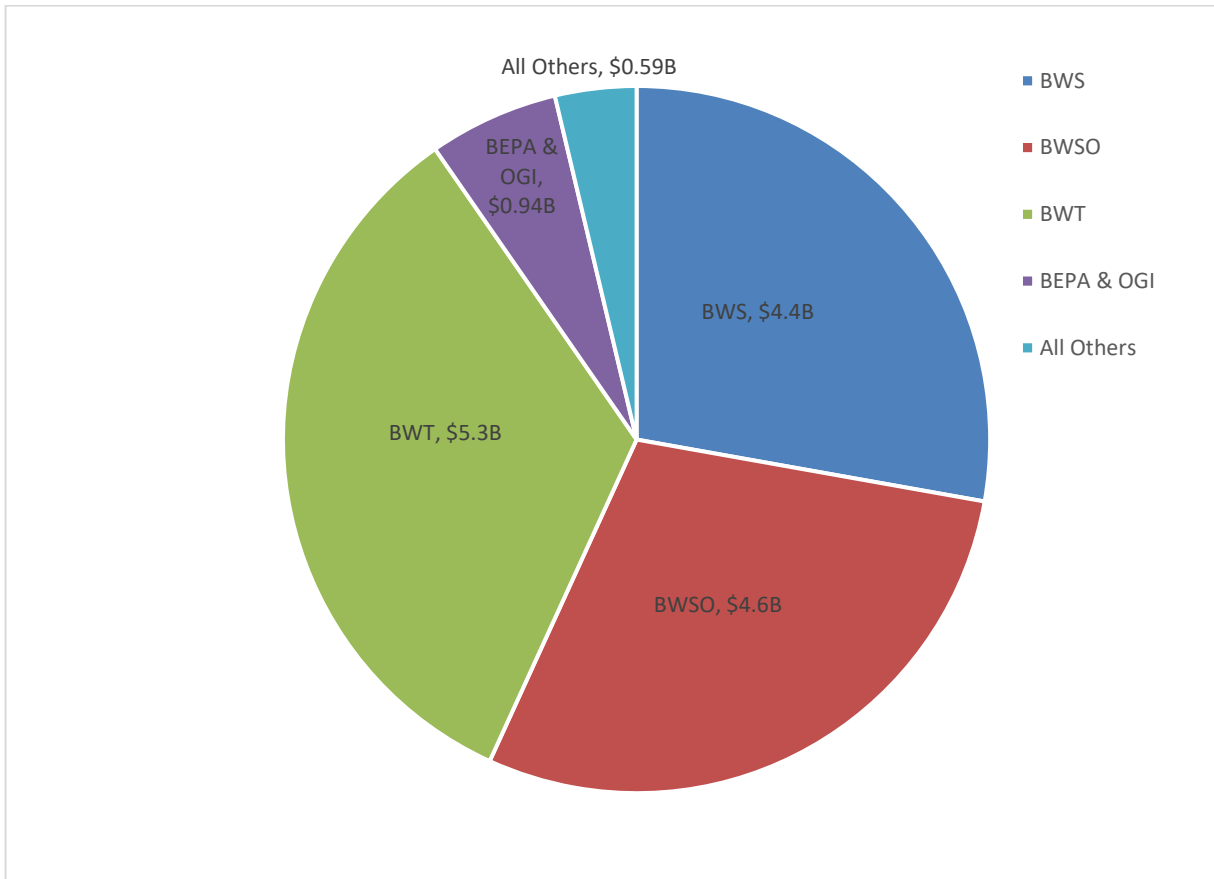


Figure 7-2: Preliminary Four Year Current Capital Plan by NYCDEP Operating Bureaus

NYCDEP is continuously finding a balance between funding mandates and funding SOGR needs. When mandated projects are accelerated, this typically causes SOGR projects to be deferred. As discussed later in this report, the mandated CSO LTCP Program and green infrastructure program, the Hillview Reservoir, and the FAD will require additional funding in the future and will extend beyond the next 10-year planning horizon. It is anticipated that there will be a continuous need to fund regulatory mandated projects. There will also be an increased and continuous need for extensive SOGR funding due to the age of the NYCDEP infrastructure and the enhanced ability to identify needs using Asset Management tools. Based upon the age of the infrastructure, there is a significant need to replace wastewater and water system assets in accordance with a proactive, systematic, data-driven plan that minimizes reactive replacements brought about by asset failures. In addition, there will be a need for additional funding for resiliency projects to address climate change and increased storms.

7.2 Capital Process Reform Task Force

A Citywide Capital Reform Task Force was convened in April 2022, with the task of performing a review of the city's capital process from project initiation to closeout and providing recommended reforms. The Task Force was managed by the Mayor's Office of Policy and Planning and supported by many city agencies that initiate and manage capital projects, including the NYCDEP. The final report, released in January 2023, includes a total of 39 recommendations, made up of nine state legislative

recommendations and 30 internal reforms. Several recommendations are intended to improve NYCDEP capital project delivery processes with the goal of reducing time and cost for capital delivery. NYCDEP has implemented some of these process improvements, with the focus on reducing procurement time and addressing contract change management. Improvements have been implemented in business processes, forecasting, reporting and management to create efficiency, accuracy, transparency and accountability. For example, by the end of FY 2023, NYCDEP had reduced procurement times by eight to ten months. NYCDEP plans to implement control and continuous improvements, such as continuing to identify additional root causes and areas for improvement and automate manual tracking and reporting processes.

7.3 Recent Program Accomplishments

There are a number of program accomplishments during the past year that are noteworthy. These items play an essential role in the development and advancement of the CIP and provide for prudent and professional management of The System.

- NYCDEP broke ground on the first of two Gowanus Canal Superfund CSO Tanks, known as the Red Hook tank.
- NYCDEP completed the Mid-Islands New Creek Bluebelt expansion in Staten Island.
- NYCDEP achieved 100% commitment to the Capital Plan for FY2023 funding target.

7.4 Asset Management

NYCDEP's Asset Management is continuing to evolve. In 2023, NYCDEP BWT established a Digital Transformation Directorate that will help deliver and achieve the goals of asset management, SCADA, and several other data management systems. As required by the 2022 SPDES permits, NYCDEP submitted an Asset Management Program (AMP) Update Workplan to NYSDEC in July 2023. The submittal described BWT's existing AMP and the plans for future updates and expansion, including the strategies that will be used to determine the current state of assets, level of service, risk management, lifecycle planning, managing, funding, monitoring and reporting. The BWT AMP Update follows the *NYSDEC Asset Management Guide for Publicly Owned Treatment Works*. NYCDEP is also required to submit an AMP Annual Report to NYSDEC by September 30 each year. BWT is participating in a NYSDEC asset management pilot program that is underway at the Port Richmond WRRF to conduct a more detailed appraisal of its asset management program. The pilot program will help BWT identify needs by assessing life cycle costs of equipment and will provide a bottom-up approach to identify needs for equipment repair/replacement. BWT plans to expand the AMP to all 14 WRRFs. The continued building and implementation of the NYCDEP AMP is a significant multi-year task due in part to the significant number of assets. BWT is committed to improve the AMP, as it seeks to develop a more comprehensive, programmatic and strategic AMP that incorporates information associated with asset maintenance and/or renewal projects into a seamless enterprise system to increase data driven decision making. BWT has purchased and is deploying a new computerized maintenance management system (CMMS) Platform to support the AMP.

The continued integration of the AMP with the CIP is evolving and it is anticipated that NYCDEP will improve their ability to prioritize and integrate SOGR projects into the CIP planning process. Due to the age and magnitude of the NYCDEP infrastructure, there are significant SOGR needs throughout the water and wastewater system. In particular, significant BWT SOGR funding needs exist for the wastewater system across various infrastructure, including: collections (pumping stations, regulators); WRRF main wastewater process tanks (primary settling, aeration, and secondary settling); WRRF main sewage pumps/headworks; fire protection systems; sludge handling (digesters, docks, thickening); power (distribution, generators, engines); resiliency and disaster recovery projects; and non-process facility improvements (building HVAC, IT).

7.5 Capital Improvement Program Highlights for the Water System (Supply, Treatment, and Conveyance Programs)

A number of NYCDEP projects and programs for the water system are in various stages of implementation (planning, design, and construction). The most significant of these programs are described below.

Catskill/Delaware Water Supply System Filtration Avoidance

On December 28, 2017, the NYSDOH issued another 10-year FAD, known as the 2017 FAD, to the NYCDEP for the Catskill and Delaware watersheds (**Figure 7-3**). NYCDEP received its first FAD in 1993 by the USEPA. Jurisdiction of the FAD was turned over to NYSDOH in 2007/2008. The current 2017 FAD consists of a watershed protection program for 2017-2027 and required a mid-point five-year review. NYCDEP submitted the 2021 Long-Term Watershed Protection Plan to NYSDOH in December 2021. The mid-term FAD update was finalized and released by NYSDOH in December 2022.

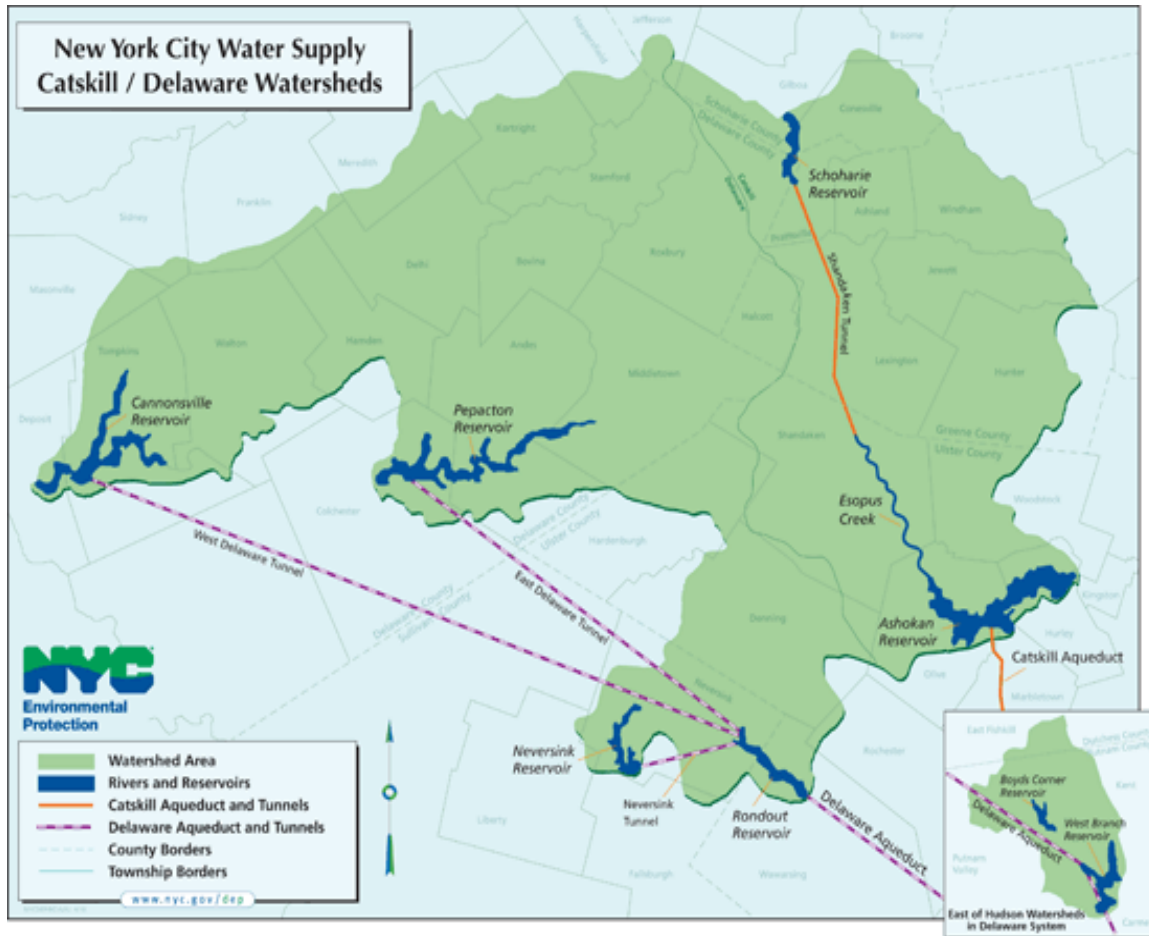


Figure 7-3: Filtration Avoidance Determination (FAD) for the Delaware and Catskill Watersheds

The 2022 five-year mid-term review of the 2017-2027 FAD was based in part upon the results of an expert panel review of the program. The National Academies of Sciences, Engineering, and Medicine expert panel completed a review of the current NYCDEP FAD programs and published a report titled *Review of the New York City Watershed Protection Program*. The panel performed a comprehensive review and evaluation of the NYCDEP's Watershed Protection Program to determine if the programs are adequate to comply with the Surface Water Treatment Rule now and into the future. The report was released August 10, 2020, and provided a number of conclusions and recommendations for specific programs of the FAD, including the land acquisition program, watershed agricultural program, stream management program, wastewater programs, ecosystem protection and management programs, and public health programs, along with monitoring, assessment and modeling. NYCDEP has thoroughly reviewed and addressed the expert panel review recommendations, including revising the land acquisition program and continuing to focus on climate change impacts to the water supply. Based upon the expert panel review, a significant revision to the revised FAD is the 43% reduction in the seven-year goal for solicitation for the watershed land acquisition program. Other revisions to the FAD include a new economic vitality study of the watershed communities, an evaluation of areas in the Kensico Reservoir basin for potential future sewer connection, an expansion of the Stream Management

Program in the Ashokan Reservoir basin, and an expansion of a collaboration between the Conservation Reserve Enhancement Program and the Catskill Streams Buffer Initiative.

