

A. INTRODUCTION

The *City Environmental Quality Review (CEQR) Technical Manual* outlines the following guidelines for the infrastructure assessment:

- *Water Supply.* An analysis of an action's impact on the New York City water supply system should be conducted only for actions that would have exceptionally large demand for water, such as power plants, very large cooling systems, or large developments (e.g., those that use more than 1 million gallons per day [GPD]). In addition, actions located at the extremities of the water distribution system should be analyzed.
- *Sanitary Sewage and Wastewater Disposal.* Because the City is committed to adequately treating all wastewater generated in the city and to maintaining its wastewater treatment plants at or below the capacity permitted by applicable state and federal permits, orders, and decrees, only unusual actions with very large flows could have the potential for significant impacts on sewage treatment.

Because the Proposed Project would not trigger any of the CEQR thresholds, this chapter discloses the Proposed Project's water demands and wastewater generation. In addition, this chapter discusses the stormwater management practices to be used within the Project Site. The assessment concludes that the Proposed Action would not result in significant adverse impacts on infrastructure.

B. METHODOLOGY

Infrastructure demands for the project have been analyzed according to the 2001 *CEQR Technical Manual*. The following methodology for analysis of water demand and sewage generation will be used:

- Describe the existing water supply network currently serving the Project Site and, using water demand rates from the *CEQR Technical Manual*, determine the Proposed Action's incremental increase in water demand for the two analysis years in order to assess the impacts of this incremental demand on the city's water supply and conveyance system.
- Provide data on the existing sewer lines serving the Project Site; provide data on the existing flows to the 26th Ward Water Pollution Control Plant (WPCP) for the latest 12-month period; estimate sanitary sewage generation for both analysis years in the future without the Proposed Action and then add to that the Proposed Action's projected water-consumption demand; and, assess the Proposed Action's effects on the local sewer system and operations at the 26th Ward WPCP.
- Describe any modifications to the stormwater collection system and the baseline stormwater runoff conditions, including the stormwater management strategies of the Proposed Action

as well as capital projects proposed by the City, and assess project impacts on stormwater runoff patterns and local sewers for both analysis years.

Rates used to calculate water demand and sewage generation were taken from the *CEQR Technical Manual*, and are as follows:

Table 13-1
Water Demand and Sanitary Sewage Generation Rates

	Use	Rate/Per
Water Demand	Residential	112 GPD/Person
	Retail (Domestic)	0.17 GPD/sf
	Retail (Air Conditioning)	0.17 GPD/sf
	Office (Domestic)	25 GPD/person
	Office (Air Conditioning)	0.10 GPD/sf
	Schools/Community Facility (Domestic)	30 GPD/seat
	Schools/Community Facility (Air Conditioning)	0.10 GPD/sf
Sanitary Sewage Generation	Residential	112 GPD/Person
	Retail	0.17 GPD/sf
	Office	25 GPD/person
	Schools/Community Facility	30 GPD/seat
Source: <i>CEQR Technical Manual</i> (2001)		

C. EXISTING CONDITIONS

WATER SUPPLY

New York City draws water from three watersheds and a network of reservoirs, aqueducts, and tunnels extending as far as 125 miles north of the city. Within the city, a grid of mains distributes water to individual buildings. The New York City Department of Environmental Protection (DEP) operates the water supply system and the sewer system.

The Delaware and Catskill systems collect water from the Catskill Mountains and deliver it to Kensico Reservoir in Westchester County and then to the Hillview Reservoir in Yonkers. The Croton system collects water from Westchester and Putnam Counties and delivers it to the Jerome Park Reservoir in the Bronx. From there, it is distributed to the Bronx and Manhattan through the New Croton Aqueduct, which travels beneath the Bronx and Manhattan. The Croton system has lower pressure than the Delaware and Catskill systems and supplies domestic uses primarily in the lower elevations of Manhattan and the Bronx. The higher-pressure Delaware and Catskill systems serve all five boroughs and higher elevations where the water pressure of the Croton system would be inadequate. Of the three systems, the Croton watershed supplies an average of 10 percent of the city’s water, primarily to users in the lower elevation portions of Manhattan and the Bronx. The Delaware and Catskill systems supply all five boroughs and typically deliver about 90 percent of the city’s drinking water.

Water is distributed to the city through three tunnels: City Tunnel Number 1 through the Bronx and Manhattan to Brooklyn, and City Tunnel Number 2 through the Bronx, Queens, and

Brooklyn. A third tunnel, City Tunnel Number 3, is under construction and the first portion became operational in August 1999.

The Project Site and adjoining streets currently have a scattered grid of water distribution mains. For the east/west streets, the existing water mains are as follows:

- A 20-inch and a 12-inch water main run under Flatlands Avenue. From a spur on the 20-inch main, two 12-inch mains run under Vandalia Avenue to Fountain Avenue. A 12-inch main under Fountain Avenue, Gateway Drive, Seaview Avenue, and Erskine Street forms a grid around the Project Site. A 12-inch internal water main runs along the north side (rear) and an 8-inch internal water main runs along the south side (front) of the existing Gateway Center. Both of these mains are connected on the east and west to the 12-inch main in Gateway Drive and Erskine Street and were constructed in 2002.
- Several water mains are presently under construction in the northern portion of the Project Site as part of the Nehemiah housing development. These include a 20-inch main in Elton Street from Flatlands Avenue to Vandalia Avenue, a 12-inch main in Elton Street from Vandalia Avenue to Schroeders Avenue, an 8-inch main in Schroeders Avenue from Elton Street to Erskine Street, an 8-inch main in Essex Street from Flatlands Avenue to Schroeders Avenue, an 8-inch main in Egan Street from Elton Street to Essex Street, and an 8-inch main in Linwood Street from Flatlands Avenue to Egan Street. Finally, there are several water mains in the northern portion of the Project Site which are scheduled for construction this year. These comprise a 12-inch main in Erskine Street from Flatlands Avenue to Vandalia Avenue, an 8-inch main in Egan Street from Essex Street to Erskine Street, and an 8-inch main in Berriman Street from Schroeders Avenue to Vandalia Avenue.

