

A. INTRODUCTION

The visitors, residents, employees, and shoppers expected as a result of the proposed Brooklyn Bridge Park Project would create new demand for drinking water and wastewater treatment. In addition, the new and expanded uses would generate more solid waste and consume more energy. The potential effects on these municipal and private services are discussed in this chapter. Because there are existing uses on the project site, this analysis considers the difference between continued use of those buildings in the future without the proposed project and the expected development associated with the proposed Brooklyn Bridge Park.

Currently, about 19,000 gallons per day (gpd) of water are used on the project site. The proposed project is expected to generate net new water usage of about 850,000 gpd and net new wastewater flows of 640,000 gpd. Although the projected demand that would likely result from the development of Brooklyn Bridge Park would create new demand for water and wastewater treatment, the municipal services have adequate capacity to meet the increased demand. Therefore, no significant adverse impacts are expected to result to these services.

About 400 cubic feet per second (cfs) of stormwater are currently discharged from the project site into the East River during a rainstorm that occurs about once every 5 years. One of the goals of the project is to reduce the speed and volume of stormwater discharged from the site. Various methods of retention and reuse of stormwater, as well as the use of wetlands for natural filtration, are being investigated. Alone, the change from paved aprons on the uplands to grass and planted areas would substantially reduce the speed and volume of stormwater runoff into the East River.

The current uses on the proposed project site generate about 20 tons of solid waste per week. The proposed project would generate about 135 tons per week—the New York City Department of Sanitation (DSNY) would be responsible for about 28 tons per week and private carters would handle about 107 tons per week. This amount of solid waste is a small percentage of the about 27,000 tons per day of solid waste generated in New York City and would not impair the system's ability to collect and dispose of solid waste.

The proposed project would use about 241 million British Thermal Units (BTUs) of energy per year. Compared with the approximately 17.5 trillion BTUs of electricity consumed in New York City annually, this amount of consumption is small and would not have a significant adverse impact on the energy delivery system.

B. EXISTING CONDITIONS

WATER SUPPLY

New York City's water supply system is composed of three watersheds—the Croton, Delaware, and Catskill—and extends as far north as the Catskill Mountains. In 2003, the New York City

Brooklyn Bridge Park FEIS

Department of Environmental Protection (DEP) delivered approximately 1,093.7 million gallons of water per day (mgd) to the five boroughs and Westchester County. (The peak year was in 1979, when 1,512.4 mgd of water were consumed.) The 2003 consumption is equivalent to about 136 gallons per person per day. From these watersheds, water is carried to the city via a conveyance system made up of reservoirs, aqueducts, and tunnels extending as far as 125 miles north and west of the city. Within the city, a grid of water pipes distributes water to customers.

The Delaware and Catskill systems supply all five boroughs and typically deliver about 90 percent of the city's drinking water. These water systems collect water from watershed areas in the Catskill Mountains and deliver it to the Kensico Reservoir in Westchester County. This reservoir acts as the seasonal balancing reservoir. The New York City water systems use more water during the summer months than the upstate aqueducts can supply. Extra water is stored in Kensico Reservoir to meet the summer needs. From the Kensico Reservoir, water is sent to the Hillview Reservoir in Yonkers, which balances the daily fluctuations in water use. From there, water is delivered to the city via three tunnels, Tunnel Nos. 1, 2, and 3. Tunnel No. 1 carries water through the Bronx and Manhattan to Brooklyn; Tunnel No. 2 travels through the Bronx, Queens, Brooklyn, and then through the Richmond Tunnel to Staten Island; and Tunnel No. 3 goes through the Bronx and Manhattan, terminating in Queens.

A water transmission main, 24 inches in diameter, runs under Furman Street and turns to continue under Water Street. This transmission main feeds 8- and 12-inch water lines beneath the project site and the surrounding streets. These 8- and 12-inch water mains supply water to the project area. The water lines branch directly into Piers 1 through 6. North of Pier 1, the water lines are arranged in a grid system, which equalizes water pressure in an area and allows a section to be cut off for repair and maintenance without affecting users not directly connected to that section. There are currently no reported problems with the water distribution system's capacity, coverage, or pressure in the area.