The Water Supply Permit that allows NYCDEP to acquire land in the watershed expires at the end of 2025. NYCDEP is currently working on the application for a successor permit. In March 2026, NYCDEP will compile a five-year summary and assessment of the current FAD, which should form the basis of discussions and negotiations for the subsequent FAD.

Funding for FAD programs comes from both the NYCDEP capital budget and the annual expense budgets. The continuation of the existing FAD program is currently funded in the Current Capital Plan at a level of \$113 million. Additional capital funding will be required in the later years of the Ten Year Capital Strategy beyond 2027, once the next FAD is negotiated. FAD funding currently in the expense budget is \$68 million for FY 2024 and \$64 million for FY 2025. It is anticipated that funding for the FAD will continue to be included in the NYCDEP expense budget for the duration of the FAD.

As part of the continuous long-term planning efforts, NYCDEP will update its planning level studies to identify the capital investment and operating cost impact if it becomes necessary to build a water treatment plant for the Delaware and Catskill water supply. The Cat/Del UV Facility currently provides disinfection of the drinking water derived from the Catskill and Delaware watersheds, however if the FAD is no longer in place, additional treatment facilities would be required for filtration. NYCDEP is conducting a comprehensive review of filtration methods and technologies and planning to design and operate a filtration pilot plant. These studies will result in the development of a new conceptual design for a filtration facility and updated cost estimates. The NYCDEP capital and expense financial investments in FAD programs are a more cost-effective means to protect the Catskill/Delaware water supply than building a filtration plant with high up-front capital construction costs, as well as recurring operation and maintenance costs.

Delaware Aqueduct Rondout-West Branch Tunnel (RWBT)

After extensive evaluations and study of several repair alternatives, NYCDEP developed a long-term comprehensive plan to address the leaks in the Delaware Aqueduct RWBT. The Delaware Aqueduct RWBT bypass tunnel is the largest repair project in the history of the NYC's water supply system. The plan consists of building a two-and-a-half-mile bypass tunnel under the Hudson River between the Town of Newburgh in Orange County (west connection site) to the Town of Wappinger, in Dutchess County (east connection site), to address the leaking section of the Delaware Aqueduct in the area of Roseton, NY, and to perform repairs of the concrete liner in upstream areas near Wawarsing, in Ulster County,

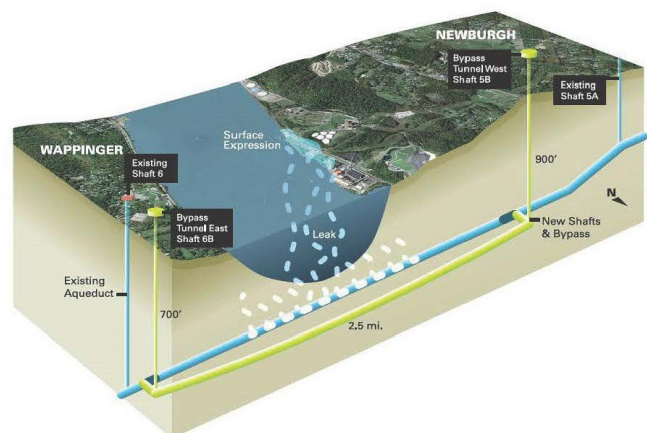


Figure 7-4: Delaware Aqueduct RWBT Program

NY (**Figure 7-4**). In 2013, NYCDEP began construction of two new shafts, Shaft 5B (in the Town of Newburgh) and Shaft 6B (in the Town of Wappinger). Construction of the two vertical shafts has been completed (contract BT#1).

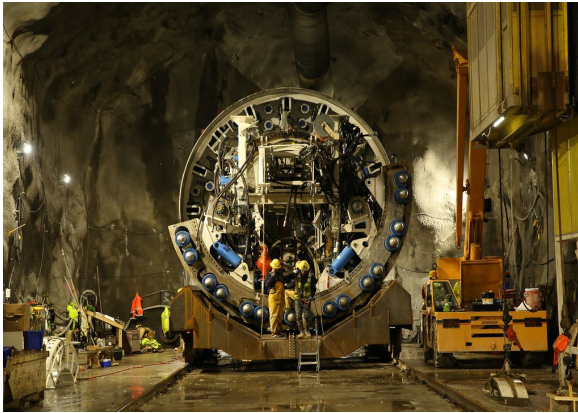


Figure 7-5: Delaware Aqueduct Bypass Tunnel

The tunnel construction contract (contract BT#2) was initiated in the summer of 2015. A tunnel boring machine (TBM) was utilized for the construction of the new tunnel between the two shafts. The TBM began tunnel construction in January 2018, and the tunneling was completed in August 2019. The bypass tunnel steel-liner installation was completed in May 2020. A second layer of concrete lining has been added inside the steel liner. The final concrete liner was completed in February 2021. The triple pass design (concrete, steel, concrete) of the bypass tunnel is intended to provide structural stability and prevent future leaks (**Figure 7-5**).

A strong organizational structure has been in place within BEDC and across all operating bureaus and executive management, to diligently continue with the construction, implementation and risk management of this program due to its magnitude and complexity. The majority of the funding for this bypass tunnel was committed in previous years. Approximately \$22 million is committed in FY 2024 for the continued construction of the bypass tunnel connection and repairs.

The new bypass tunnel has been completed and will be connected to the Delaware Aqueduct by short drill and blast tunnels. This will require the Delaware Aqueduct to be taken out-of-service and unwatered. The connection shutdown was originally scheduled for October 2022 but was delayed a year to provide additional time for NYCDEP to perform further testing of the unwatering pumping system. An additional shift in schedule from October 2023 for an additional year was necessary due to the additional inflow and seepage that was found during pumping tests in March 2023. The schedule adjustment and additional time was to allow for the procurement of additional pumps, and related drainage infrastructure to be installed to provide worker safety during the shutdown while the new tunnel is to remain dry during the connection. In addition, NYCDEP performed another pumping test in October/ November 2023 to confirm the amount of inflow and that the available pumping capacity is sufficient to address inflows during shutdown. During this test the water level in the Delaware system was lowered by pumping to about 250 feet below river level. As expected, this resulted in some settlement of terrain in the Roseton area and reduced capacity in some of the water supply wells in the area. NYCDEP is currently addressing these issues and expects to proceed with the connection shutdown in October 2024. The Delaware Aqueduct shutdown is currently planned for October 2024, and the overall work is scheduled to take 5 to 8 months during the low water demand season (fall and winter) to minimize the possibility of water shortages to the city. During the shutdown, work will proceed with a 24 hours per day, 5 days per week schedule, and 2 shifts during the weekend. During the Delaware shutdown, water will be supplied and delivered to the city by the Catskill Aqueduct and the Croton WFP operating at near to full capacity.

NYCDEP and its contractors continue to complete necessary risk management mitigation and evaluations of upstream impacts during Delaware shutdown for connection of this complex project. NYCDEP continues community outreach with project updates within the upstate communities.

Hillview Reservoir

The Long Term 2 Enhanced Surface Water Treatment Rule (LT2), a federal regulation administered by USEPA, requires the Hillview Reservoir (**Figure 7-6**) to be covered. However, a series of compliance agreements with several commitments to cover the Hillview Reservoir between NYCDEP and the regulators dating back to 1996 predate the LT2 requirement.

In 2017, the USEPA declined to reconsider the requirement to cover finished water reservoirs such as Hillview. NYCDEP requested that NYSDOH and USEPA further extend the deadline to complete construction of the cover to enable NYCDEP to complete two higher priority water supply infrastructure capital improvements: construction of the Kensico Eastview Connection (KEC) tunnel and Hillview Reservoir Improvements. NYSDOH and USEPA agreed to extend the schedule for commencing operation with the West Basin covered to 2049. A federal Consent Decree, known as the Hillview Consent Decree, was approved by the federal court in May 2019. The Hillview Consent Decree provides new deadlines for covering the reservoir, along with design and construction milestones for the precursor projects (KEC tunnel, the Hillview Reservoir Improvements), and stipulated penalties to enforce such milestones. The Consent Decree also includes a \$1 million civil penalty payable to the United States and a \$250,000 penalty to the State (\$50,000 in cash and \$200,000 as an environmental benefit project).



**Figure 7-6: Hillview Reservoir
Located in Yonkers**

NYCDEP is undertaking a facility planning study into a wide range of options for the development of covered storage. NYCDEP is currently evaluating and reviewing options and will select the most cost-effective solution before committing capital investment funding. The Facility Plan report must be submitted to the regulators in August 2024 in accordance with the Hillview Consent Decree. Currently, \$50 million is included in FY 2026 for design funding of the selected project for Hillview Reservoir to address the requirement to achieve LT2 compliance. Pending the results of the LT2 compliance feasibility planning study, significant additional funds will be necessary in the next Ten Year Capital Plan and beyond the ten year budget planning period.

The Hillview Reservoir Improvements project includes significant SOGR work including two new buildings to consolidate and improve chemical and provide flow-paced chemical feed systems (Chemical Addition Facility North and South), interim structures for chemical systems, modification of chambers, site electrical upgrades, new operations control center, new site-wide SCADA system, new North entrance to the site and security equipment, and other upgrades. The Hillview Modifications Basis of Design Report was submitted to the regulators in April 2020, as required by the Hillview Order. Funding is included in FY 2025 for \$438 million for this work at Hillview. The engineer's estimate was \$498 million.

Two construction bids were received in late January and were significantly higher than the engineer's estimate. The contractor's pre-negotiation low bid exceeded the engineer's estimate by approximately \$350 million. The NYCDEP is conducting a 3rd party independent review of the engineer's estimate and the bids. In parallel with the 3rd party review, NYCDEP is evaluating next steps to proceed with the Hillview Reservoir Improvements project.

Kensico Eastview Connection (KEC) Tunnel Project

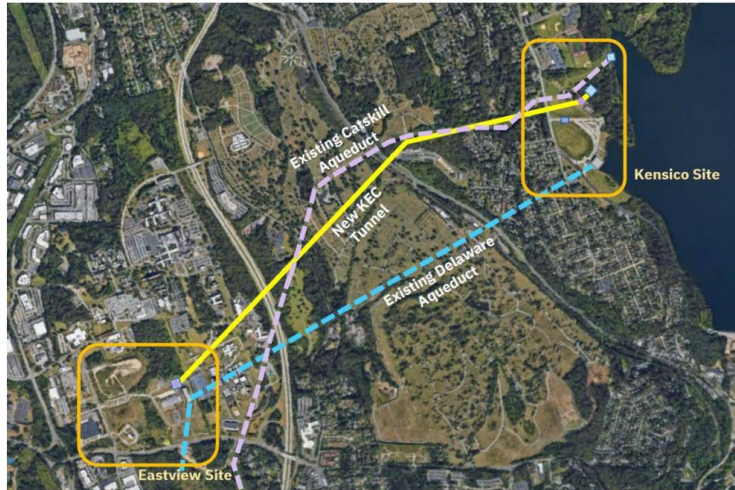


Figure 7-7: Kensico Eastview Connection

NYCDEP has determined that the KEC tunnel is essential to improve redundancy and increase operational flexibility by having a second means to convey water from the Kensico Reservoir to the Cat/Del UV Facility. The Catskill Aqueduct has not been able to convey water between Kensico and the UV Facility due to hydraulic limitations. As a result, the Delaware Aqueduct has been the only means to convey water from Kensico to the UV plant. The KEC tunnel project will add another connection between these

two vital components of the water supply, making a significant improvement to system reliability and operational flexibility. This is an important high priority project for NYCDEP. Funding of \$1.83 billion is included in the Current Capital Plan for this tunnel project. The KEC tunnel project has been determined to be a precursor project which is part of the Hillview Cover Consent Order, and the KEC tunnel is now considered to be a mandated project.

The KEC tunnel project will consist of many components, the chief being the tunnel itself, but also including upgrading of the existing Catskill Intake Chamber on Kensico Reservoir, construction of a new Screen Chamber at Kensico and a new Connection Chamber at the Eastview site. The tunnel will be excavated by TBM and will be about 2 miles in length extending from a new downtake shaft at Kensico to a new uptake shaft at the Eastview site adjacent to the UV Facility. The finished tunnel will be approximately 27 feet in diameter and 400 to 500 feet below ground. The tunnel will be designed for a peak capacity of about 2,600 MGD to provide redundancy to the water supply system.

The existing intake chamber on Kensico Reservoir will be upgraded and its capacity increased from 800 MGD to 2,600 MGD. The upgraded intake chamber will connect into a new Screen Chamber at Kensico via an existing tunnel, enlarged to handle the increased flow and provided with a short tunnel to connect into the downtake shaft of the KEC tunnel. The new Connection Chamber at Eastview will be constructed directly above the new uptake shaft and will connect into the existing UV facility via a system of 12-foot diameter steel pipes.

The KEC project has been broken down into several construction contracts. The tunnel and shaft contracts are currently out for bid. About \$1.85 billion is included in the Current Capital Plan for the KEC program. The amount for the tunnel and shaft contracts totals \$915 million. The bids for this work are due on June 1, 2024. Any significant increase over the engineer's estimate will impact funding requirements for FY 2025.