SANITARY SEWAGE

The proposed development is located in the service area of the 26th Ward WPCP. The 26th Ward WPCP, like each of the city's WPCPs, is regulated through a State Pollution Discharge Elimination System (SPDES) permit issued by the New York State Department of Environmental Conservation (NYSDEC). The permits specify the maximum average monthly dry-weather flow in millions of gallons per day (GPD) (based on the quantity of wastewater that the plants can adequately treat), and such effluent parameters as the minimum percent (85 percent) of biological oxygen demand (BOD) that must be removed; the minimum percent of suspended solid loading that must be removed (also 85 percent), the maximum concentrations of suspended solids, fecal coliform, settleable solids, and other pollutants; and, the range of acceptable pH levels. The permits also stipulate monitoring requirements for the regulated parameters, as well as for odor control, and require infiltration/inflow assessments and correction programs if the plants reach a certain percent of their permitted capacity.

Performance statistics for the 26th Ward WPCP are shown in Table 13-2. The SPDES permit limit for flow at the 26th Ward WPCP is 85 million gallons per day (MGD), but the 12-month average dry weather flow is well below the permitted levels. In addition, the SPDES permit requires that a minimum of 85 percent of suspended solids and BOD be removed. The 26th Ward WPCP is within the SPDES permit limits.

Table 13-2
26th Ward WPCP Performance Statistics

Year	Month	Sanitary Sewage Flow (MGD)	Suspended Solids (Percent Removed)	Biological Oxygen Demand (Percent Removed)
2006	January	63	93%	96%
	February	54	93%	96%
	March	49	92%	96%
	April	53	91%	94%
	May	56	91%	95%
	June	65	89%	94%
	July	70	89%	92%
	August	70	89%	92%
	September	60	90%	93%
	October	56	94%	96%
	November	56	94%	96%
	December	51	92%	96%
2007	January	51	94%	96%
SPDES Permit Limit/Minimum		85	85%	85%
Sources: New York City Department of Environmental Protection				

Several sanitary sewer lines currently run under Flatlands Avenue, but they do not serve the site. An existing 60-inch sanitary interceptor sewer runs under Egan Street to the 26th Ward WPCP. This sanitary interceptor sewer receives sewage directly from the collection system and connects directly to the 26th Ward WPCP. No connections to buildings or houses are allowed into this interceptor sewer. An existing 18-inch sewer serving the Brooklyn Developmental Center and the Gateway Center runs under Erskine Street and connects to the 60-inch interceptor. Sanitary flows from the Brooklyn Developmental Center and the existing Gateway Center connect to this existing sanitary sewer. Existing sanitary sewer lines are also located in Vandalia Avenue between Erskine Street and Ashford Street, and near Walker Street.

In addition to these existing sanitary sewers there are numerous collector sewer lines which are currently under construction or scheduled for construction this year in the northern portion of the Project Site as part of the Nehemiah housing development. These sewers run in portions of Schroeders Avenue, Elton Street, Essex Street, Egan Street, Vandalia Avenue, Erskine Street, and Linwood Street.

STORMWATER

The Project Site is currently served by a storm sewer system generally located within the bed of Vandalia Avenue, Erskine Street, and Gateway Drive. West of Elton Street the storm sewers flow to the west and discharge into Hendrix Creek via an existing 60” storm sewer. East of Elton Street the storm sewers flow to the east to Fountain Avenue ultimately discharging to Spring Creek through a 78-inch outfall. Proposed storm sewers within the Project Site would connect to these existing sewers in accordance with the DEP Drainage Plan being amended as part of this project. The Project Site currently generates 157 cubic feet per second (CFS) of stormwater in a 2-year storm event, 227 CFS of stormwater in a 5-year storm event, and 343 CFS of stormwater in a 100-year storm event.

The area south of the Project Site (the existing Gateway Center) is served by existing storm sewers located within Gateway Drive and Erskine Street. Stormwater runoff from the rear service drive is treated in a mechanical treatment unit to remove pollutants, sediment, and floatables. The eastern portion of the service drive is conveyed via a 30-inch pipe to an existing 48-inch storm sewer in Erskine Street which flows to the south and ultimately discharges to Spring Creek. The western portion of the service drive is conveyed to an existing 48-inch storm sewer in Gateway Drive, which flows to the north and ultimately discharges to Hendrix Creek through a 66-inch pipe outfall. Building roof drains are connected to this rear system. The remainder of the site, which includes all of the parking lot south of the retail buildings, drains to a series of stormwater swales located adjacent to Gateway Drive. These swales provide detention of storm flows to allow pollutants and sediment to settle out prior to discharge into the sewers in Gateway Drive which discharge directly into Hendrix Creek or into constructed wetlands in the northern right-of-way of Shore Parkway (see Figure 13-1).