The project site is currently occupied principally by warehousing, an office, a repair shop, a restaurant, a small events facility, and public uses. The existing water demand in the project site is estimated to be approximately 19,000 gpd. This estimate includes both domestic water use (sinks and toilets) and air conditioning during the summer. Domestic water use enters the sewer system, while water from air conditioning evaporates.

SANITARY SEWAGE

The project site is entirely within the service area of the Red Hook Water Pollution Control Plant (WPCP), which discharges treated wastewater flows (or effluent) into the East River. A New York State Pollutant Discharge Elimination System (SPDES) permit issued by the New York State Department of Environmental Conservation (DEC) regulates the effluent from this WPCP. The Red Hook WPCP is designed to treat a monthly flow of 60 mgd. The average actual monthly flow rate at the plant for the latest 12 months of records available (March 2004 through February 2005) is 30 mgd, which is one half of the plant's treatment capacity of 60 mgd (see Table 13-1).

Combined sewers that collect stormwater runoff (from roof and street drainage) and sanitary sewage serve the area surrounding the project site. On the piersheds and the aprons that front the piers, stormwater is collected in separate stormwater sewers and discharged directly into the East River. During dry weather, the combined sewer lines convey only sanitary sewage and carry it to the Red Hook WPCP. However, during and immediately after precipitation, (i.e., rain and

Table 13-1
Monthly Flows at Red Hook WPCP

Year	Month	Flow (mgd)
2004	March	31
	April	29
	May	30
	June	31
	July	29
	August	36
	September	33
	October	35
	November	28
	December	32
	January	32
	February	29
12-month average		30
Note:	Allowable flow 60 mgd.	
Source:	DEP.	

snow), the combined sewer lines convey both sanitary sewage and stormwater. The large volumes of stormwater exceed the capacity of the Red Hook WPCP. In those situations, the Red Hook WPCP treats its maximum volume of combined sewage, and the excess combined sewage overflows into the East River without treatment at controlled points known as regulators.

Nine outfalls discharge along the project site's waterfront. Regulator 13 is located at the foot of Atlantic Avenue, Regulator 14 is located by Pier 6, Regulator 15 is located by Pier 4, and Regulator 16 is located by Pier 1. These regulators serve Furman Street and the Brooklyn-Queens Expressway. Regulator 17 is located at Fulton Ferry and serves about one half of Brooklyn Heights. Regulators 18 and 18A are located west of the Manhattan Bridge, and Regulators 19 and 19A are east of the Manhattan Bridge. These four regulators generally serve the area bounded by Adams Street on the west, Gold Street on the east and inland as far as Sands Street.

The existing uses in the project site generate approximately 15,000 gpd of sanitary sewage.

STORMWATER

Most of the precipitation that falls onto the piers and aprons is discharged directly into the East River without entering the combined sewer system. All of the precipitation that falls on the piers flows off the sides of the piers and into the East River. The aprons, or upland areas that serve the piers, are drained by storm sewers that discharge directly into the East River. The precipitation that falls on Furman Street enters the combined sewer system; this includes precipitation that drains from the overhanging Brooklyn-Queens Expressway. The streets north of the Brooklyn Bridge are served by combined sewers, but Empire Stores, Empire Fulton Ferry State Park, Main Street Park, and the existing DEP site do not drain into the city system.

The area of the proposed Brooklyn Bridge Park is approximately 85 acres. The design storm used by DEP is a rainfall intensity of 5.95 inches per hour. Given the area's development, the runoff coefficient is estimated to be about 0.85. The rational formula for calculating runoff is:

$$Q = C \times I \times A \text{ where}$$

Q is runoff in cubic feet per second (cfs);
C is the runoff coefficient;
I is the rainfall intensity in inches per hour; and
A is the area in acres.