Catskill Aqueduct Pressure Tunnels

NYCDEP is evaluating leaks in the pressure tunnel portions of the Catskill Aqueduct. Inspections of the Rondout pressure tunnel and Wallkill pressure tunnels using a remote operated vehicle (ROV) have been completed. Funding of \$93.6 million is included in the CIP for the design and repairs of the tunnel leaks identified in the Rondout Creek pressure tunnel. NYCDEP is planning to perform inspections of additional pressure tunnels of the aqueduct to determine their condition. It is anticipated that additional funding may be required to address additional sections of the Catskill pressure tunnels if additional leakage is determined.

Dam Safety

Upstate reservoir dams are critical infrastructure for NYCDEP operations and the safety of the surrounding communities. New York State requires existing high hazard dams to be capable of safely passing half of the probable maximum flood (PMF). The PMF is the flood that can be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in a particular area. When capital improvements are made at dams, NYCDEP evaluates the ability of the dams to safely pass half of the PMF and the full PMF, and DEC Dam Safety is briefed on these analyses.

Due to significant SOGR needs to provide continued dam safety, dam upgrades are in various stages of design and construction throughout The System. Funding is provided for the Olive Bridge Dam, part of the Ashokan Century Program, as described below. An agreement was reached with NYSDEC for Olive Bridge Dam to be designed to meet 75% PMF. The full long-term rehabilitation upgrades for the Gilboa Dam that brought the dam into compliance with the NYSDEC dam safety guidelines have been completed. The remaining upgrades at Gilboa Dam and Schoharie Reservoir are funded at approximately \$30.3 million in FY 2024. The New Croton Dam requires reconstruction and is funded with \$174 million. Merriman Dam Spillway is funded with \$49 million. Funding of \$49 million is included for Class C high hazard dams in the Croton watershed.

NYCDEP has installed additional equipment at several upstate dams to enhance the monitoring capacity during and after storms. In addition to capital programs, NYCDEP maintains an inspection and maintenance program to support dam safety. NYCDEP continues their dam inspection program using engineering contracts and in-house NYCDEP inspectors. NYCDEP operates and maintains a safe dam system for upstate and in-city dams, based upon capital upgrades, inspection and maintenance programs, and emergency action plans.

Ashokan Century Program

In 2017, as part of their commitment to SOGR upgrades in the watershed, NYCDEP announced the Ashokan Century Program. This program will upgrade all infrastructure associated with the Ashokan Reservoir in the Catskill watershed. In addition to the upgrade to the Olive Bridge Dam, this program will include upgrades to the Ashokan Reservoir spillway, dividing weir bridge, and the Ashokan Reservoir headworks. The CIP includes \$1.03 billion in funding for the Olive Bridge Dam and the Ashokan Reservoir upgrades. However, additional funding may be required in the outer years of the plan for the full implementation of the Ashokan Century Program.



Figure 7-8: Ashokan Reservoir

City Tunnel No. 3, Stage 2

The CIP includes funding of \$427 million for the completion, activation and shaft work (Shafts 17B and 18B) for City Tunnel No. 3, Stage 2 Brooklyn/Queens leg. The Notice to Proceed (NTP) for the first contract was issued in January 2021, and work is proceeding. As of December 2017, City Tunnel No. 3 Brooklyn/Queens leg achieved activation-readiness, which means it is available in case of an emergency. NYCDEP maintains a Stakeholder Management Plan for continuous internal and external communications. Significant ongoing coordination is required with NYCDOT and other city agencies. Full operation of City Tunnel No. 3 Brooklyn/Queens leg is expected once the construction contracts are completed, which is currently expected in 2032. NYCDEP plans to initiate significant master planning for the city tunnels this year so that inspections of CT#1 and then CT#2 can be conducted once CT#3 is fully in service.

Water Main and Sewer Replacement

The Current Capital Plan includes \$1.925 billion for water main and sewer work (new and replacement) throughout the city for FY 2024 through FY 2028. BWSO coordinates closely with NYCDDC and other city agencies for water and sewer projects. The NYCDDC is responsible for the construction and reconstruction of water and sewer mains in the city. NYCDDC has initiated a Capital Project Program (CPP) to facilitate better planning for capital projects. NYCDEP utilizes several parameters for the selection of water main and sewer replacement, including the age, size, material, and historical performance of the current pipes. The construction of new water and sewer pipes is coordinated with other utility underground infrastructure construction projects. NYCDEP is developing a predictive model to forecast the likelihood of future water main breaks.

7.6 Capital Improvement Program Highlights for the Wastewater and Stormwater System

Several NYCDEP projects and programs for the wastewater and stormwater system are in various stages of planning, design, and construction. Many of these significant programs are described below.

Combined Sewer Overflow (CSO) Program

The 2012 CSO Consent Order Modification incorporates a hybrid approach of green and grey infrastructure control strategies. The modified Consent Order is based upon an adaptive management approach to solving the CSO water quality issues which incorporates the Green Infrastructure (GI) Planning. The CSO Order contains milestones and schedules governing the planning, design and construction of a significant number of projects for NYCDEP's Citywide CSO Program. As required by the Order, NYCDEP has developed multiple waterbody-specific Long-Term Control Plans (LTCPs) to control CSOs and improve water quality in NYC's waterbodies and waterways. **Figure 7-9** shows the locations of the combined sewer areas associated with each LTCP waterbody. The goal of each LTCP is to identify appropriate CSO controls necessary to achieve waterbody-specific water quality standards, consistent with the Federal CSO Policy and the water quality goals of the federal Clean Water Act (CWA).

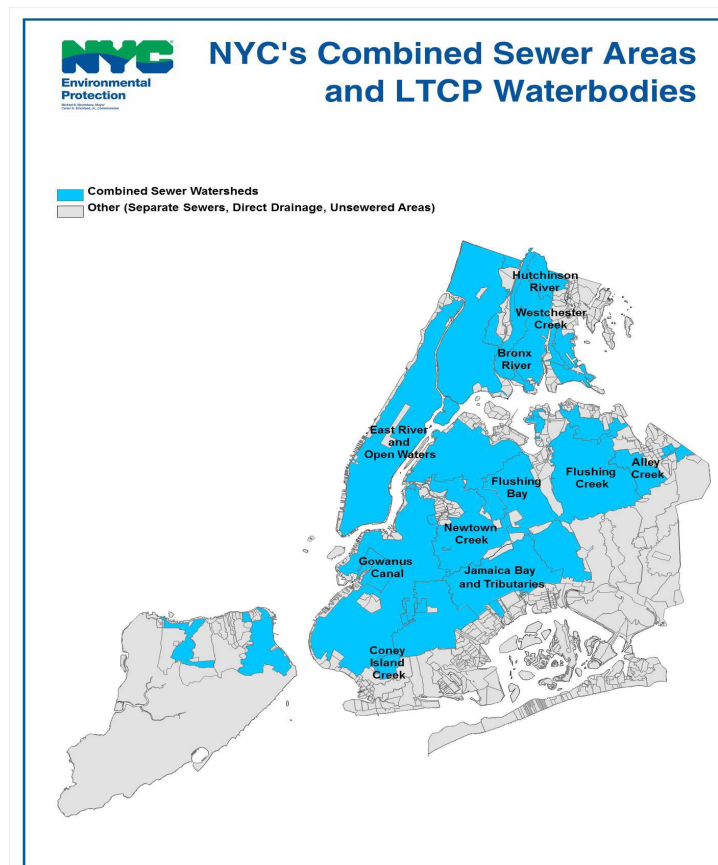


Figure 7-9: Combined Sewer Areas and CSO LTCP Waterbodies

NYCDEP has submitted eleven LTCPs to NYSDEC, all of which have been approved. Each approved LTCP identifies plans at each CSO LTCP waterbody.

Table 7-1 along with **Figure 7-10** present the status of the LTCPs.

Table 7-1: Status of CSO Long Term Control Plans

Waterbody/LTCP	Status of LTCP
Alley Creek	Approved March 2017
Westchester Creek	Approved August 2017
Hutchinson River	Approved March 2017
Flushing Creek	Approved March 2017
Bronx River	Approved March 2017
Gowanus Canal	Approved March 2017
Flushing Bay	Approved March 2017
Coney Island Creek	Approved April 2018
Newtown Creek	Approved June 2018
Jamaica Bay and Tributaries	Approved January 2023
Citywide/Open Waters	Approved July 2023



Figure 7-10: Status of CSO LTCPs

NYCDEP and NYSDEC have negotiated revisions to parts of the CSO Consent Order, allowing the Flushing Bay CSO tunnel to be deferred until a decision has been made regarding the feasibility of the Rikers WRRF Consolidation Plan (see Section 7.8 for further description of the Rikers WRRF Consolidation Plan). A decision matrix is part of the Rikers Study, which will be submitted to NYSDEC in March 2024. A decision regarding the Flushing Bay CSO tunnel and the Rikers Consolidation Plan is expected in December 2024.

The Current Capital Plan includes approximately \$1.06 billion in funding for grey infrastructure capital projects for implementation of the CSO Program, which includes \$676 million for the CSO Gowanus Superfund Facility. Additional funding will be required in the outer years of the CIP and beyond the current budget planning period to implement additional infrastructure required as part of the approved LTCPs, including the Newtown Creek CSO tunnel and the Flushing Bay CSO tunnel.

The LTCPs were based upon water quality criteria in effect at the time the individual LTCPs were developed. Those criteria have evolved over the course of the LTCP program. NYSDEC promulgated final amendments to Parts 701 and 701 of Title 6 NYCRR to address water quality standards that will impact Class SA, SB, SC, and I waterbodies in and around NYC. The October 2023 amendments do not change any water body classifications. Reclassification of water bodies around NYC could require new water quality standards for *Enterococcus* as a fecal indicator. NYCDEP may be required to revise the LTCPs based upon *Enterococcus* bacteria rather than the fecal coliform standard. NYCDEP is evaluating the proposed changes to determine the impact on the approved LTCPs.

Green Infrastructure (GI)



Figure 7-11: Green Infrastructure Rain Garden

Since the release of NYC's Green Infrastructure Plan in 2010, NYCDEP has been continuously planning and constructing green infrastructure in the CSO areas throughout NYC. Over 12,000 green infrastructure installations have been built. The GI assets include curbside rain gardens (**Figure 7-11**), infiltration basins, porous pavements, green roofs, and subsurface detention. The implementation of the GI Program in NYC has focused on three distinct locations: (1) public right of way (ROW) rain gardens, (2) GI on public property, and (3) GI on private properties. NYCDEP has implemented ROW GI

assets in partnership with the NYCDOT. NYCDEP coordinates with many city agencies and partnering agencies to implement green infrastructure on public property, including parks, schools, and city housing facilities. NYCDEP engages with partnerships to implement the GI Program across the city, including Trust for Public Land, Department of Education, School Construction Authority, NYC Housing Authority, NYC Department of Parks and Recreation, NYCDDC, Economic Development Corporation, and other city agencies. NYCDEP has introduced the Private Property Green Infrastructure Retrofit Incentive Program in order to aggressively expand green infrastructure retrofits on private property. Also, the Unified Storm Rule requires all new development and redevelopments to manage stormwater on site.

In April 2023, NYCDEP and NYSDEC entered into an agreement to modify the 2012 Consent Order, known as the 2023 Citywide Green Infrastructure Modification. The modified Order includes an expanded definition of GI to include cloudburst projects, daylighting, bluebelts, and reuse, and includes construction of green infrastructure throughout the city beyond CSO areas. The modified Order commits NYC to an additional \$2 billion in green infrastructure to better manage more intense rainfall and severe weather events caused by climate change. The modified Order also extends the milestone for completing green infrastructure to achieve 1.67 billion gallons a year in annual CSO reduction from 2030 to 2040.

The Tibbetts Brook Daylighting Project will reduce combined sewer overflow discharges to the Harlem River by diverting the brook away from the combined sewer system and into its own conduit. The Tibbetts Brook Daylighting project is advancing. Tibbetts Brook daylighting is included as part of the Baseline

Conditions for the NYCDEP Citywide Open Waters Combined Sewer Overflow LTCP. The Current Capital Plan includes \$104 million for this daylighting project, and additional funding will be provided from Department of Parks due to the cost-sharing agreement in place. The Modified Order includes milestones for the implementation of the Tibbetts Daylighting project.



Figure 7-12: A rendering of Cloudburst Infrastructure

Cloudburst projects use a combination of green and grey infrastructure strategies to slow, delay, and divert stormwater to minimize nuisance flooding and damage to property and infrastructure (**Figure 7-12**). These projects typically manage more stormwater than traditional green infrastructure. A “cloudburst” is a sudden, heavy downpour of rain in a brief period of time. Cloudbursts can damage property and disrupt critical infrastructure. In addition to New York City Housing Authority (NYCHA) South Jamaica Houses Cloudburst initiative, NYCDEP has expanded its Cloudburst program to four additional neighborhoods – Corona and Kissena Park in Queens, Parkchester in the Bronx, and East New York in Brooklyn. The selection process for the sites was based upon evaluations of historic and future stormwater flooding hotspots, existing city projects, environmental justice areas, and social factors that may increase vulnerability. These Cloudburst projects are part of the city’s continued resiliency efforts to better prepare for intense rainfall events.

The NYCDEP submits an annual report updating NYSDEC on the progress of the GI Plan. The 2022 Annual Report was submitted April 30, 2023 (**Figure 7-13**). It provides a comprehensive summary of the green infrastructure program in NYC. The next update, the Annual Report for 2023, is expected to be released on April 30, 2024, which will reflect the modified 2023 Order.