There is one combined sewer overflow (CSO) outfall at the northern end of Hendrix Creek connected to the 26th Ward WPCP. According to stormwater modeling prepared for the *Jamaica Plan Final Environmental Impact Statement* (FEIS; Department of City Planning, June 2007), it is estimated that CSO events in the 26th Ward WPCP drainage area result in an annual CSO flow of approximately 638 million gallons into Jamaica Bay.¹ However, because the Project Site is served by separate sanitary and storm sewers, storm flows from the site do not contribute to CSO events.

D. 2011 THE FUTURE WITHOUT THE PROPOSED ACTION

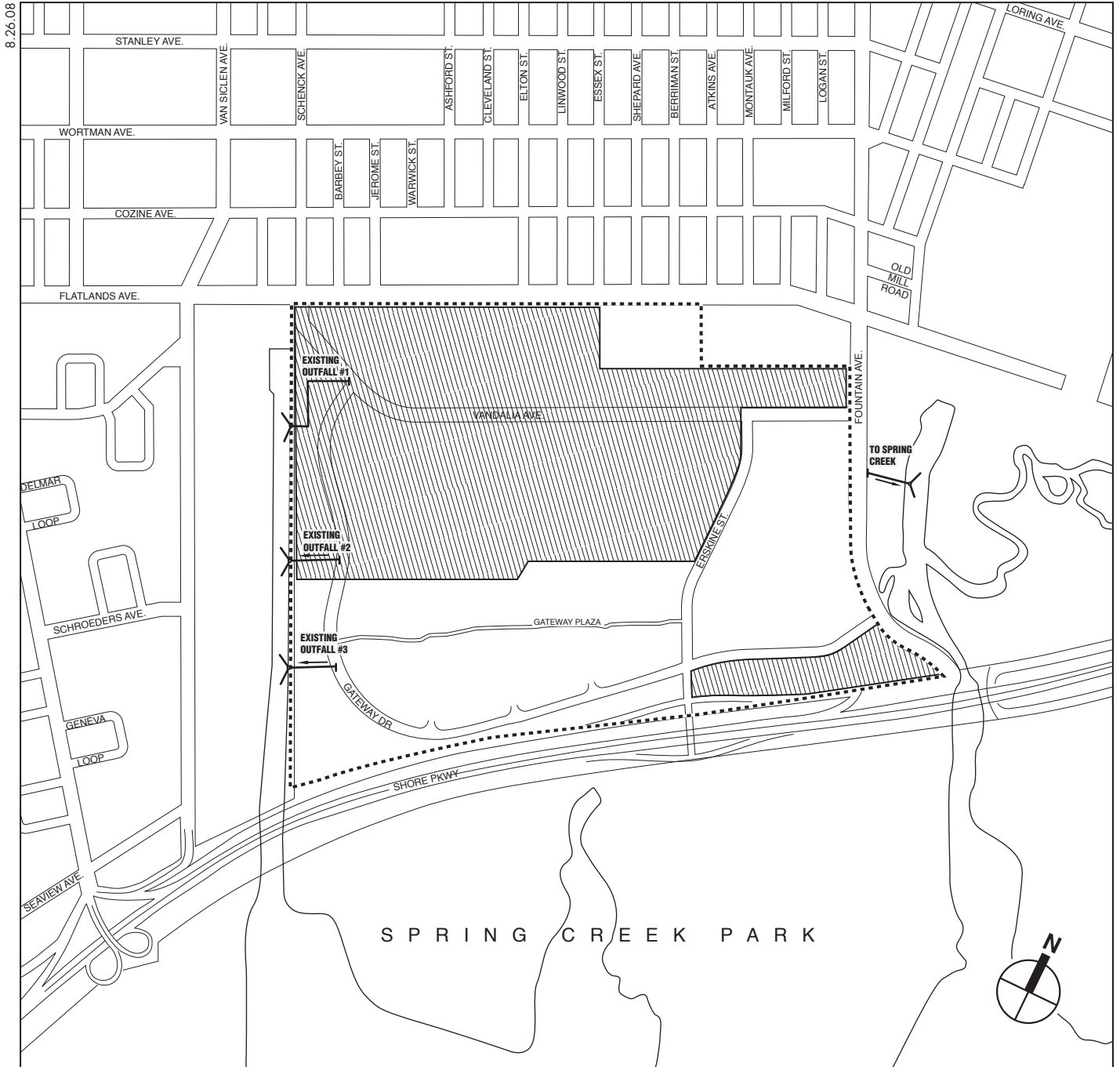
As was stated in Chapter 1, “Project Description,” by 2011, absent approval of the Proposed Action, Phases I and II of Nehemiah housing, which are currently under construction, will be completed, adding additional residents to the Project Site. The project study area will also realize an increase in retail use, with the construction of a shopping center at the intersection of Flatlands and Fountain Avenues, and three residential developments will be completed. These additional developments will increase demand on infrastructure in the project study area.




WATER SUPPLY

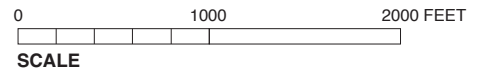
In 2011, in the future without the Proposed Action, New York City’s water supply system is not expected to change significantly. It is expected that the benefits of the City’s comprehensive water conservation programs, through metering and low-flow fixtures requirements (Local Law No. 29, 1989), will continue to be realized. These and other measures—including leak detection programs and locking fire hydrant caps—are aimed at reducing the city’s water needs and are expected to continue to further the City’s efforts to reduce flows to WPCP facilities. In addition, DEP’s routine maintenance and system upgrades of old water mains and other components of the water system will further benefit the city’s water distribution system.