The existing runoff from the project site is about 405 cfs. As discussed above, the runoff is primarily directed into the East River, and it does not enter the city sewer system.

SOLID WASTE

In New York City, residential and institutional refuse is handled by DSNY, while solid waste from commercial, retail, and manufacturing uses is collected by private carters. Since March 22, 2001, all DSNY handled solid waste has been disposed of at landfills outside of New York City. Waste materials are taken to transfer stations for sorting and transfer to larger trucks. From there, private carters take the materials to out-of-city landfills and waste-to-energy plants. In New York City fiscal year 2003 (ended June 30, 2003), DSNY handled about 4,991 tons per day of recyclables and about 12,057 tons per day of solid waste, for a total of about 17,048 tons per day.

Commercial carters pick up refuse from businesses, manufacturers, and offices and take the waste materials to transfer stations, where the recyclable materials are separated from the solid waste. The solid waste is consolidated into larger trucks for transport and disposal in landfills outside New York City. The recyclable materials are sold and transported to manufacturing facilities. Private carters are estimated to handle about 10,474 tons per day of recyclables and solid waste, not including construction debris and fill materials.

The existing activities in the project site are estimated to generate a total of about 40,000 pounds (20 tons) per week of solid waste and recyclables, and almost all of the solid waste is handled by private carters. Using an average truck load of 10 tons, carters need the equivalent of about two truck loads per week to handle these materials. However, because the current occupants probably use different carters, more truck trips with partial loads are required.

ENERGY

Consolidated Edison (Con Edison) delivers electricity to New York City and almost all of Westchester County. The electricity is generated by a number of independent power companies as well as Con Edison. Annual electric sales total nearly 50 billion kilowatt hours (KWH) of electricity supplied to Con Edison's delivery area (New York City and Westchester County). This is equivalent to about 170.75 trillion BTUs and does not include the energy content in the natural gas and other energy sources used in New York City. Current energy use in the project area is minimal.

C. THE FUTURE WITHOUT THE PROPOSED PROJECT

The DEIS conservatively assumes that minimal growth and development within the project site will occur in the future without the proposed park by 2012. Alternatively, if there were other development plans for the project area, infrastructure demands would increase beyond those currently at the site.

WATER SUPPLY

In the future without the proposed project, conditions for overall water supply to New York City are not expected to change significantly. The city has initiated a comprehensive water conservation program that seeks to reduce water use by implementing a metering program and requiring that all new fixtures in the city, including those in existing and new structures, be of low-flow design (Local Law No. 29, 1989). Other measures—including leak detection programs, water meters, and locking fire hydrant caps—are aimed at further reducing the city's water needs and will serve to reduce water demand and flows to sewage facilities. As demonstrated by the reduction in both total water consumption and per capita consumption, the water conservation program has been successful. DEP projects that over the next decade, the savings from these conservation measures will exceed any increase in water demand from consumers.

In addition, Stage 2 of water supply Tunnel No. 3 is now under construction in Queens and Brooklyn. When Tunnel No. 3 is complete, it will enhance and improve the adequacy and dependability of the entire water supply system and improve service and pressure to outlying areas of the city. It will also allow DEP to inspect and repair Tunnel Nos. 1 and 2 for the first time since they were activated.

SANITARY SEWAGE

Without the proposed project, little increase in sewage flows is expected from the project site by 2012. DEP expects the Red Hook WPCP to remain within its SPDES permit limits. In 1997, DEP developed two flow projections (high end and low end) for each of its WPCPs. Experience has shown that the low-end projections have been fairly accurate. In 2010, the projected flow at the Red Hook WPCP would be about 40 mgd. This projection subsumes all expected development and growth within the Red Hook service area.

STORMWATER

The stormwater collection system is not expected to change without the development of Brooklyn Bridge Park.