The Current Capital Plan includes approximately \$634 million in funding for green infrastructure projects. Components of the GI program are also funded through the expense budget, including maintenance of the GI assets, research and development and partner agency support.



Figure 7-13: Green Infrastructure Annual Report

Bluebelts

Bluebelts are innovative stormwater drainage systems made up of wetlands, creeks, streams and ponds, which are optimized to help control and filter stormwater from surrounding neighborhoods. NYCDEP has been successful in developing effective Bluebelt sites in the South Shore of Staten Island since the 1990s. Over the last 25 years, NYCDEP has built more than 83 Bluebelts across Staten Island, with additional sites currently in construction, design, and feasibility stage. Although the majority of the Bluebelts are located in Staten Island, NYCDEP is in the early stages of developing a Five-Borough Bluebelt Strategy evaluating expansion of the program to additional sites throughout the five boroughs. Approximately \$237 million is included in the Current Capital Plan to expand the Bluebelts for stormwater management. The New Creek Bluebelt expansion to protect the Mid-Island section of Staten Island from flooding (**Figure 7-14**) was completed this past year.



Figure 7-14: New Creek Bluebelt Expansion in Staten Island

Southeast Queens Stormwater Infrastructure

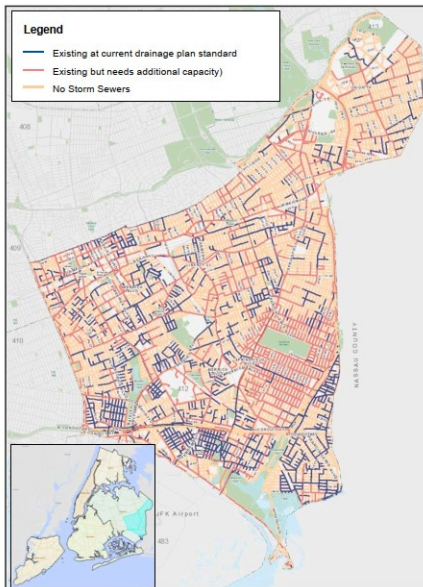


Figure 7-15: Southeast Queens Stormwater Program

NYCDEP is continuing a comprehensive program to improve drainage to address flooding issues in Southeast Queens (**Figure 7-15**). Southeast Queens undergoes chronic flooding due to the topography in the area and due to the lack of storm sewers and undersized storm sewers. The existing storm sewers in Southeast Queens are not fully built out and not all are built to NYC drainage standards. The Southeast Queens Program (Community Districts 12 and 13) was initially announced in 2015 with \$1.5 billion in funding, and the program has increased to \$2.6 billion to build out the drainage program and reduce flooding in Southeast Queens. In the Current Capital Plan, \$985 million is funded for the Southeast Queens storm sewer program. NYCDEP is aggressively working on this storm sewer build-out program in Southeast Queens, as the Program consists of several projects which are in various stages of implementation (23 projects have been completed, 7 projects currently in active construction, 9 projects in design, 6 projects in

project development). NYCDEP has also developed an interactive online map that shows the completed and ongoing projects in Southeast Queens. NYCDEP has developed an approach to continue to address the flooding issues in the area, which consists of quick fixes in areas with the most severe flooding, construction of neighborhood sewers, construction of larger trunk sewers, and the evaluation of opportunities to reduce groundwater flooding. NYCDEP continues to implement projects in a phased

approach, on a priority basis. Green infrastructure and Bluebelts are also being constructed in Southeast Queens to help manage stormwater. NYCDEP has also identified locations in Southeast Queens to implement cloudburst projects.

NYCDEP provides annual updates that show progress of the implementation of the Southeast Queens Plan to the Mayor and City Council. NYCDEP also provides continuous public outreach and program updates to the Southeast Queens community. The buildout of the drainage system in Southeast Queens is a collaboration between NYCDEP, NYCDDC and NYCDOT. NYCDEP continues to maintain close coordination with other city agencies.

Combined Heat and Power (CHP) Facility at North River WRRF

A project for a Cogeneration Facility at the North River WRRF was developed as a sustainability project to provide significant GHG emission reductions and replace the engine-driven main sewage pumps and engine blowers that are near the end of their useful life. The North River WRRF Cogeneration Facility is currently nearing construction completion and is anticipated to come on-line this summer. The project consists of replacing the dual fuel (gas/fuel oil) engines driving the main sewage pumps with electric motors, and the existing dual fuel (gas/fuel oil) engine-driven aeration blowers with new aeration blowers that use electric motors. The new cogeneration facility will provide new gas-driven generators which will provide electricity to drive the main sewage pumps and the nine high speed turbo aeration blowers, and heat for digester and building heating. The new engines will operate on both digester gas derived from the North River digesters and natural gas purchased from the utility company. Fuel oil will no longer be required at the North River WRRF.

Hunts Point WRRF Digesters and Sludge Thickening

NYCDEP is planning a major sludge processing upgrade at the Hunts Point WRRF that will improve digestion performance, enhance biosolids quality to enable more beneficial reuse, and increase biogas production. Replacement and upgrade of the digesters at the Hunts Point WRRF commenced construction in FY 2022. The upgrade to the sludge thickening equipment is an integral part of the overall sludge processing facilities and improved thickening will make the digesters operate more efficiently. The sludge thickeners reduce the volume of water that passes through the digesters, which reduces the energy required for heating and increases solids retention time sufficiently. The sludge thickeners are an important step to produce a product that meets the criteria for Class “B” Biosolids, so that the full program goals are attained. Funding for the sludge thickeners at Hunts Point WRRF is in the Current Plan at a level of \$26 million in FY 2026 and additional funding of \$263 million for construction is beyond the Current Capital Plan, in FY 2029.

As discussed earlier in the report, NYCDEP is planning a biogas-to-grid project at Hunts Point WRRF as part of the new digesters project. NYCDEP continues to evaluate additional potential energy projects in collaboration with SOGR needs. It is anticipated that digesters and sludge thickening at other WRRFs will be evaluated.

Citywide Nitrogen Removal Program

The Upper East River (UER) WRRFs (Hunts Point, Bowery Bay, Tallman Island, and Wards Island WRRFs) and four of the Jamaica Bay WRRFs (26th Ward, Jamaica, Rockaway, and Coney Island WRRFs) have been operating in Step Feed BNR mode as required by the Nitrogen Consent Judgment for the Phase I Facility Plan and a Stipulation and Order Modifying the Nitrogen Consent Judgment and the First Amended Nitrogen Consent Judgement (FANCJ) in 2011. The nitrogen load limits for the UER and the Jamaica Bay WRRFs are currently being met. Coney Island WRRF BNR is complete which initiated a step-down for total nitrogen discharge in Jamaica Bay. NYCDEP conducted a 12-month performance evaluation to establish a performance-based TN limit of 19,300 lbs/day as of November 1, 2023 for Jamaica Bay. NYCDEP submitted a Jamaica Bay Feasibility Study in January 2020 to evaluate the available nitrogen removal technologies and optimization techniques for existing infrastructure, to identify potential measures to reduce nitrogen discharges from the Jamaica Bay WRRFs and to improve dissolved oxygen (DO) water quality in Jamaica Bay.

Glycerol has been used as the supplemental carbon source for additional nitrogen removal. The supplemental carbon addition for Phase II BNR at the UER WRRFs (Hunts Point, Bowery Bay, Tallman Island and Wards Island WRRFs) and the Jamaica Bay WRRFs (Jamaica and 26th Ward WRRFs) is operational.

The Current Capital Plan includes funding of almost \$64 million for the nitrogen program, which includes the conversion of the Sharon nitrogen removal process demonstration facility at the Wards Island WRRF to the Anammox process, as part of the BWT's ongoing Research and Innovation Program.

Total Residual Chlorine (TRC)

Prior to discharge to a receiving body, wastewater effluent is disinfected with chlorine at the WRRFs. Excessive residual chlorine can be toxic to aquatic life in the receiving water body. NYSDEC and NYCDEP have negotiated modifications to the TRC Order, which includes optimization of processes and revised schedules. This Order became effective in June 2022. The Current Capital Plan currently includes \$36.5 million for implementation of the TRC program upgrades at Hunts Point WRRF and Oakwood Beach WRRF.

7.7 Superfund Designations

NYC has been identified as a potential responsible party (PRP) for the following three Superfund sites: Gowanus Canal, Newtown Creek, and Wolff-Alport Chemical Company. These sites may have future potential financial impacts to NYC; however, the extent to which NYC will be responsible has not yet been fully determined for the Newtown Creek and the Wolff-Alport Chemical Company sites. The term PRP still applies to NYC for the Gowanus Superfund site although financial responsibility has been identified, as described below.

In March 2010, the Gowanus Canal was declared a Superfund site and USEPA notified NYC that they are considered a PRP for hazardous waste under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). On September 30, 2013, USEPA issued its Record of

Decision (ROD) for the Gowanus Canal, establishing the dredging, capping and source control requirements. The ROD requires NYC to build two CSO retention tanks as part of the source control component due to the CSO contribution at Gowanus Canal. In June 2016, USEPA issued a memorandum stating that the size of the two CSO storage tanks should be 8 million gallons at outfall RH-034 (Red Hook tank) and 4 million gallons at outfall OH-007 (Owls Head tank). USEPA issued a Unilateral Order to the city in March 2021, requiring the city to design and construct both CSO tanks by March 2029, to complete design and construction of a new bulkhead, and to implement additional stormwater controls in the Gowanus Canal sewershed. Funding of approximately \$676 million is included in the CIP for the Gowanus Canal CSO retention facility. NYCDEP broke ground to commence the Red Hook tank construction contract in March 2023. NYCDEP is continuing with design of the Owls Head tank. The tanks are currently on schedule. The design costs of the in-canal portion of the remediation (dredging and capping of sediments) have been allocated between NYC and twenty other parties. In January 2020, the USEPA issued a Unilateral Order to the six largest PRPs to implement the in-canal remediation in the upper reach of the Canal, the first of three portions where this work will occur.

In September 2010, Newtown Creek was declared a Superfund site. In July 2011, NYCDEP entered into an Administrative Settlement Agreement and Order on Consent with EPA, along with five other PRPs that own or operate facilities adjacent to Newtown Creek in the investigation of conditions in Newtown Creek and the evaluation of feasible remedies. The investigation and feasibility study is expected to continue until 2027, and the ROD for the entire site is expected in 2027. The city's financial share has not yet been determined. The settlement does not cover any remediation that might eventually be required by USEPA to address the contamination identified as a result of the investigation and evaluation. In 2020, the USEPA issued the ROD to address the CSO discharges, which requires no further action beyond the projects identified in the NYSDEC approved Newtown Creek CSO LTCP. The September 2022 Administrative Settlement Agreement and Order on Consent between NYC and the USEPA requires monitoring of the four largest CSOs on Newtown Creek.

In May 2014, the USEPA listed Wolff-Alport Chemical Company in Queens as a Superfund site, based upon radioactive contamination at the site. USEPA has indicated that the Superfund process would include an investigation of impacts to the NYCDEP sewer system from operations at the chemical company site. Radioactive material was disposed on-site and also into the sewer system. In September 2017, USEPA issued its ROD requiring jet washing and replacement of sewers and excavation of contaminated portions of the right-of-way. In December 2017, USEPA notified NYC of its status as a PRP for the work on city property pertaining to this Superfund site. In September 2019, the USEPA issued a Unilateral Administrative Order requiring the city to perform additional investigatory work and develop a remedial design in accordance with the ROD. In 2023, USEPA approved the workplan for the pre-design investigation and the schedule for completing the workplan. NYCDEP is also coordinating with NYCDOT and NYCDDC on this Superfund site.

NYC operated a wastewater treatment plant in the Town of Mt. Kisco, in Westchester County which was decommissioned in the 1960s. Elevated radiation levels have been detected throughout the site. These levels are most likely due to the operations of Canadian Radium & Uranium Corporation (CRUC) which processed radioactive materials in Mt. Kisco and most likely sent wastewater to the Mt. Kisco WWTP.

Based upon NYCDEP's former operation of the Mt. Kisco WWTP, NYCDEP signed an Order of Consent with NYSDEC which committed NYCDEP to fund an environmental study of the site. NYCDEP completed the preliminary environmental study and submitted to NYSDEC. A new or amended Order is anticipated between NYCDEP and NYSDEC that may require further investigations and actions. NYCDEP may be required to fund remedial design and remedial action at the site, along with waste disposal, which could amount to significant costs.

7.8 Potential Future Long-Term Water and Wastewater Projects Beyond Current Budget Planning

Consolidation Plans for Jamaica Bay WRRFs

NYCDEP has evaluated alternatives for future operation of the Rockaway WRRF for several years. NYCDEP completed a Facility Plan for the Rockaway WRRF in 2014, which analyzed alternatives for future Rockaway WRRF operations. NYCDEP revisited this consolidation option and expanded the options to evaluate eight alternatives. As a result of the recent analysis, the recommended alternative is the consolidation of Rockaway and 26th Ward WRRFs, with a discharge to the Atlantic Ocean that would include the effluent flow from the Jamaica WRRF. The consolidation of Rockaway and 26th Ward flows would be treated at an expanded 26th Ward WRRF, and the Rockaway WRRF would be taken out of operation. This plan would require a new effluent pump station at the 26th Ward WRRF to pump the consolidated 26th Ward and Jamaica WRRF effluent to the Atlantic Ocean for discharge. This recent Jamaica Bay WRRFs Consolidation Plan Update analysis has determined this option to be the most economical solution to address a series of water quality issues and regulatory challenges, including limit of technology for nitrogen, ammonia toxicity, total residual chlorine, free cyanide, enterococcus, and whole effluent toxicity. It is anticipated that NYCDEP will continue with Master Planning of this consolidation scheme later in 2024.