Stage 2 of DEP’s water Tunnel Number 3 is now under construction in Manhattan, Queens, and Brooklyn. When complete, it will improve the adequacy and dependability of the entire water supply system as well as service and water pressure in outlying areas of the city. It will also

¹ Hydroqual Inc. *Technical Memorandum, Jamaica Plan FEIS, WPCP and CSO Impact Analysis*. Prepared for the NYC Department of City Planning, NYC Economic Development Corporation, and NYC Department of Environmental Protection. June 2007. Available online at http://ci.nyc.ny.us/html/dcp/pdf/env_review/jamaica/app_i_feis.pdf.



-  *Project Site*
-  *Fresh Creek Urban Renewal Area Boundary*
-  *Existing Outfall Stormwater*



allow DEP to inspect and repair Tunnels 1 and 2 for the first time since they were activated. It is projected that Tunnel 3 will be completed in its entirety by 2020. However, the Brooklyn segment is currently anticipated to be active in 2009.

In 2011, without the Proposed Action, water demand on the Project Site is expected to increase by 124,432 GPD. Other projects in the area around the Project Site will increase water usage by approximately 158,561 GPD, resulting in an increase of 282,993 GPD in the cumulative demand for water.

SANITARY SEWAGE

DEP's 2004-2013 Capital Program has over \$2 billion dollars set aside for consent decree upgrading; construction, plant upgrading, and reconstruction; and, plant component stabilization. DEP is in the process of upgrading certain components of the 26th Ward WPCP in order to make the plant consistent with the 2004 Consent Order with NYSDEC, but there are no plans to expand the capacity of the 26th Ward WPCP. By 2011, without the Proposed Action, sewage generation on the Project Site is expected to increase by 124,432 GPD; when other developments in the project study area are completed, total sewage generation will increase by 243,417 GPD.

STORMWATER

In 2011, without the Proposed Action, the storm sewer system is not expected to change significantly with the exception of the portion of the site from Schroeders Avenue north to Flatlands Avenue. This area will see the completion of Phases I and II of the Nehemiah housing development and with it a potential increase in stormwater discharges to Hendrix Creek and Spring Creek.

E. 2011 PROBABLE IMPACTS OF THE PROPOSED ACTION

As stated in Chapter 1, "Project Description," the Proposed Project would develop over 1,000 dwelling units and almost 700,000 square feet (sf) of retail uses by 2011. The Proposed Project would also include the construction of additional infrastructure, including sewer and water lines and other capital investments required to provide services to the Project Site.

WATER SUPPLY

As part of the Proposed Project, water lines would be installed under new city streets. The water lines would be designed and built to meet DEP requirements, and would become the responsibility of DEP after their completion.

Internal ductile iron pipe (DIP) water lines would also be installed on the proposed retail center portion of the site to provide domestic and fire protection water service. These water lines would be located in the front and rear of the retail center and would connect to existing water mains located in Gateway Drive and Erskine Street.

In 2011, the Proposed Project would add a total of approximately 422,904 GPD of water demand (see Table 13-3). The Proposed Project's water demand, coupled with demand from residential development in the study area, would lead to a total demand in the project area of 581,464 GPD, representing a 298,471 GPD increase as compared to the No Build condition. This total demand would be less than 0.01 percent of New York City's average daily demand of 1.2 billion GPD.

This demand would not have a significant adverse impact on the water supply system’s ability to adequately deliver water to New York City or Brooklyn.

Table 13-3
2011 Build Conditions: Projected Water Demand Increase

Use	Domestic Water (GPD)	Air Conditioning (GPD)	Total (GPD)
Residential	185,584	0	185,584
Retail	118,660	118,660	237,320
Total (Proposed Project)	304,244	118,660	422,904
No Build	118,984	39,576	158,560
Total Increase	423,228	158,236	581,464
Source: CEQR Technical Manual (2001)			

SANITARY SEWAGE

Under the Proposed Project, the following sanitary sewer mains and other associated infrastructure would be constructed to support development on the Project Site by 2011:

- As part of the Proposed Project, sanitary sewers would be constructed in the beds of city streets between Schroeders Avenue and Flatlands Avenue and between Gateway Drive and Erskine Street. The sanitary sewer mains would be designed and built to meet DEP requirements, and would become the responsibility of DEP after their construction by 2011.
- Internal sanitary drains would also be constructed on the proposed retail center portion of the site. A 12-inch DIP sanitary drain would be constructed along the rear of the retail center draining from the west and the east to a point at the middle of the retail center, and then would flow to the north and connect to a proposed sanitary sewer in Elton Street.

The Proposed Project would generate approximately 304,244 GPD of sanitary sewage in 2011 leading to a total sewage generation (including projected developments) of 423,228 GPD in 2011 (see Table 13-4). This represents an 182,531 GPD increase in sanitary sewage generation as compared to the No Build condition.

Table 13-4
2011 Build Conditions: Projected Sewage Demand Increase

Use	Domestic Water (GPD)
Residential	185,584
Retail	118,660
Total (Proposed Project)	304,244
No Build	118,984
Total Increase	423,228
Sources: CEQR Technical Manual (2001)	

This sewage from the Project Site would be treated at the 26th Ward WPCP. As was stated above, the 26th Ward WPCP has a permitted capacity of 85 MGD, and is estimated to be treating approximately 58 MGD on average. The total sewage from the Proposed Project would represent about 0.3 percent of the 26th Ward WPCP’s permitted capacity and would not cause

the WPCP to exceed its capacity or impair its ability to properly treat sanitary sewage. Therefore, no significant adverse impacts would result.

