

A. INTRODUCTION

This chapter analyzes the potential impacts of the Proposed Actions on the infrastructure systems of New York City. As defined by the *City Environmental Quality Review (CEQR) Technical Manual*, the City’s “infrastructure” comprises the physical systems supporting its population, including water supply, wastewater treatment, and stormwater management. Other infrastructure components, such as solid waste management, energy, and transportation, are addressed separately under CEQR and are assessed in separate chapters of this Environmental Impact Statement (EIS).

The addition of workers and residents to the project area as a result of the Proposed Actions would create new demands for drinking water and wastewater treatment. The potential effects on those municipal services are discussed in this chapter.

PRINCIPAL CONCLUSIONS

The incremental demand for water supply from the Proposed Actions would not adversely affect the ability of the existing system to distribute water to, or maintain water pressure for, local users. Further, the increase in sanitary sewage and stormwater discharge would not cause the North River Water Pollution Control Plant to exceed its permitted flow limit. Finally, the stormwater generated by the Proposed Actions would not result in a significant adverse impact on the combined sewer system or the Hudson or East Rivers. Therefore, implementation of the Proposed Actions would not result in significant adverse impacts on the city’s water supply, sewage treatment, and stormwater discharge systems.

B. METHODOLOGY**WATER SUPPLY**

The Proposed Actions were evaluated to determine whether the generated water demand would overburden the existing supply system, or require a reconfiguration of or modification to the water supply infrastructure. The City has initiated a comprehensive water conservation program with the objective of reducing water use by implementing water metering programs and by requiring that existing and new structures be designed on the basis of low-flow criteria (Local Law No. 29, 1989). Additional measures, including leak detection programs and locking fire hydrants, are also intended to reduce water demand, as are plans by the New York City Department of Environmental Protection (DEP) to meter water usage in all buildings. The *CEQR Technical Manual* provides water usage rates that do not include the effects of these water conservation measures, which results in a conservative water consumption analysis.

SANITARY SEWAGE AND STORMWATER TREATMENT

The Project Site’s sanitary sewage is served by the North River Water Pollution Control Plants (WPCP). Consistent with *CEQR Technical Manual* guidance, the amount of sanitary sewage

from the Project Site to be treated at the North River WPCP is assumed to be equal to the projected volume of potable water demand for the Proposed Actions. Wastewater generated from air conditioning use is minimal because of the recirculation and evaporation processes of water cooling systems and is therefore not included in the overall sanitary sewage volumes. The analysis includes an evaluation of whether the increased volume of sanitary sewage flows from the Project Site to the North River WPCP would be within the limits of its New York State Department of Environmental Conservation (DEC) State Pollutant Discharge Elimination System (SPDES) permit. A significant adverse impact would occur if the Proposed Actions would result in a volume of sanitary sewage that exceeds the limits of the SPDES permit.

C. EXISTING CONDITIONS

WATER SUPPLY

NEW YORK CITY

New York City's water supply system is composed of three watersheds—Croton, Delaware, and Catskill—and extends as far north as the Catskill Mountains. New York City water systems provide approximately 1.1 billion gallons per day (gpd) to the five boroughs, as well as to Westchester, Putnam, Ulster, and Orange Counties. 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 of the City. Within the City, a grid of water pipes distributes water to customers. The Croton system supplies an average of 22 million gallons per day (mgd), primarily to users in the lower-elevation portions of Manhattan and the Bronx. Groundwater from the Brooklyn Queens Aquifer supplies about 2 mgd, less than 1 percent of the average daily supply.

The Delaware and Catskill systems supply all five boroughs and deliver about 98 percent of the City's drinking water. The Delaware and Catskill 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 seasonally balancing reservoir. Summer demand is usually greater than winter demand. From the Kensico Reservoir, water is sent to the Hillview Reservoir in Yonkers, which balances the daily fluctuations in water demand and pressure to the system. From there, water is delivered to the City through 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, and Brooklyn, and then through the Richmond Tunnel to Staten Island; and Tunnel No. 3 goes through the Bronx and Manhattan, terminating in Queens.

Average daily water consumption in Manhattan, with 2006 population estimate of 1,611,581¹, is estimated at about 215 mgd², and the average water pressure in the area surrounding the Project Site is estimated by the New York City Bureau of Water and Sewer Operations to be 40 to 60 pounds per square inch (psi). A pressure of 20 psi is the minimum water pressure acceptable for uninterrupted service and for the New York City Fire Department (FDNY)'s service requirements.

¹ Population of the Borough of Manhattan based on the Census Bureau's *Change in Population, Census Bureau and DCP Estimates (April 2000 to July 2006)*.

² The estimated water usage in the borough was calculated using a multiplier of 133.5 gpd/person.

PROJECT SITE

The Project Site is located in the Clinton neighborhood of Community District 4 in Manhattan. The site comprises most of the block bounded by West 44th Street to the south, Eleventh Avenue to the west, West 45th Street to the north, and Tenth Avenue to the east.