SOLID WASTE

New York City adopted a Comprehensive Solid Waste Management Plan (SWMP) in August 1992, and the implementation of the plan was altered slightly in May 1993 to gain approval from the DEC. It has since been updated to reflect changing conditions. In order to close the Fresh Kills landfill, New York City developed interim plans to export all the municipal waste that it collects. A long-term plan was developed that led to large-scale trucking of municipal solid waste. A new SWMP was released in October 2004 with a focus on municipal solid waste. The Final Environmental Impact Statement for the new SWMP was released on April 1, 2005. The new SWMP adheres to two main principles: (1) containerization of waste and (2) long distance export of that waste by barge or rail. Under the new SWMP, DSNY will take solid waste from the Brooklyn Bridge Park area to the converted Hamilton Avenue Marine Transfer Station. There, waste would be containerized and transported by barge for disposal. Recyclable materials are expected to be taken to a sorting plant in the Sunset Park section of Brooklyn where after sorting, the materials would be sold.

Under the new SWMP, the methods of handling commercial solid waste are not expected to change significantly from current methods. In March 2004, DSNY published the Commercial

Brooklyn Bridge Park FEIS

Waste Management Study (CWMS). Local Law 74 of 2000 required the preparation of the CWMS. The purpose is to: (1) address the siting and operations of private transfer station and waste collection operations, (2) determine future demand for commercial transfer capacity, and (3) facilitate a transition from the current mode of truck-based export to export by barge and/or rail. The study found that basic system of private carters collecting and disposing of waste from commercial facilities is expected to remain unchanged. Overall, the major change to solid waste collection systems serving New York City is greater reliance on private carters to transport and dispose of DSNY-handled waste outside New York City. Municipal waste and privately handled waste will continue to be shipped to licensed landfills outside New York City. Recyclables are expected to be sorted and sold.

Within the project site, little development is expected without Brooklyn Bridge Park. Therefore, the volume of solid waste will likely remain at or about current levels.

ENERGY

The demand for electricity is expected to increase about 1.5 percent per year in New York City. To meet that demand, a number of power plant construction projects are planned or are currently underway. In addition, a number of electric transmission projects are proposed to bring electric power from outside New York City into the city. While not all of the projects will likely be constructed, sufficient additional generating capacity is expected to be built to meet New York City's projected future energy demand.

D. THE FUTURE WITH THE PROPOSED PROJECT

Table 13-2 presents the expected water demand from the Brooklyn Bridge Park project.

**Table 13-2
Expected Water Demand with the Proposed Project**

Use	Number of Units	Unit Rate (gpd)	Domestic Demand (gpd)	Air Conditioning Rate (gpd)	Air Conditioning Demand (gpd)	Total Demand (gpd)
Hotel	225 rooms	300 per room	67,500	0.17 sq ft	9,520	77,020
Restaurant	86,398 sq ft	10 per meal	172,800	0.17 sq ft	14,700	187,500
Residential	1,210 units	235 per unit	284,350	0.10 sq ft	133,400	417,750
Retail	151,200 sq ft	0.17 per sq ft	25,700	0.17 sq ft	25,700	51,400
Office	36,000 sq ft	25 per worker	3,600	0.10 sq ft	3,600	7,200
Active covered recreation uses	113,000 sq ft	5 per user	22,600	0.0 sq ft	0	22,600
Open space	75.4 acres	5 per visitor	52,780	0.0 sq ft	0	52,780
Marina	185 slips	50 per slip	9,250	0.0 sq ft	0	9,250
Other building space	128,000 sq ft	0.17 per sq ft	21,760	0.17 sq ft	21,760	43,520
Total	N/A	N/A	660,340	N/A	208,680	869,020

Notes:

Rates generally from the 2001 CEQR Technical Manual.

Residential uses: 2.1 residents per residential unit.

Restaurant uses: 1 restaurant seat per 10 square feet and 2 meals per day per seat.

Office uses: 250 square feet of office space per employee.

Active recreational uses: 25 square feet per participant and viewer.

Open space uses: 140 visitors per acre on a peak weekend day.

WATER SUPPLY

The anticipated water demand is estimated at approximately 869,000 gpd of water (of which, about 850,000 gpd is new demand), which would be a nominal increase to the city's current water demand. This minor increase in demand would not be large enough to significantly impact the water supply system's ability to deliver water reliably, and demand for water is not expected to affect local water pressure.