STORMWATER

As part of the Proposed Project, storm sewers would be constructed within the bed of city streets between Schroeders Avenue and Flatlands Avenue and between Gateway Drive and Erskine Street. The storm sewers would be designed and built to meet DEP requirements, and would become the responsibility of DEP after their construction by 2011.

Internal storm drains would also be constructed within the proposed retail center portion of the Project Site. A majority of the stormwater flows from within the retail center would flow to the west to an existing storm sewer main located in Gateway Drive which discharges to Hendrix Creek. A small portion of the proposed retail site stormwater would be conveyed to the east and connected to the existing storm sewer main in Erskine Street. The retail site would also incorporate a number of stormwater best management practices (BMPs), including vegetated swales throughout the parking lot, rain gardens, and mechanical treatment units; and, temporary on-site stormwater storage to comply with the DEP stormwater discharge rate control requirements and NYSDEC Stormwater Management Program requirements.

F. 2013 THE FUTURE WITHOUT THE PROPOSED ACTION

Between 2011 and 2013, the 1996 Plan will increase the number of housing units and construct parklands and community and public facilities. These additional users will increase demand for infrastructure in the study area.

WATER SUPPLY

Between 2011 and 2013, there are no additional projects which will expand the capacity of the water supply system in the project study area. Absent the Proposed Action, the water demand on the Project Site will increase by 850,806 GPD. Total water demand for the project study area (including anticipated developments outside of the Project Site) will increase by 1,009,367 GPD.

SANITARY SEWAGE

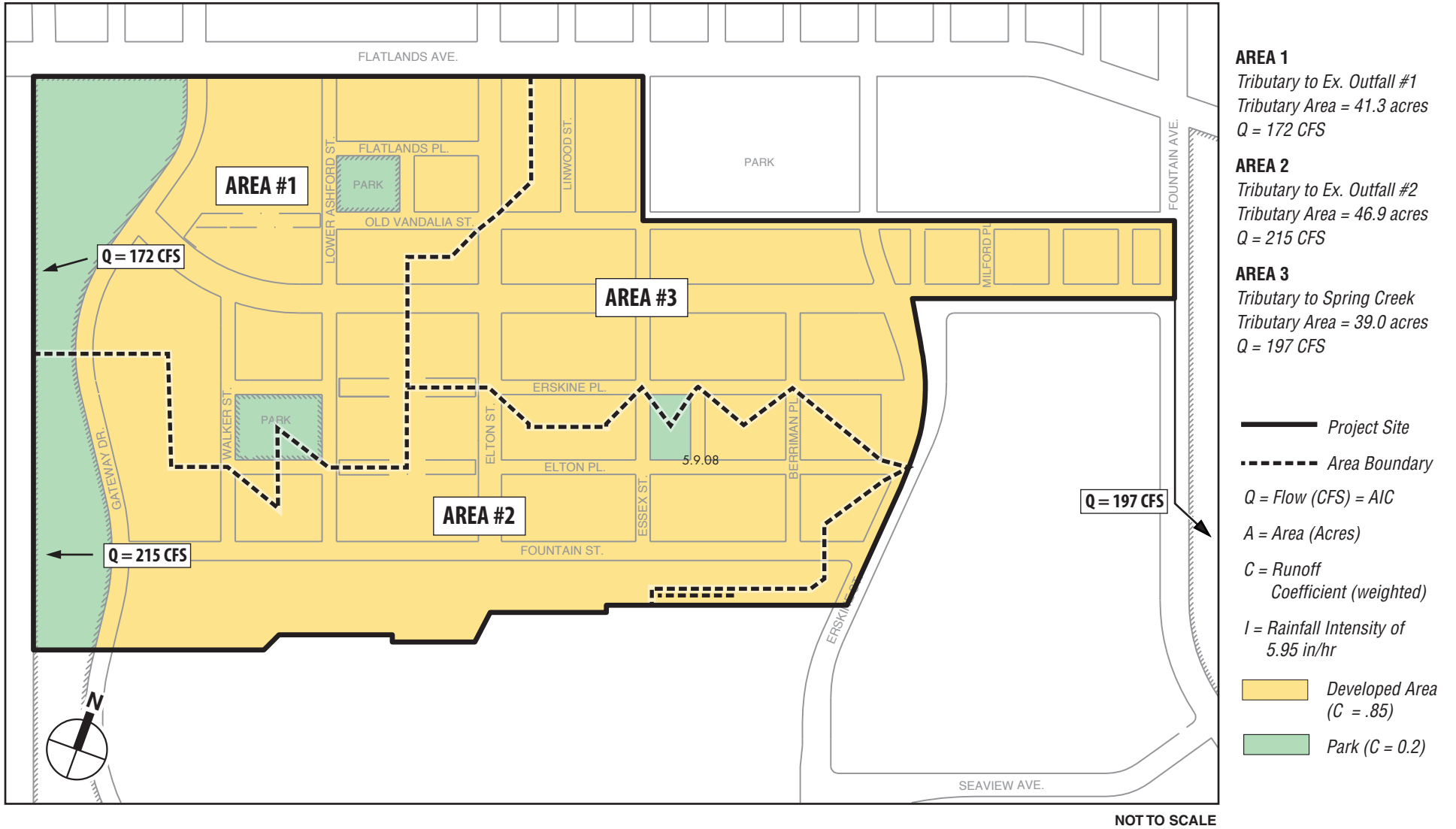
Absent the Proposed Action, sewage production on the Project Site will increase by 816,456 GPD and coupled with adjacent developments will increase by 935,440 GPD.