The trunk mains that would serve the Project Site run 45th Street, 44th Street, 10th Avenue, and 11th Avenue with the exception of the location of the rail cut. Individual smaller mains branch out from the trunk mains to provide water sources to buildings and fire hydrants.

The Project Site currently contains a 300-space parking lot, a private parking lot, a vacant warehouse, a school, and a horse stable. The entire Project Site is owned by the City of New York. For purposes of this report, it is assumed that the existing parking lot and vacant warehouse do not produce demands on the existing water supply, nor do they generate sewage. Water and sewage generations rates from *770 Eleventh Avenue Mixed-Use Development Rezoning Final Environmental Impact Statement* (CEQR No. 07DCP071M, March 2009), which is also located in Clinton and includes a proposed stable for the New York City Police Department, were used for the horse stables currently located on the Project Site. Based on recommended CEQR rates for water consumption (see **Table 12-1**), the Project Site currently consumes an estimated 15,276 gpd.

Table 12-1
Existing Water Usage and Sewage Generation

Use	Rate ¹	Area (sf)	Water Consumption and Sewage Generation (gpd)	Air Conditioning (gpd) ¹
Horse Stables ³	Domestic: 0.17 gpd/sf Air conditioning: 0.17 gpd/sf	10,000	3,400	1,700
Public School ²	Domestic: 0.17 gpd/sf Air conditioning: 0.17 gpd/sf	29,930	5,088	5,088
Subtotals:			8,488	6,788
Total Water Consumption:			15,276	
Notes:				
1 Usage and generation rates from the <i>CEQR Technical Manual</i> .				
2 Usage and generation rates for public use were used as a conservative estimate for the school on the site.				
3. <i>770 Eleventh Avenue Mixed-Use Development Rezoning Final Environmental Impact Statement</i> (CEQR No. 07DCP071M, March 2009)				

WATER CONSERVATION

During the 1990s, the City's various WPCPs came under increased scrutiny from federal and state agencies, primarily because the plants exceeded the dry weather flow allowed in their respective SPDES permits. As a result, the City instituted a variety of water conservation measures intended to reduce dry weather flow to these facilities. For example, fire hydrants were equipped with locks to prevent illegal use. In addition, all new plumbing fixtures in the City, including replacements in existing structures and new fixtures in new structures are required to be of a low-flow design (Local Law No. 29, 1989). The City also implemented a metering program, installing water meters at thousands of properties where water fees had previously been based on property frontage rather than actual consumption. This metering provided a new financial incentive for consumers to conserve. The City also implemented leak detection programs to identify and repair leaks in the water distribution system.

The programs above have, on the whole, been successful in that they have reduced water demand and the load on the City's WPCPs. At many WPCPs, this reduction has been on the

order of several million gallons per day. DEP projects that savings from the continued implementation of these conservation measures over the next decade would exceed any increase in water demand from consumers.

SANITARY SEWAGE AND STORMWATER TREATMENT

Most sanitary sewage in the City is collected and conveyed through a combined sewer system operated and maintained by DEP. This system receives sanitary sewage from residences, businesses, and municipal buildings, as well as stormwater accumulated in catch basins along the streets, and the combined flow is sent for treatment at one of the City's WPCPs.

The Project Site is entirely within the service area of DEP's North River WPCP. The North River WPCP is located on the Hudson River, west of the West Side Highway from 137th Street to 145th Street. The plant provides wastewater treatment for the hundreds of thousands of people who live and work in or visit the west side of Manhattan, from Bank Street in Greenwich Village to Inwood Hill at the island's northern tip. North River treats about 125 million gallons of wastewater every day during dry weather, and it is designed to handle up to 340 million gallons a day when the weather is wet.

A SPDES permit issued by DEC regulates the quality and the quantity of effluent from this WPCP for the purposes of protecting the water quality of the Hudson River and regional water quality as a whole. The North River WPCP is currently designed and permitted to treat a monthly flow of 170 mgd. The rolling 12-month average monthly flow rate at the plant, as of October 2008, was 126 mgd, which is lower than the plant's design capacity (see **Table 12-2**).

Table 12-2

2007-2008 Average Monthly Dry Weather Flows at North River WPCP

Month	Average Monthly Flow (mgd)
October 2008	124
September 2008	134
August 2008	125
July 2008	126
June 2008	126
May 2008	123
April 2008	123
March 2008	129
February 2008	133
January 2008	122
December 2007	129
November 2007	122
Total 12-month average:	126
North River WPCP SPDES permit limit:	170
Source: New York City Department of Environmental Protection.	

The sewer system within the Project Site consists of combined sewers, regulators, and interceptors. Each trunk sewer feeds into the interceptor sewer through a regulator chamber that controls the flow from the trunk sewer to the interceptor. Generally, the wastewater within the Project Site flows north and eventually west towards the wastewater treatment plant. The purpose of a regulator is to divert sanitary flow from the existing combined sewers to the intercepting sewer during normal flow periods (dry weather), and limit the flow to the intercepting sewer to twice the dry weather flow during storm periods (wet weather). The existing tide gates placed on the combined sewer outfall (CSO) downstream of the regulators are

designed to keep tide water from entering the existing combined sewers and the intercepting sewer. Tide gates can either be part of the regulator structure or stand-alone chambers. In addition, outfalls are located at the end of roadways.