SANITARY SEWAGE

Sanitary sewage generation is conservatively assumed to be equal to the domestic water demand. The water used by air conditioning evaporates and does not enter the sewer system. Therefore, the new additional flow with the proposed project would be about 640,600 gpd. This volume is about 1.1 percent of the permitted flow. The additional sanitary sewage expected to result from the proposed project would not cause the Red Hook WPCP to exceed its design capacity or SPDES permit flow limit. Therefore, sewage generated from the proposed project would not cause any significant adverse impacts to infrastructure systems.

STORMWATER

The goal of the proposed project is to retain and treat the majority of stormwater on site and to minimize discharges from Brooklyn Bridge Park to the East River and to the City's combined sewer system. Through various management techniques, little, if any, stormwater would be discharged into the city's combined sewer system. The management techniques would include capture and storage of the water for reuse, managed wetlands, detention and retention ponds, adding pervious surfaces, and natural and manufactured filtration systems.

The Brooklyn Bridge Park Development Corporation (BBPDC) has estimated that it may need about 30,000,000 gallons per year for irrigation of the lawns and plantings. Some or all of this volume of water could be captured during a rainstorm and stored for later use. The water storage system could be accommodated within the proposed upland earthforms and other areas. Other potential uses for captured rain water would include washing of sidewalks, park fixtures, boats in the marina, and other outdoor facilities.

Stormwater would be diverted into wetlands and swales for natural filtration and treatment. Several wetlands, shallow water habitats, and natural areas are currently planned for the park, and these would serve to retain the stormwater on-site prior to reuse, infiltration into the ground, or discharge into the East River. On the piers, lightweight filtering media could be used to treat the stormwater before it is reused or released into the East River. On the land areas, the pervious area would increase from the conversion of the paved area between the piers and Furman Street. Where feasible in the park area, pervious pavement would be used for the "hardscaped" areas, such as walkways and paths.

It is anticipated that the proposed project would maintain the City's existing stormwater system and connections along Furman Street, the Brooklyn-Queens Expressway and adjacent roadways. The stormwater is currently collected in the City's combined sewers and discharged for conveyance either to the Red Hook WPCP or to the East River through outfalls located within Brooklyn Bridge Park.

Nine existing DEP outfalls are located between Jay Street and Atlantic Avenue. Modifications to the existing grades and proposed park uses may lead to the relocation of existing outfalls or to

Brooklyn Bridge Park FEIS

the construction of new stormwater outfalls. If new stormwater outfalls are required, they would be located at one or more of the following positions:

- Empire Fulton Ferry State Park;
- Southern end of Pier 1;
- Foot of Pier 2;
- Foot of Pier 3;
- Foot of Pier 4; and
- Foot of Pier 5.

Stormwater that could not be managed by surface runoff or held in the storage containers would be conveyed to the existing outfalls or the new outfalls, if they are required. The connections would be on the East River side of the existing regulators, so that the stormwater from Brooklyn Bridge Park would not contribute to combined sewage overflows. The new outfalls would be for stormwater only and would not handle sanitary sewage. Therefore, the stormwater system for Brooklyn Bridge Park would lessen the volume of combined sewage that is conveyed to Red Hook WPCP during storms.

The change from the existing paved aprons of the piers and along the upland areas to landscaped lawns and open space would reduce the runoff coefficient, and thereby lower both the volume of stormwater discharged into the East River and the rate at which it is discharged. Therefore, the existing rate of about 400 cfs would be lessened. In addition, some stormwater that enters the city's combined sewer system would be diverted. The stormwater from the proposed project would not have a significant adverse impact on the East River or on the city's combined sewer system.