Renewable Rikers

City Council introduced legislation that requires studies to be completed to determine the future use of Rikers Island. NYCDEP has conducted a feasibility study to evaluate the relocation and consolidation of the four Upper East River (Bowery Bay, Tallman Island, Hunts Point, Wards Island) WRRFs to Rikers Island (**Figure 7-16**). Rikers Island consists of 413 acres and is located in the East River between the Bronx and Queens.

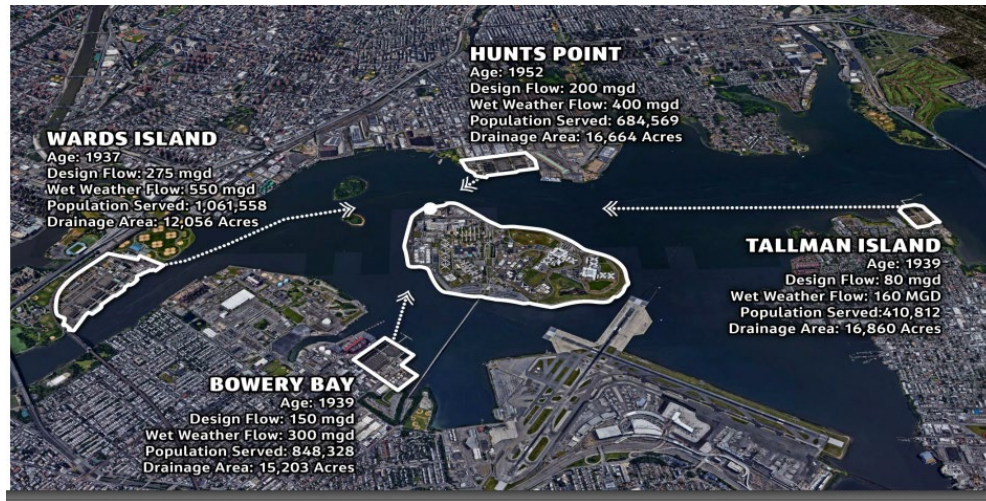


Figure 7-16: Rikers Island WRRF Consolidation Feasibility Study

A formal public outreach process to obtain community input commenced in Spring 2022. The *Feasibility Study for a New Wastewater Resource Recovery Facility on Rikers Island* was released on March 4, 2024.

7.9 Design-Build

Typically, NYCDEP projects are implemented with design, bid, build. NYCDEP is now pursuing design-build as an alternate project delivery method to save time with project implementation and delivery. The NYS legislation that allows for projects to be delivered using design-build construction contracts in NYC has been extended. NYCDEP has initiated three design-build pilot projects (Port Richmond electrical upgrades, upstate watershed road and culvert upgrades, and Port Richmond WRRF/ Rockaway WRRF dock improvements) which consist of six capital projects. These projects are in the procurement phase. Based upon the outcome of these projects, NYCDEP will determine if design build might be used for larger projects in the future. It is anticipated that the NYCDEP will start evaluating the next projects that will be selected for design-build project delivery.

8.0 EXPENSE BUDGET

The FY 2024 expense budget released in the Preliminary Plan is \$1.735 billion. The proposed FY 2025 expense budget in the Preliminary Plan is \$1.607 billion. Expense budget projections for FY 2025 are currently being evaluated based upon the new needs of The System and will require adjustment when the evaluation is complete. The FY 2025 expense budget is expected to increase and be updated in the Executive Budget, to be released in late April 2024. The expense budget is made up of both Personal Services (PS) costs and Other than Personal Services (OTPS) costs. The PS budget is made up of staff salary, fringe benefits and pension costs. The OTPS costs make up the remaining expense budget, including taxes, chemicals, supplies, fuel oil, gasoline, biosolids, equipment, contract services, leases, FAD, training, and other requirements/needs.

There are many competing needs within the Expense budget each year; therefore, NYCDEP must continue to evaluate all requirements of the water and wastewater system when completing the expense budget. In accordance with applicable regulations and directives, NYC decides the projects (or elements of a project) that are eligible for capital funding. The remaining needs are covered in the expense budget. In addition to the day-to-day requirements to operate and maintain the NYCDEP system, the expense budget must also cover planning studies that are necessary to prioritize capital investments, but the studies themselves are not capital eligible. Planning studies/Facility Plans are important aspects of long-term management of The System and should be carried out before any significant capital funds are committed to a specific project or facility.

9.0 OPERATIONAL PERFORMANCE OVERVIEW

One Water NYC – Water Conservation

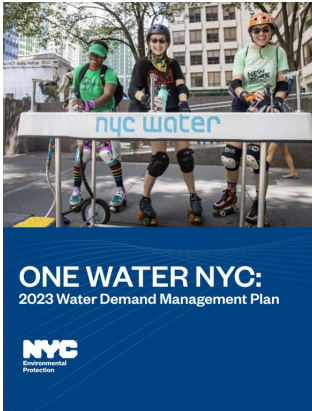


Figure 9-1: Water Demand Management 2023

NYCDEP released *One Water NYC: 2023 Water Demand Management Plan* in June 2023 (**Figure 9-1**). Over the past 10 years, the NYCDEP Water Demand Management Plan has achieved 22.7 mgd in water savings. The plan focuses on the following key strategies for managing water demand: the Municipal Water Efficiency Program, the Residential Water Efficiency Program, the Non-Residential Water Efficiency Program, Water Distribution System Optimization, Water Supply Shortage Management, and Wholesale Customers Demand Management. NYCDEP created an interactive online map identifying the location of water conservation projects, the estimated demand savings, and the estimated energy and greenhouse gas reductions anticipated from each project. The main driver of the original 2013 Water Demand Management Plan was to reduce demand and optimize water supply during the Delaware Aqueduct shutdown and repair. These savings have been realized. Water Demand

Management has been transitioning to a One Water holistic approach. NYCDEP's initial focus areas for the One Water approach will include Reuse and Recirculation, Education and Outreach, and Affordability. Water reuse projects, including the Domino District non-potable water reuse and Central Park recirculation project are described in the NYCDEP Report.

The average daily in-city water consumption for FY 2023 was 1,004 MGD. **Figure 9-2** presents the annual water consumption for the city for over three decades. Water conservation measures taken by NYCDEP in the 1990s have resulted in a steady reduction in the overall water demand. Water demand has decreased by approximately 36% since the 1990s. More recent declines in water consumption have been noted most likely attributed to continued conservation measures, water usage metering, availability of easily accessible data for tracking, weather patterns, and implementation of NYCDEP's Water Demand Management Program. New York's per capita water demand has declined from its peak of 213 gallons a day per person in 1979 to 120 gallons per day per person in 2022⁶. This change reflects a 44% reduction in per capita water demand. It is anticipated that strategies identified in the NYCDEP Water Demand Management Plan will continue to reduce the water demand.

⁶ One Water NYC: 2023 Water Demand Management Plan, NYCDEP.

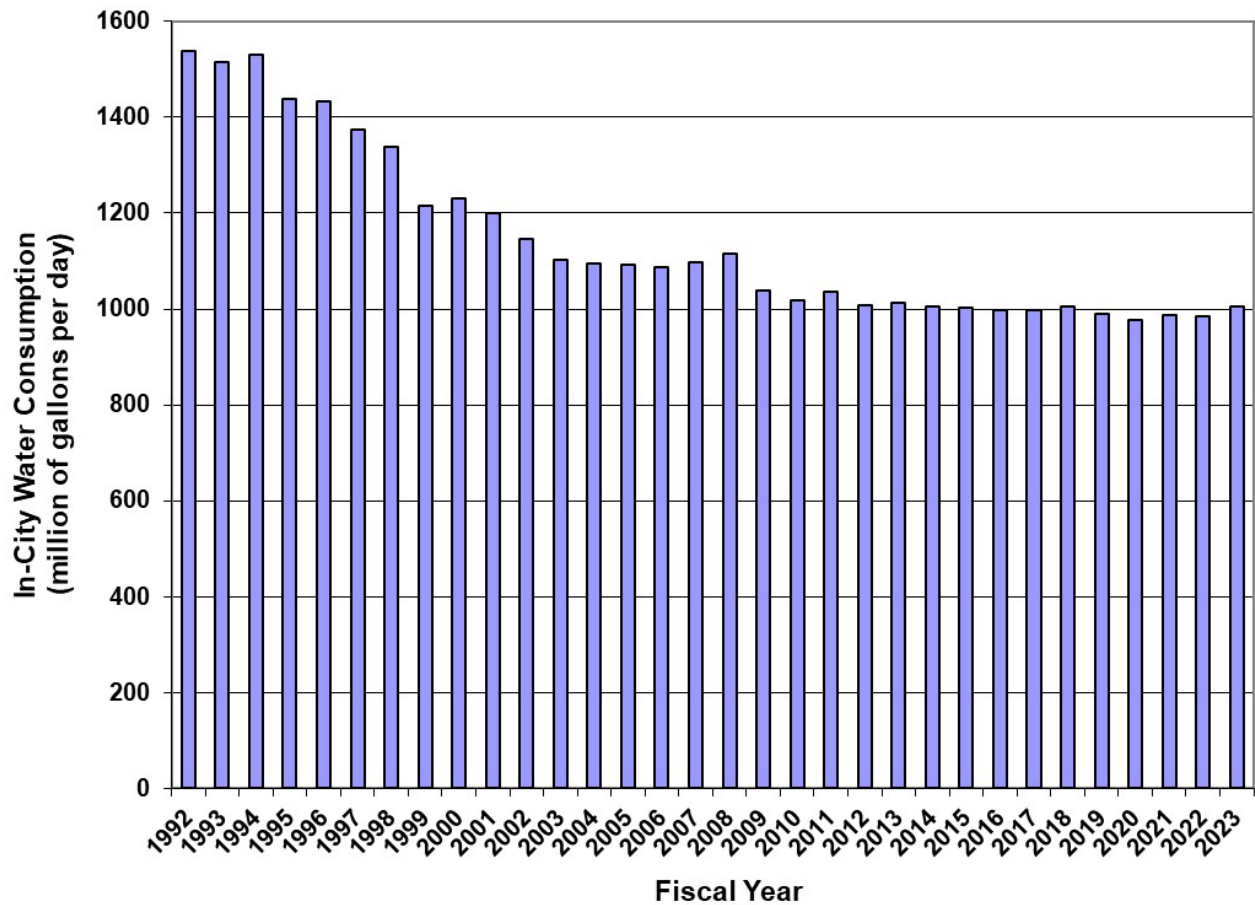


Figure 9-2: New York City Average Daily Water Demand in Million Gallons per Day (MGD)

System Staffing Levels

Figure 9-3 shows the NYCDEP approved staffing positions and vacancies for the past 27 years. NYCDEP has hired over 300 employees within the last year. The total number of NYCDEP vacancies decreased to 713 in FY 2024. However, NYCDEP continues to face a significant number of retirements and departures, along with some challenges in the hiring process.

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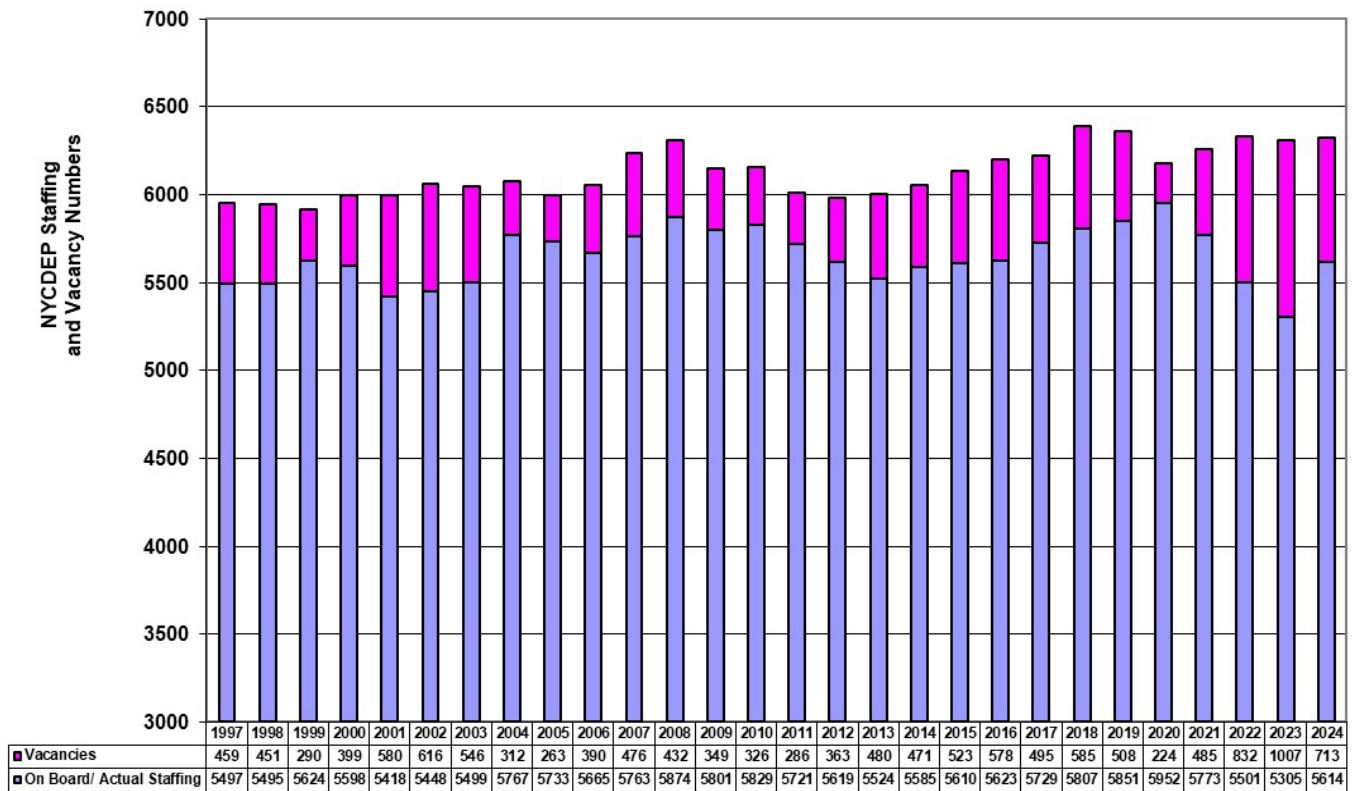


Figure 9-3: Staffing and Vacancy Levels FY 1997-2024

It is important to note that many experienced, critical employees are eligible for retirement and NYCDEP continues to experience significant retirements. Recruitment, training, transfer of knowledge, and succession planning are essential to maintain a skilled NYCDEP workforce. Staffing vacancies remain in the engineering, technical, watershed maintainers, and support staff. NYCDEP has been aggressively working on recruitment, hiring and retention strategies.