STORMWATER

Absent the Proposed Action, stormwater runoff from the Project Site will remain the same on the retail center portion of the Project Site and will increase due to the construction of planned housing on the northern portion of the Project Site. Development on the Project Site in 2013 without the Proposed Action would generate 403 CFS of stormwater in a 2-year storm event, 584 CFS in a 5-year storm event, and 883 CFS in a 100-year storm event (see Figure 13-2).

G. 2013 PROBABLE IMPACTS OF THE PROPOSED ACTION

By 2013, the Proposed Project would result in the full build-out of the Fresh Creek Urban Renewal Area (FCURA). It would include new housing, community/public facilities, and



parklands. These uses would result in higher demand for infrastructure as compared to the No Build condition.

WATER SUPPLY

In 2013, the Proposed Project would increase water demand by approximately 1,066,836 GPD. The Proposed Project’s water demand, coupled with demand from off-site development would increase current demand in the study area by 1,225,397 GPD (see Table 13-5). As compared to the No Build condition, the Proposed Project would generate 216,030 GPD (or 25 percent) more demand for water. This total demand would be an insignificant portion of New York City’s average daily demand of 1.2 billion GPD and would not have a significant adverse impact on the water supply system’s ability to adequately deliver water to Brooklyn or New York City.

SANITARY SEWAGE

The Proposed Project would generate approximately 920,556 GPD of sanitary sewage in 2013 leading to a total sewage generation (including other projected developments) of 1,039,540 GPD in 2013 (see Table 13-6). This represents an increased demand of 104,100 GPD or approximately 13 percent as compared to the No Build condition.

**Table 13-5
2013 Build Conditions: Projected Water Demand Increase**

Use	Domestic Water (GPD)	Air Conditioning (GPD)	Total (GPD)
Residential	744,576	0	744,576
Retail	118,660	118,660	237,320
High School	49,500	19,800	69,300
Day care	2,720	2,720	5,440
Other Community Facility	5,100	5,100	10,200
Total	920,556	146,280	1,066,836
No Build	118,984	39,576	158,560
Total Increase	1,039,541	185,857	1,225,397

Sources: CEQR Technical Manual (2001)

**Table 13-6
2013 Build Conditions: Projected Sewage Generation Rates**

Use	Sewage Generated (GPD)
Residential	744,576
Retail	118,660
High School	49,500
Day care	2,720
Other Community Facility	5,100
Total	920,556
No Build	118,984
Total Increase	1,039,541

Sources: CEQR Technical Manual (2001)

This sewage from the Project Site and FCURA would be treated at the 26th Ward WPCP. As stated above, the 26th Ward WPCP has a permitted capacity of 85 MGD, and is estimated to be treating approximately 58 MGD on average. The total sewage from the Proposed Project would represent about 1.0 percent of the 26th Ward WPCP's permitted capacity.

The Proposed Project would discharge to separate sanitary and storm sewers, and therefore, storm flows from the Project Site would not have an effect on CSO events. However, the sanitary sewage generated by the Proposed Project would increase the dry-weather flow at the 26th Ward WPCP and could contribute to CSO events during wet weather. According to the stormwater modeling prepared for the *Jamaica Plan FEIS*, the 26th Ward WPCP would process an annual flow of approximately 21,900 MG in 2015 (the year for which the analysis was performed) and would have an annual CSO flow of 645.86 MG or approximately 2.9 percent of its total flow. The Proposed Project would add 920,556 GPD of sanitary sewage, or about 336 million gallons (MG) per year at the 26th Ward WPCP. If 2.9 percent of this sewage flow was discharged as CSO, the Proposed Project would add 9.6 MG, or 1.5 percent, to the annual CSO of the 26th Ward WPCP.

Therefore, the Proposed Project is not anticipated to substantially increase CSO discharges to Hendrix Creek from the 26th Ward WPCP, would not cause the WPCP to exceed its capacity, and would not impair its ability to properly treat sanitary sewage.

STORMWATER

The Proposed Project would discharge to separate sanitary and storm sewers, and therefore, storm flows from the Project Site would not contribute to stormwater flows and CSO events at the 26th Ward WPCP. The Proposed Action would increase the density of residential and commercial development on the project site as compared to the 1996 Plan. However, the Proposed Action would also increase the acreage of open space. Although the Proposed Project would produce stormwater runoff and, therefore, discharges to Hendrix Creek and Spring Creek, runoff would be decreased slightly as compared to the 1996 Plan.

The amount of impervious surface on the Project Site, as approximated by the DEP's guideline design runoff coefficients used in the stormwater flow calculations,¹ would be substantially similar under both the 1996 Plan and the Proposed Project. A runoff coefficient characterizes the ability of a drainage area to absorb rainfall, with a coefficient of one representing a completely impervious area. DEP design runoff coefficients are based on the development intensity allowed on a site by zoning. Although the Proposed Action would change zoning to allow for higher density development, according to DEP, the existing and proposed zoning would have runoff coefficients that are substantially similar or identical. Under the 1996 Plan, the three drainage areas on the Project Site would have weighted runoff coefficients of 0.70, 0.77, and 0.85; under the Proposed Project, these areas would have weighted coefficients of 0.69, 0.78, and 0.83.² Under the Proposed Project, the runoff coefficients for two of the drainage areas would decrease

¹ NYCDEP *Rules and Regulations Governing the Construction of Private Sewers/Drains*. Pg 21.