SOLID WASTE

As shown in Table 13-3, solid waste generated from the proposed project is estimated to total 268,500 pounds (about 134 tons) per week. Of that total, about 214,000 pounds per week (about 107 tons per week) would be handled by private carters, and about 55,000 pounds per week (about 27.5 tons per week) would be handled by DSNY. If 10 tons of solid waste per trash truck were transported, private carters would make about 14 truck trips per week, and DSNY about three truck trips per week. Compared with the 17,000 tons per day that DSNY handles and the 10,000 tons per day that private carters handle, this amount of solid waste would be minimal. The increase is not expected to overburden New York City's solid waste handling services, and the proposed project would not have a significant adverse impact on solid waste and sanitation services.

Table 13-3
Expected Solid Waste Generation with the Proposed Project

Use	Number of Units	Unit Rate (lb/wk)	Private Carters (lb/wk)	DSNY (lb/wk)	Solid Waste (lb/wk)
Hotel	75 employees	75 per employee	5,625	—	5,625
Restaurant	605 employees	284 per employee	171,820	—	171,820
Residential	1,210 units	41 per unit	—	49,610	—
Retail	424 employees	79 per employee	33,496	—	—
Office	144 employees	13 per employee	1,872	—	—
Park space	128 employees	10 per employee	—	1,280	—
Other building space	128,000 sq ft	0.03 per sq ft	—	3,840	—
Marina	185 slips	5 per slip	925	—	—
Total	N/A	N/A	213,738	54,730	268,468

Note: Rates generally from the 2001 CEQR Technical Manual.

ENERGY

POTENTIAL ENERGY SAVINGS MEASURES

The New York State Conservation Construction Code requires buildings to be energy efficient. Executive Order 111 requires even more stringent measures be taken to ensure that New York State government buildings to be energy efficient. New York State government buildings are required to achieve a 20 percent improvement over the requirements of the Construction Code, and renovated buildings are required to be 10 percent more efficient. The measures to achieve the required energy efficiency would include the building's mechanical, electrical, and plumbingsystems. In addition, operational requirements would extend to the use of recycled materials, reduction in quantity of waste generated in the construction project, and enhancement of indoor air quality. No final determination has been made as to which measures would be implemented. Some of the green elements currently being considered are:

- Use of façade glazing and curtain wall design optimized for energy conservation;
- Daylighting and glare prevention;
- Daylight dimming systems for all exterior offices;
- Occupancy sensors for all spaces, including the fire stairs;
- Fuel cells to back up electrical power generation;
- DOE-2 energy modeling to optimize all systems; and
- Digital controls to regulate all energy and air delivery systems.

Executive Order 111 also requires that New York State agencies obtain at least 10 percent of their energy from renewable sources through 2009. By 2010, at least 20 percent of the energy must come from renewable sources. The goal of BBPDC is to far exceed these goals, through the on-site use of photovoltaic systems. Investigations have been undertaken for photovoltaic systems. The piershed roofs would be able to support an array of the solar cells.

PROBABLE IMPACTS OF THE PROPOSED ACTIONS ON ENERGY

Table 13-4 shows the expected energy demand, conservatively based on meeting just the requirements of the New York State Conservation Construction Code, which governs performance requirements of heating, ventilation, and air conditioning systems, as well as the exterior building envelope of new buildings. It is expected that the proposed project would meet the requirements of Executive Order 111, and be more energy efficient than shown by this analysis. The additional consumption of about 241,050 million BTUs per year would be very small, compared with the existing energy demands of New York City. Further, this additional demand is not expected to overburden the energy generation, transmission, and distribution system and would not cause a significant adverse energy impact.

Table 13-4
Expected Energy Usage with the Proposed Project

Use	Square Feet	Unit Rate (BTU/Sq Ft/Yr)	Energy Consumed (BTU/Yr)
Hotel/residential	1,401,513	145,500	203,920,141,500
Restaurant	86,398	113,800	9,832,092,400
Enclosed public space	254,400	65,300	16,612,320,000
Retail	151,200	55,800	<u>8,436,960,000</u>
Office	36,000	77,900	2,804,400,000
Total	N/A	N/A	241,605,913,900

Note: Rates from the 2001 CEQR Technical Manual.

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