It is vital to the organization that these efforts continue so that operations and capital delivery are not impacted. BWT has hired several sewage treatment workers (STWs) this past year to increase and improve operations. BWT operations is now fully staffed. However, significant vacancies still exist throughout BWT, including engineering staffing levels and the BWT Asset Management group. BWT will require additional staff as new CSO facilities come online. BWS has initiated an Apprenticeship Program for water treatment operators with State University of New York (SUNY) Ulster County. Vacancies also exist throughout BWSO. Within Sustainability, the NYCDEP will need to increase seasonal Green Jobs that perform maintenance of green infrastructure assets throughout the city, as the number of green assets has increased. Over the next few years, GI assets are expected to increase in NYC, at the same time as GI staffing vacancies are also increasing. BEDC also has engineering staffing vacancies.

Although the hiring restrictions have been lifted, there continue to be vacancies which have put a strain on NYCDEP's resources and have created challenges for some maintenance, planning and engineering activities. NYCDEP continues to operate water and wastewater facilities 24 hours per day, 7 days a

week with essential workers/operators. However, NYCDEP will require additional staff to operate infrastructure associated with the citywide resiliency programs.

Operational Performance Indicators

Many operational parameters can be reviewed to assess the effectiveness of operating programs. Several performance indicators for water and sewer operations are summarized below. However, other parameters can impact these indicators, such as localized weather patterns.

A total of 403 water main breaks were reported in FY 2023, which reflects a decrease since last year. The number of water main breaks translates to 5.8 breaks per 100 miles of main over a 12-month period (see **Figure 9-4**). The range of water main breaks that NYC has recently experienced remains much lower than the average frequency of water main breaks experienced by other municipalities in the United States (various studies show overall average annual break rates for all pipe materials average 25 breaks per 100 miles, 21-25 breaks per 100 miles, 14 breaks per 100 miles depending upon the study and utilities surveyed). NYCDEP BWSO has expanded its Leak Detection Program to proactively identify and repair leaks before they become water main breaks. BWSO field crews have used audio equipment and scanned 40,000 linear feet to listen to sounds and pinpoint leaks, then repair the leaks before they become water main breaks. NYCDEP BWSO operations continue a preventive maintenance program to target pressure reducing valves by exercising valves, inspecting regulators and utilizing predictive modeling to help prevent the occurrence of water main breaks, costly repairs, leaks and disruption of service. In addition, BWSO prioritizes replacement of water mains based upon those with the greatest risk of breakage. The majority of water main breaks occur in the winter since the water mains are impacted by the freeze/thaw cycles in the colder temperatures. NYCDEP restores water to residents following a break within an average of 4.8 hours after confirming the water main break.

NYCDEP achieved approximately 18 miles of new water main replacement or reconstruction in 2023, which is lower than the average 46.4 miles of new water main replacement or reconstruction over the past 20 years. NYCDEP completed construction or reconstruction of 12 miles of sewer lines in 2023, and an average of 22 miles of sewer line construction or reconstruction over the past 20 years. NYCDEP plans to utilize artificial intelligence predictive tool modeling to forecast future water main replacement and sewer replacement cycles, which will vary from year to year. In addition, the amount of water main replacement and sewer replacement varies from year to year based upon funding, procurement and other factors. The average sewer replacement per year is typically less than the water main replacement due to operating conditions and pipe materials.

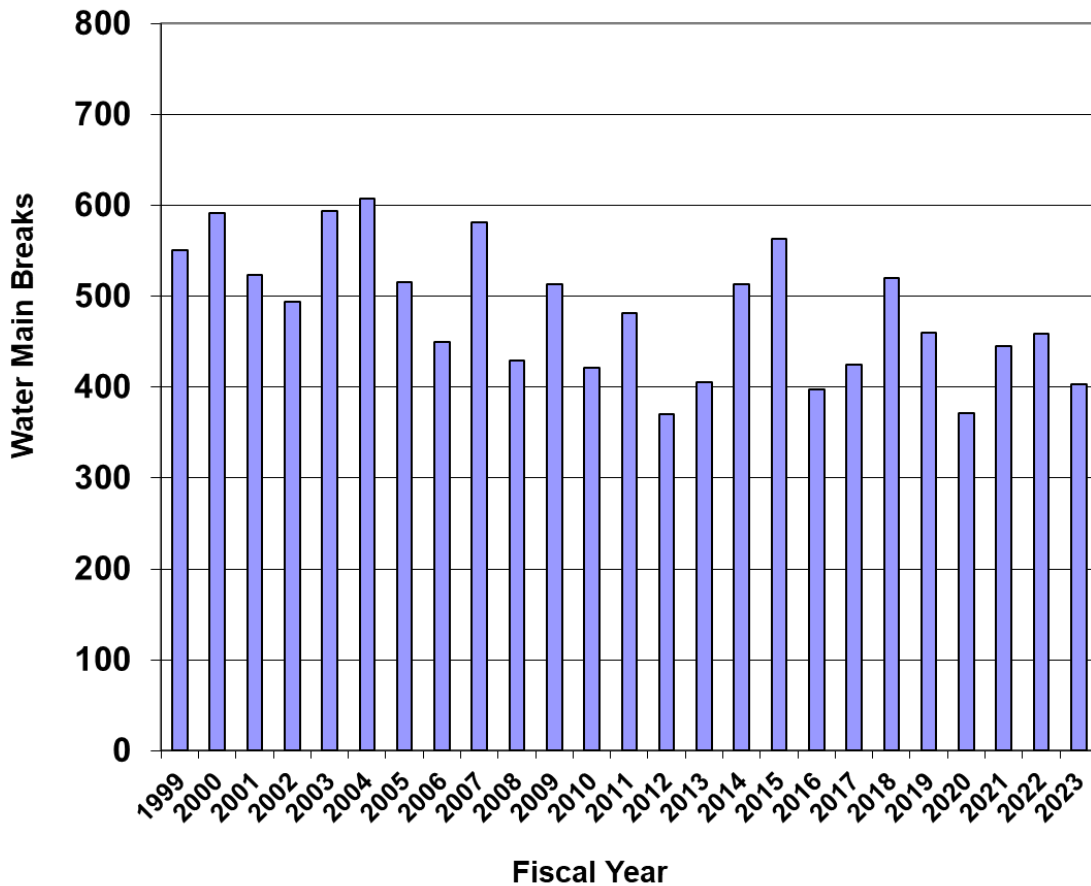


Figure 9-4: Total NYCDEP Water Main Breaks per Fiscal Year

There are 112,000 fire hydrants in NYC over which BWSO has responsibility for repair and maintenance. Approximately 0.39% of total fire hydrants were broken and inoperative in FY 2023. The average time to repair or replace high priority broken or inoperative hydrants (as determined by the Fire Department) by NYCDEP was 2.3 days in FY 2023, which is less than the target time for repair or replacement of five days.

A total of 42,214 catch basins were cleaned (both programmatic and complain-driven cleaning) by BWSO in FY 2023, an increase from the past two years. BWSO has initiated a Catch Basin Modernization Plan. The number of catch basins that were surveyed and inspected in FY 2023 was 64% of the total of 150,000 catch basins. BWSO has increased catch basin cleaning frequency in specific areas and cleaning when necessary, based upon a data driven approach.

NYCDEP received 11,705 sewer backup (SBU) complaints in FY 2023, which includes 2,164 confirmed SBUs (on NYCDEP infrastructure) and 9,543 unconfirmed SBUs (not on NYCDEP infrastructure or not found). Response time for SBUs was 3.4 hours on average. The number of SBUs and the response time for resolution of the SBUs decreased in FY 2023 compared to FY 2022, most likely due to the massive flooding caused by the intense storm Hurricane Ida in September 2021. NYCDEP has also found that the significant majority of the confirmed sewer backups can be attributed to fats, oils and

grease (FOG) buildup in the sewers. NYCDEP has continued to implement and expand aggressive operational and public outreach initiatives to address the FOG problem in the sewers. NYCDEP continues to use a public outreach campaign to educate the public about which objects should not be flushed down the toilet (wipes, cooking oil, and many other personal hygiene products) as they impact the operation of sewers and treatment plants. This campaign is known as **Trash It. Don't Flush It. FatbergFree.nyc.**

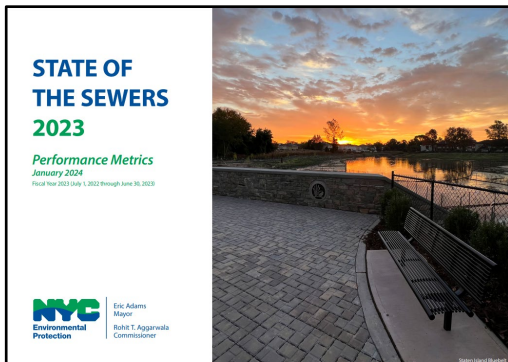


Figure 9-5: State of the Sewers 2023

BWSO issued the bureau's annual *State of the Sewers 2023 Report*, which documents several metrics on sewer operations across the five boroughs (Figure 9-5).

NYCDEP continues to use a data-driven proactive approach to operate and maintain the sewer system.

Operational and Maintenance Program Summary and Updates

Water Supply and Treatment Operations. NYCDEP strives to increase the reliability, flexibility and redundancy of overall water supply operations. The interconnection of the Delaware Aqueduct with the Catskill Aqueduct at Shaft #4, which allows water from the Delaware Aqueduct to be diverted to the Catskill Aqueduct, has been operational since 2015. This interconnection provides operational flexibility and an additional tool in dealing with turbidity incidents following high rainfall in the Catskill watershed. The upgrades at the Croton Falls Pump Station and the Cross River Pump Station provides conveyance flexibility to NYCDEP and provide the ability for Croton water to be supplied to the Delaware Aqueduct, if required in emergencies or when parts of The System are out of service for planned or unplanned maintenance (such as during the upcoming Delaware Aqueduct Shutdown). NYCDEP must receive NYSDOH approval prior to operating Croton Falls and Cross River Pump Stations. In addition, the connection between the Catskill Aqueduct and Croton allows blended water to be sent to the Croton WFP, if necessary. NYCDEP strives to maintain or increase operational flexibility in the operations of the vast network of upstate reservoirs and aqueducts in order to reliably deliver safe drinking water to NYC on a continuous basis.

Croton Operations. The Croton WFP initially began sending treated drinking water to the NYC distribution network in May 2015. In November 2015, Croton demonstrated operations at its full water production rate (290 MGD). Depending upon the water supply demands, NYCDEP varies water production at the Croton WFP. NYCDEP scientists and engineers continue to evaluate seasonal variations in water quality from the Croton watershed. In 2020, BWS installed new filter media at Croton WFP by removing the old anthracite filters and replacing them with granular activated carbon (GAC) filters to address the taste and odor issues. Croton WFP was in operation in February 2023 to test the GAC filters in cold temperature operating conditions and to demonstrate sending additional flow into distributions to prepare for the upcoming Delaware shutdown. Croton WFP operated at full capacity during the few weeks of Delaware Aqueduct shutdowns in March 2023 and October 2023. Croton WFP

is currently not in operations. However, during the upcoming Delaware Aqueduct shutdown, Croton WFP will be operating Plant A and Plant B for the entire shutdown.

UV Operations. The Cat/Del UV Facility has been in operation since October 2012. NYCDEP BWS Operations staff successfully took over 100% control of the facility on June 15, 2013. The UV facility is the largest UV water disinfection facility in the world with a capacity to disinfect 2.4 BGD. It is currently receiving and providing UV disinfection to all water from the Catskill and Delaware watersheds. Currently, water is transferred from the Kensico Reservoir to the Cat/Del UV Facility via the Delaware Aqueduct.