² These coefficients are weighted to account for developed areas with a runoff coefficient of 0.85 and park areas with a runoff coefficient of 0.20. These runoff coefficients cannot be compared directly because the drainage areas differ slightly from the 1996 Plan to the Proposed Project, as shown in Figures 10 and 11. However, these coefficients provide a general sense of the amount of impervious surface on the Project Site under the 1996 Plan and the Proposed Project.

by approximately 1 to 2 percent and one drainage area would increase by approximately 1 percent, as compared to the 1996 Plan.

Development on the Project Site in 2013 with the 1996 Plan would generate 403 CFS of stormwater in a 2-year storm event, 584 CFS in a 5-year storm event, and 883 CFS in a 100-year storm event (see Table 13-7). The Proposed Project would generate approximately 400 CFS of stormwater in a 2-year storm event, 580 CFS in a 5-year storm event (see Figure 13-3), and 878 CFS of stormwater in a 100-year storm event.

**Table 13-7
Comparison of Stormwater Flows on the Project Site (in CFS)**

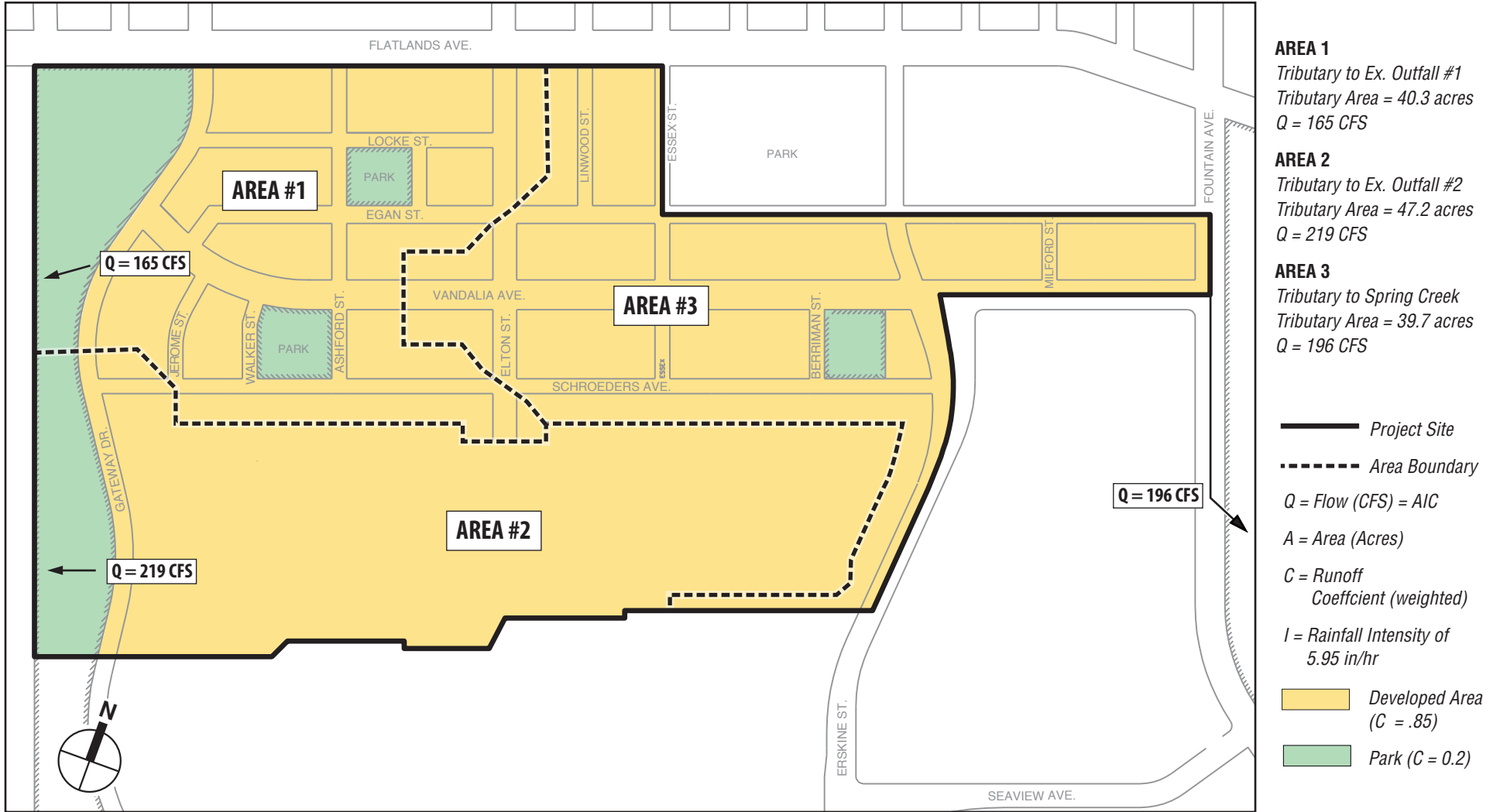
Storm Event	Existing Conditions ¹	2013 With 1996 Plan No Build Condition ¹	2013 With Proposed Project/ Build Condition ¹
2-Year Storm	157	403	400
5-Year Storm	227	584	580
100-Year Storm	343	883	878
Notes: ¹ Flows are in cubic feet per second Sources: Langan Engineering & Environmental Services <i>Rules and Regulations Governing Design of Private Sewers</i> (New York City Department of Environmental Protection)			