The Project Site's land area is predominantly covered by rooftops (buildings) and vacant lots with generally impervious surfaces. Therefore, absorption of stormwater is minimal, and stormwater runoff is instead collected in catch basins along the streets and channeled to the combined sewer system. A typical outfall has regulators that divert the wastewater flow to interceptor sewers, which deliver wastewater to the North River WPCP. The regulators are designed to allow two times the mean dry weather flow into the interceptor.

Consistent with *CEQR Technical Manual* guidance, the amount of sanitary sewage from the Project Site to be treated at the Newtown Creek WPCP is assumed to be equal to the volume of potable water demand for the Project Site. The current amount of sewage generated by the Project Site is estimated to be 9,488 gpd (see **Table 12-1**). This volume is included in the total average estimated combined monthly flow treated at the Newtown Creek WPCP.

D. THE FUTURE WITHOUT THE PROPOSED ACTIONS

In the Future without the Proposed Actions, no changes are anticipated to occur on the Project Site. Therefore, the Project Site is expected to consume the same amounts of domestic water and air conditioning that are currently being used. In the Future without the Proposed Actions, no reduction in the amount of impervious surfaces is anticipated.

According to DEP, wastewater flow and water demand for North River Creek will be approximately 126 mgd in 2015.

E. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

As described in Chapter 1, "Project Description," it is anticipated that new development on the Project Site would result in a total of up to 1,350 residential units, 17,500 gross square feet (gsf) of retail, and a 630-seat public school.

WATER SUPPLY

As shown in **Table 12-3**, in the Future with the Proposed Actions, total water usage on the Project Site would be an estimated 521,350 gpd, resulting in a net increase of approximately 506,074 gpd over anticipated water usage in the Future without the Proposed Actions. This resulting usage represents less than a one percent increase (0.002 percent) over the current water demand for Manhattan. Given the size of the city's water supply system and the city's commitment to maintaining adequate water supply and pressure, the Proposed Actions are not anticipated to result in a significant adverse impact on this system.

SANITARY SEWAGE AND STORMWATER TREATMENT

Sanitary sewage flows in the Future with the Proposed Actions at the Project Site would be approximately 311,481 gpd, a net increase of approximately 302,993 gpd from flows projected in the Future without the Proposed Actions. This increase would not result in a significant adverse impact to the North River WPCP nor cause it to exceed its design capacity or SPDES permit flow limit. Thus, the North River WPCP would continue to adequately treat wastewater effluent. It is noted that adding the growth from the Proposed Actions to the projected flows is conservative, since the DEP flow projections already take into account population and employment growth within the North River WPCP service area.

West 44th Street and Eleventh Avenue Rezoning

The Proposed Actions would result in an overall decrease in pervious area on the Project Site. Based on New York City Department of Environmental Protection guidance, stormwater runoff from the Project Site would increase by 5 percent (from a coefficient of 0.88 in the existing condition to a coefficient of 0.93 in the build condition), assuming no on-site retention. The Proposed Project would also result in an increase in sanitary sewer disposal. However, the proposed residential development on the Project Site would comply with stormwater retention requirements of the New York City Building Code, and it is anticipated that these measures would result in minimal or no increase in stormwater runoff as compared to existing conditions.

The Proposed Actions would not result in any significant adverse impacts to the combined sewer system, conveyance systems (i.e. regulators, outfalls) or the City's wastewater treatment services.

Table 12-3

Future With the Proposed Actions: Water Usage and Sewage Generation

Use	Rate ¹	No Build			Build		
		Area (sf)	Water Consumption and Sewage Generation (gpd)	Air Conditioning (gpd)	Area (sf)	Water Consumption and Sewage Generation (gpd)	Air Conditioning (gpd)
Residential	Domestic: 112 gpd/person ² Air conditioning: 0.17 gpd/sf	0	0	0	1,119,177	291,872	190,260
Retail	Domestic: 0.17 gpd/sf Air conditioning: 0.17 gpd/sf	0	0	0	17,500	2,975	2,975
Public School	Domestic: 0.17 gpd/sf Air conditioning: 0.17 gpd/sf	29,930	5,088	5,088	97,850	16,634	16,634
Horse Stable	Domestic: 0.17 gpd/sf Air conditioning: 0.17 gpd/sf	10,000	3,400	1,700	0	0	0
Subtotals:		39,930	8,488	6,788	1,234,527	311,481	209,869
Total Water Consumption:		15,276			521,350		
Notes:							
1 Usage and generation rates from the <i>CEQR Technical Manual</i> .							
2 Assumes 2,606 new residents.							

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