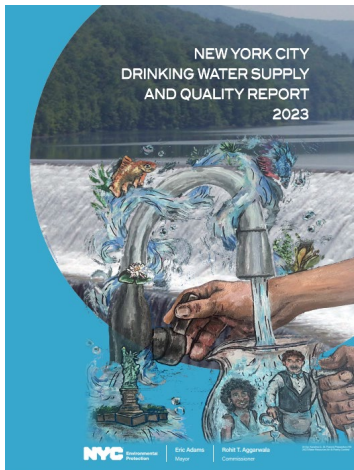


Figure 9-6: New York City Drinking Water Supply and Quality Report 2023

Drinking Water Quality and Quantity. NYCDEP released the *New York City Drinking Water Supply and Quality Report for 2023* on March 1, 2024 (**Figure 9-6**). NYCDEP conducts significant monitoring of the source water and in-city water quality. In FY 2023, NYCDEP collected 31,600 samples from the distribution system and performed approximately 357,700 analyses, meeting all state and federal monitoring requirements. In addition, NYCDEP collected more than 13,200 samples and performed approximately 231,800 analyses from the upstate reservoirs and watersheds. Approximately 2.4 million robotic monitoring measurements were made to support FAD watershed protection programs and to optimize water quality. Microbiologists, chemists and other scientists with the BWS test water from key locations across the watershed and the city at NYCDEP laboratories. NYCDEP water quality laboratories are located in Hawthorne, Kingston, Grahamsville and Queens. As of March 7, 2024,

the overall storage in NYC's water supply system stands at 96.9% of capacity, compared to the normal levels at this time of 90.4% of capacity.

PFAS. Per- and polyfluoroalkyl substances (PFAS) are a group of synthetic chemicals used in industrial applications and consumer products, such as stain resistance products, non-stick materials, waterproofing, and firefighting applications. PFAS compounds do not break down in the natural environment due to their unique and complex chemical properties. In October 2021, the USEPA released the *PFAS Strategic Roadmap*, outlining the USEPA approach to addressing PFAS. The USEPA's approach is focused in three areas – research, restrict, and remediate. The USEPA released its *PFAS Strategic Roadmap Second Annual Progress Report* in December 2023.

NYCDEP BWS implemented an Emerging Contaminant Monitoring Project (ECMP) throughout the NYC watershed in 2019. Over 140 emerging contaminants were tested, including PFAS compounds perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). The results were posted quarterly on the NYCDEP website. In 2020, New York State established maximum contaminant levels (MCLs) for drinking water for two PFAS compounds, PFOS and PFOA with enforceable limits of 10 parts per trillion (ppt). In March 2023, the USEPA proposed national drinking water standards for six PFAS compounds, and MCLs for PFAS compounds are expected to be released in 2024. NYCDEP monitors

for PFAS compounds, as required by the Fifth Unregulated Contaminant Monitoring Rule (UCMR5). Monitoring for UCMR5 commenced in the 4th quarter of 2023. NYCDEP is planning to conduct a PFAS assessment in the Kensico Reservoir watershed. In addition, sampling and monitoring of PFAS in the wastewater influent, effluent and biosolids will be required in the near future and NYCDEP is tracking and preparing for this future regulatory requirement.

Operation Support Tool. NYCDEP utilizes the Operation Support Tool (OST) for various decision making and operating modes. The OST model links water quality and water quantity models, uses near real-time data for reservoir levels, stream flows entering reservoirs, snowpack and water quality in streams and reservoirs, and includes National Weather Service forecasts.

Wastewater Operations. BWT utilizes predictive maintenance methods to better identify maintenance and replacement cycles and increase overall reliability of the WRRF equipment. Examples of predictive maintenance include measuring mechanical wear on equipment parts and using thermographic cameras to examine electrical systems. This program is anticipated to save on capital replacement and energy costs.

BNR Operations at the Wastewater Resource Recovery Facilities. NYCDEP has been operating in Step Feed BNR mode at the UER WRRFs (Hunts Point, Bowery Bay, Tallman Island, Wards Island) and the Jamaica Bay WRRFs (26th Ward, Rockaway, Jamaica, Coney Island WRRFs). Due to the long-term planning and significant capital projects that have been implemented, NYCDEP operations have been achieving the final total nitrogen (TN) removals established for the UER. NYCDEP conducted a 12-month performance evaluation to establish a performance-based TN limit of 19,300 lbs/day as of November 1, 2023 for Jamaica Bay. The UER and Jamaica Bay WRRFs have seen a significant reduction in TN in the effluent and are in compliance with the TN limit.

Harbor Water Quality. NYC has been collecting and maintaining records of water quality data for over 100 years. The New York Harbor Water Quality Survey currently consists of 89 sampling stations harbor-wide, with 40 located in open waters and another 49 located in tributaries. NYCDEP has increased the number of monitoring sites throughout the harbor and at the mouth of key tributaries to evaluate the effectiveness of the NYCDEP stormwater management and CSO control projects. The number of water quality parameters measured has increased from five at the start of the New York Harbor Water Quality Survey Program to 27 water quality parameters at present. The 2019 – 2021 Harbor Water Quality Report was released September 2022 and is available online.

Sludge Vessels. In FY 2014, NYCDEP commissioned three new sludge vessels, the Motor Vessel (M/V) Hunts Point, the M/V Port Richmond and the M/V Rockaway. These three ships join the M/V North River and the M/V Red Hook sludge vessels. The sludge vessels transport liquid sludge from the six WRRFs not served by onsite dewatering facilities to those WRRFs with dewatering facilities.

Biosolids. NYCDEP typically produces 1,400 wet tons per day of biosolids from the wastewater treatment operations at the 14 WRRFs. NYCDEP is developing a Biosolids Strategic Plan to identify alternative end uses for NYCDEP biosolids beyond 2030. NYCDEP has been transitioning to beneficial reuse of biosolids rather than landfilling. Currently, approximately 50% of the biosolids contracts send

the NYCDEP biosolids to beneficial reuse. BWT plans to continue to increase the beneficial reuse of biosolids, with the goal of 100% beneficial reuse by 2030. Beneficial reuse of biosolids supports the initiative of zero waste to landfills by 2030 due to the significant environmental and sustainability benefits it provides.

Environmental Health & Safety (EH&S). NYCDEP maintains a robust and comprehensive EH&S program across all bureaus throughout the NYCDEP. NYCDEP provides consistent EH&S training so that staff can carry out their work responsibilities safely and in compliance with the many local, state and federal regulations. The EH&S Group is responsible for a comprehensive EH&S compliance program, all EH&S training, audits, EH&S employee surveys and the NYCDEP internal compliance office. EH&S is carried out by in-house NYCDEP management and staff as well as EH&S contracts. Safety is one of NYCDEP's core values. NYCDEP maintains a culture where safety comes first for every employee, contractor and the public. NYCDEP continues to put safety as a top priority and is committed to creating the safest possible workplace for everyone involved in their work at NYCDEP.

Permit Updates

Wastewater Treatment. NYCDEP received revised and renewed comprehensive State Pollutant Discharge Elimination System (SPDES) Permits for the 14 NYC WRRFs, effective July 2022. The current SPDES permits for the 14 WRRFs expire in 2027. The new permits require additional sampling and monitoring for ammonia, free cyanide, and *Enterococcus*, with compliance limits. As previously discussed in the Asset Management section of the report, the new SPDES permits also required an AMP Update Workplan on July 1, 2023, and an AMP Annual Report due each year by September 30. NYCDEP is operating in accordance with the 2022 SPDES permits for the 14 WRRFs. Based upon diligent wastewater treatment plant operations, 99.9% of the NYCDEP wastewater treatment plant effluent met state pollutant discharge elimination standards in FY 2023. For the first four months of FY 2024, measurement of effluent samples drawn from the plants indicated that 99.7% of the NYCDEP wastewater plant effluent met state pollutant discharge elimination standards.

Stormwater. A portion of New York City has separate storm and sanitary sewer systems. The storm sewers are addressed under the municipal separate storm sewer system (MS4) permit and the separate sanitary sewers send flows to the WRRFs, which operate under the SPDES permits. NYC is the permit holder since the MS4 requirements cover 14 city-chartered agencies. However, NYCDEP coordinates all required activities under the permit. NYSDEC issued a final MS4 permit for NYC on August 1, 2015. The new MS4 final permit was issued in August 2022. In October 2013, an Executive Order was signed addressing coordination and implementation of stormwater controls and MS4 permit requirements for NYCDEP and other NYC agencies. Memorandums of Understanding (MOUs) have been developed between NYCDEP and the chartered city agencies that are impacted by the MS4 permit. As required by the MS4 permit, NYC established legal authority in 2017 with the passage of Local law 97. The New York City Council approved comprehensive legislation that consolidates, clarifies, and supplements existing legal authority, to allow the City to act in a regulatory capacity to control pollutant discharges into and from its MS4. The city has established a Stormwater Controls Working Group that includes representatives from each agency that meet quarterly to discuss stormwater program development tasks and permit-related information. The MS4 permit includes robust requirements, which significantly

expand the city's obligations to reduce pollutants discharging to the storm sewers. The MS4 permit requires NYC to submit a Stormwater Management Program (SWMP) Plan within three years of the effective date of the permit. The original SWMP was submitted August 1, 2018. Key components of the SWMP include public education and outreach, mapping, illicit discharge detection and elimination (IDDE), construction site stormwater runoff control, post-construction stormwater management, pollution prevention and good housekeeping for municipal operations, industrial stormwater sources, control of floatables and settleable debris, monitoring and assessment of controls, and impaired waters. The SWMP Plan was approved by NYSDEC in March 2019. In the fall of 2021, the city updated of the SWMP to reflect the current status of program implementation and the city's compliance with the 2015 MS4 Permit. The updated SWMP was released in February 2022 (**Figure 9-7**). The MS4 Permit includes annual reporting requirements. NYCDEP highlights major programmatic changes in the MS4 Annual Report, which was submitted September 30, 2023. As discussed previously in the report, the Unified Stormwater Rule will benefit MS4 areas by requiring more on-site stormwater management.

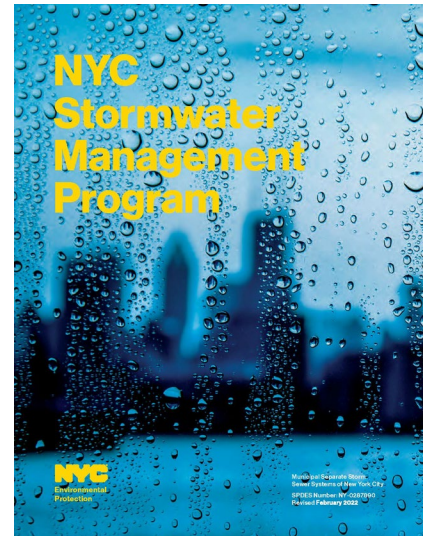


Figure 9-7: SWMP Plan

10.0 OTHER NOTEWORTHY ISSUES AND COMMENTS

Lead and Copper Rule

The finalized rule of the Lead and Copper Rule Revisions (LCRR) became effective December 16, 2021. The LCRR includes a three-year period to achieve compliance; compliance must be achieved by October 16, 2024. Some of the requirements NYCDEP has already been implementing and some will require new programs. There are significant and complex changes to the LCRR that will have an impact on NYCDEP and will make compliance more stringent and challenging. The Lead and Copper Rule Improvements (LCRI) was announced by the USEPA on November 30, 2023. A public hearing was held on January 16, 2024. The USEPA anticipates finalizing the LCRI before the LCRR compliance in October 2024. The LCRI requires complete lead service line removal across the United States in a 10-year timeframe. The proposed LCRI substantially changes requirements from the LCRR by lowering the lead action level from 15 ug/L to 10 ug/L, changes sampling protocols, and requires continual lead service line inventory updates and replacement plans.

The drinking water supply is lead-free when it leaves the upstate reservoir system. The city-owned distribution system is also lead free. NYCDEP is currently in compliance with the current Lead and Copper Rule. NYCDEP has an active corrosion control program in place in order to reduce lead absorption from service lines and internal plumbing. NYCDEP treats the water with food grade phosphoric acid and sodium hydroxide. Sodium hydroxide is added to raise the pH and reduce corrosivity, which prevents the leaching of lead from pipes into the drinking water. Phosphoric acid is added to create a protective film on pipes that reduces the release of metals, such as lead, from household plumbing. In certain cases, privately owned infrastructure contains lead such as the LSL that connects the homes to the city-owned water mains. Under the current federal Lead and Copper Rule, mandated at-the-tap lead monitoring is conducted at select households throughout New York City. The at-the-tap monitoring results are presented in the annual *New York City Drinking Water Supply and Quality Report*. NYC residents can request a free lead kit to test their water.

NYCDEP has been engaged with the National Drinking Water Advisory Council (NDWAC) Lead and Copper Rule Working Group, Water Research Foundation expert panel, and others. NYCDEP has taken a proactive approach and has initiated studies to further optimize corrosion control, better understand lead exposure, and help prepare for the LCRR and LCRI. BWS conducted a pilot program in City Island in the Bronx to further optimize corrosion control treatment by increasing the orthophosphate (PO_4) dosage.

In January 2019, a plan called LeadFreeNYC was released, which is a comprehensive roadmap to eliminating lead exposure in NYC children. NYSDOH provided a grant of \$5.3 million to NYC for a NYCDEP to pilot a program to replace lead service lines for low-income single-family homeowners. The pilot replacement program replaced 600 LSLs and ended in October 2022. As part of this Leadfree NYC program, NYCDEP has also posted a map of NYC with potential lead service lines on the LeadFreeNYC website. NYCDEP applied to NYS through the State Revolving Fund (SRF) for additional funding through the Bipartisan Infrastructure Law (BIL) for LSL replacements in six targeted areas. Funding was

received for three areas (in the Bronx and Queens). NYCDEP intends to apply during the second round of funding for LSL replacement. NYCDEP also plans to update the NYC lead service line inventory.

Awards

NYCDEP capital program, operations and customer service are often recognized throughout the industry by professional and trade organizations.

NYCDEP received a Diamond Award in the Studies, Research and Consulting Engineering Services by the American Council of Engineering Companies (ACEC) New York's 2024 Engineering Excellence Awards for the Citywide Cloudburst Feasibility Study. The installation of combined & storm sewers in 229th Street in South Queens, NY also received the Diamond ACEC award in the category of Waste and Stormwater. In addition, Honk Falls CM Services for rehabilitation received the Gold ACEC award in the category of Water Resources.

BWSO was recently honored for its online permitting system at the New York City Technology Forum, an annual IT conference for NYC agencies, hosted by NYC Office of Technology and Innovation (OTI) and Government Technology. In 2023, as part of the NYCDEP's continuous efforts to streamline the permitting process for water and sewer connections, NYCDEP BWSO expanded the online platform to allow applicants to submit records requests electronically.

Water Rate Study

The NYCDEP Sustainable Rate Structure Analysis (SRSA) is ongoing. The SRSA is analyzing water and wastewater rate structure options and customer assistance and credit programs.

Long Island Water Supply Interconnection Feasibility Study

NYSDOH, in collaboration with NYSDEC, completed the *New York City-Nassau County Water Supply Interconnection Feasibility Study* (Feasibility Study). The purpose of Feasibility Study was to evaluate the feasibility of connecting NYC public water supply to Nassau County. The report was released in August 2022. The Report evaluated a range of 20 – 180 MGD (known as the low and high bookends) for the interconnection between NYC water supply to Nassau County. This study shows that it is feasible for NYC water supply to serve some of Nassau County's water demands; however, there are several significant challenges that would need to be further evaluated.

Federal and State Funding

NYCDEP plans to apply for additional federal funding from the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA). NYCDEP has selected a consultant to support and evaluate securing and administering federal and state funding that are specifically made available for water and wastewater utilities.

11.0 SUMMARY AND CONCLUSIONS

Although NYCDEP continues to face challenges due to staffing vacancies in engineering and support groups, NYCDEP continues to operate facilities to provide essential services of water and wastewater treatment and delivery. Considering the magnitude of the overall infrastructure and the level of operational service required, it is our opinion that:

- The System continues to be managed in a professional and prudent manner with an appropriate regard for the level of service afforded to the users within the available funding.
- The physical condition of The System receives an “adequate rating”, our highest rating. Due to the size and complexity of The System, NYCDEP will require future capital investments for the following: continuous replacement and/or repair of aging infrastructure in a systematic and cost-effective manner; implementation of infrastructure to meet regulatory mandates; additional projects/programs to continue to address climate change impacts to The System.
- NYCDEP capital and expense budget projections for Fiscal Year (FY) 2024 satisfy the immediate needs for The System. This includes regulatory mandated projects, which comprise approximately 32.5% of the capital budget for FY 2024.
- NYCDEP capital budget projections for FY 2025 are currently under review for the mandated Hillview Reservoir Improvements project and its overall impact on the FY 2025 project funding. The contractor bids received for this project were significantly higher than the engineer’s estimate and the funding allocation. NYCDEP is performing further analysis of the construction bids and evaluating next steps to proceed with the Hillview Reservoir Improvements. Any necessary capital budget modifications are expected to be reflected in the Executive Budget to be released in April 2024. Currently, the regulatory mandated projects comprise approximately 52.4% of the capital budget for FY 2025. Expense budget projections for FY 2025 are currently being evaluated based upon the projected new needs of The System and may require adjustment when the evaluation is complete.
- NYCDEP capital planning is an ongoing iterative process addressing priorities and needs of The System. The NYCDEP capital planning is considered to be responsive to the long-term requirements of The System.
- Over the last year, the total number of vacancies has decreased by 294 due to increased hiring. Overall, there are 713 vacancies, and NYCDEP is at approximately 89% of approved allocations. NYCDEP continues to face significant staffing challenges due to high rates of attrition and slow hiring practices, and has been actively recruiting. NYCDEP is prioritizing staffing issues to fill vacancies and retain engineering and support staff to support capital program delivery. NYCDEP has aggressively been hiring operations staff at the in-city WRRFs this past year which has led to achieving full headcount for WRRF operations. Water treatment operations are also fully staffed.

Regarding System Management

In our opinion, The System continues to be managed in a professional and prudent manner with an appropriate regard for the level of service afforded to the users. The physical condition of The System receives an “adequate” rating. In our opinion, the NYCDEP facilities and infrastructure are in adequate condition. NYCDEP faces similar issues to many other large urban areas nationwide, such as aging infrastructure, strict regulatory requirements, staffing issues, and ongoing climate change resiliency

concerns. NYCDEP continues to successfully manage the overall operations of NYC's large and complex water and wastewater system, and prioritizes the most important projects and programs. Capital funding will need to be allocated to address the state of good repair of aging infrastructure in order to avoid emergency repairs and critical failure of essential processes. These needs will have to continue to be addressed and implemented in a systematic way. NYCDEP is taking a proactive approach, prioritizing its needs and spending (capital investment and operating expenses) where it will have the greatest impact on the water and wastewater system operations, reliability and redundancy, and to the water quality in the upstate watershed and the surrounding NYC waterways. Projects that address climate change impacts to The System and adaptation needs are in various stages of implementation (feasibility planning, design and construction) based upon sound cost-effective analysis and this process will need to continue as additional resiliency projects are identified. Prioritization of greatest need is a significant factor in moving forward with implementation of climate change resiliency. NYCDEP must remain diligent to make sure operational needs continue to be met while capital programs are identified and implemented in a timely manner. Because of the vast and extensive nature of the NYCDEP facilities and its aging infrastructure, continued diligence and future capital improvements will continue to be required in the near term and long term.

Regarding the Capital Improvement Program (CIP)

Projects/Programs that will require additional funding in future budgets include:

- *Precursor Mandated Hillview project:* The Hillview Reservoir Improvements (Chemical Additional facilities and other upgrades) may require additional funding in the Executive Budget pending the results of the NYCDEP ongoing analysis of the bids received in January.
- *SOGR:* As indicated throughout the report, significant additional funding in future budgets will be required for the continuation of SOGR projects due to the aging infrastructure throughout the wastewater and water system and to support critical infrastructure projects required for the safe and continuous operation of the water and wastewater systems. This is required in the near and long term.
- *FAD:* It is anticipated that additional funding will be identified for continued implementation of the FAD in 2027 for possibly another ten-year FAD.
- *Climate Change Adaptation, Resiliency, Energy Carbon Neutrality, and Sustainability Projects:* NYCDEP is seeking supplemental funding mechanisms for climate change resiliency and energy carbon neutrality projects. There may be a need in the future for additional NYCDEP funding to pursue these projects. This might result in an incremental cost added to some SOGR projects or entirely new projects. Additional funding needs will continue to be identified in future budgeting cycles.
- *Combined Sewer Overflow (CSO) Program:* NYCDEP has submitted eleven Long Term Control Plans (LTCPs). Additional funding will continue to be required for implementation of the CSO projects that have been identified in the LTCPs in the future budget cycles beyond the ten-year horizon. Also, additional funding will be required for the continuation of the Green Infrastructure Program.
- *Hillview Cover:* Based upon the schedule and the results of the ongoing feasibility planning study required as part of the Hillview Consent Decree, significant funding will need to be added to future capital plans.

12.0 LIST OF ACRONYMS

ACCO	Agency Chief Contracting Officer
ACEC	American Council of Engineering Companies
ADG	Anaerobic Digester Gas
AMP	Asset Management Program
AMWA	Association of Metropolitan Water Agencies
ASCE	American Society of Civil Engineers
AUV	automated underwater vehicle
AWWA	American Water Works Association
BCR	Bureau of Coastal Resilience
BCS	Bureau of Customer Services
BEC	Bureau of Environmental Compliance
BEDC	Bureau of Engineering, Design, and Construction
BEPA	Bureau of Environmental Planning and Analysis
BIL	Bipartisan Infrastructure Law
BGD	billion gallons per day
BGY	billion gallons per year
BNR	Biological Nitrogen Removal
BPS	Bureau of Police and Security
BWS	Bureau of Water Supply
BWSO	Bureau of Water and Sewer Operations
BWT	Bureau of Wastewater Treatment
CAG	Community Advisory Group
Cat/Del UV	Catskill/Delaware Ultraviolet
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFO	Chief Financial Officer
CHP	Combined Heat and Power
CIP	Capital Improvement Program
CMMS	computerized maintenance management system
CMOM	Capacity, Management, Operations and Maintenance
COO	Chief Operating Officer
COVID-19	2019-Novel Coronavirus
CPP	Capital Project Program CPP
CRUC	Canadian Radium & Uranium Corporation
CSI	Collection Systems Investigations
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DAF	Dissolved Air Flotation
DCAS	Department of Citywide Administrative Services
DOHMH	Department of Health and Mental Hygiene
DRBC	Delaware River Basin Commission
ECM	Energy Conservation Measure
ECMP	Emerging Contaminant Monitoring Project
ECN	Energy Carbon Neutrality

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EDC	Economic Development Corporation
EIS	Environmental Impact Statement
ESCR	Eastside Coastal Resiliency
ePMIS	Enterprise Project Management Information System
EH&S	Environmental Health & Safety
FAD	Filtration Avoidance Determination
FDNY	New York City Fire Department
FEIS	Final Environmental Impact Statement
FEMA	Flood Emergency Management Agency
FFMP	Flexible Flow Management Program
FOG	fats, oils and grease
FY	Fiscal Year (NYCDEP Fiscal Year begins on July 1 and ends on June 30)
GAC	granular activated carbon
GHG	greenhouse gas
GI	Green Infrastructure
HDD	horizontal directional drilling
IHD	In-House Design
IJA	Infrastructure Investment and Jobs Act
IRA	Inflation Reduction Act
ISI	Institute for Sustainable Infrastructure
JOC	job order contracts
KEC	Kensico Eastview Connection
KPI	Key Performance Indicator
LCR	Lead and Copper Rule
LCRI	Lead and Copper Rule Improvements
LCRR	Lead and Copper Rule Revisions
LL	Local Law
LMCR	Lower Manhattan Coastal Resiliency
LSL	lead service line
LT2	Long Term 2 Enhanced Surface Water Treatment Rule
LTCPs	Long Term Control Plans
LTR	Long-Term Revisions
MCLs	Maximum Contaminant Levels
MDE	Macan Deve Engineers, DPC
mg/L	milligrams per liter
MGD	Million Gallons per Day
MOCEJ	Mayor's Office of Climate and Environmental Justice
MOR	Mayor's Office of Resiliency
MOU	Memorandums of Understanding
MS4	Municipal Separate Storm Sewer System
MSP	main sewage pump
MTA	Metropolitan Transportation Authority
MTBM	micro-tunnel boring machine
MW	megawatt

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M/V	Motor Vessel
NACWA	National Association of Clean Water Agencies
NDWAC	National Drinking Water Advisory Council
NOV	Notice of Violation
NPCC	New York City Panel on Climate Change
NRDC	Natural Resources Defense Council
NSC	National Safety Council
NTP	Notice to Proceed
NWS	National Weather Service
NYC	New York City
NYCDCP	New York City Department of City Planning
NYCDDC	New York City Department of Design and Construction
NYCDEP	New York City Department of Environmental Protection
NYCDOT	New York City Department of Transportation
NYCHA	New York City Housing Authority
NYPA	New York Power Authority
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OACE	Office of the Agency Chief Engineer
OERR	Office of Energy and Resource Recovery
OMB	Office of Management and Budget
OSI	Office of Strategy and Innovation
OST	Operation Support Tool
OTI	Office of Technology and Innovation
OTPS	Other than Personal Services
PARIS	Permitting and Review Information System
PDC	Public Design Commission
PFOA	perfluorooctanic acid
PFOS	perfluorooctanesulfonic acid
PFAS	per- and polyfluoroalkyl substances
PM/CM	preventive maintenance/corrective maintenance
PMF	probable maximum flood
PO ₄	orthophosphate
PPE	personal protective equipment
ppt	parts per trillion
PRP	Potential Responsible Party
PS	Personal Services
PVSC	Passaic Valley Sewage Commission
ROD	Record of Decision
ROV	remote operated vehicle
ROW	Right of Way
RWBT	Rondout-West Branch Tunnel
SBU	Sewer Backup

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SCADA	Supervisory Control and Data Acquisition
SIRR	Special Initiative for Rebuilding and Resiliency
SOGR	State of Good Repair
SPDES	State Pollutant Discharge Elimination System
SMLP	Storm Mitigation Loan Program
SRSA	Sustainable Rate Structure Analysis
SRF	State Revolving Fund
STW	Sewage Treatment Worker
SWMP	Stormwater Management Program
TBM	tunnel boring machine
TMDL	Total Maximum Daily Load
TN	total nitrogen
tpd	tons per day
TRC	Total Residual Chlorine
UCMR5	Fifth Unregulated Contaminant Monitoring Rule
UER	Upper East River
µg/L	micrograms/L
ULURP	Uniform Land Use Review Procedure
USACE	United States Army Corp of Engineers
USDOJ	United States Department of Justice
USGS	United States Geological Survey
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
WBE	Women Business Enterprise
WEF	Water Environment Federation
WM	Waste Management
WFP	Water Filtration Plant
WRRF	Wastewater Resource Recovery Facility
WWTP	Wastewater Treatment Plant
WUCA	Water Utility Climate Alliance

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