A comparison was performed to understand the increase in development intensity between the 1996 Plan and the Proposed Project for the area that would be occupied with the expanded shopping center (see Figure 13-4). Based on the 1996 Plan, the developed stormwater coefficient was calculated to be 0.71 using DEP runoff coefficients for building, pavement and landscaped areas. With the Proposed Project, the development intensity increases, resulting in a coefficient of 0.84. This would result in an increase in storm water volume of 13 percent for the various design storms analyzed.

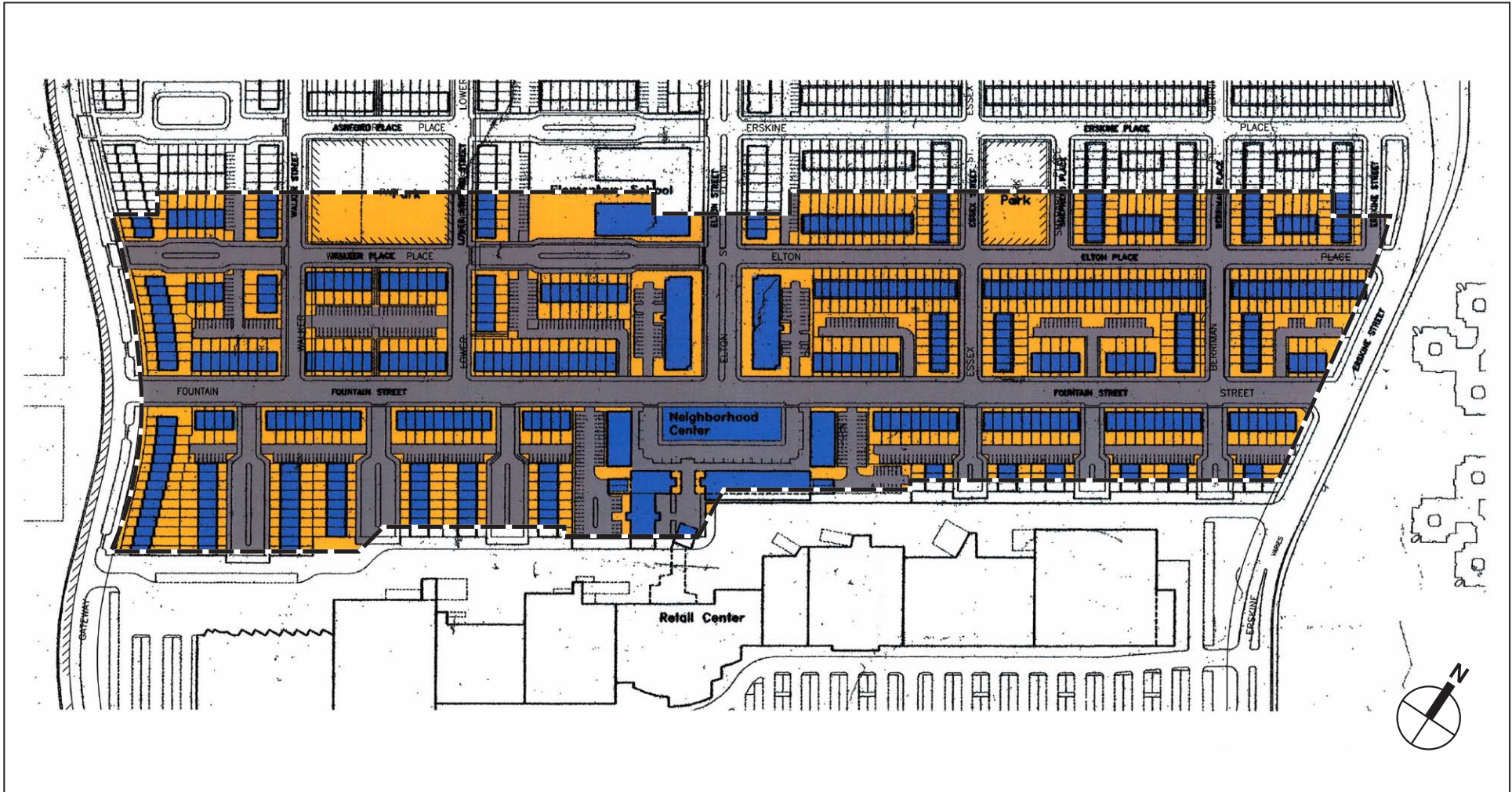
Per the *New York State Stormwater Management Design Manual*, Chapter 4, Section 4.2, “Water Quality Volume”, the proposed retail center would need to provide 3.64 AC-FT of water quality volume based on the proposed site plan (see Table 13-8). This would be achieved through a combination of non-structural and structural BMP devices as per the NYSDEC design guidelines.





**Table 13-8
Comparison of NYSDEC Water Quality Calculations for the Area of the Proposed Retail Center**

Factor	1996 Plan (No Build Condition)	Proposed Project (Build Condition)
P = 90% Rainfall Event Number = 1.25	P = 1.25	P = 1.25
Rv = 0.05+0.009*I	I = 67%	I = 87%
I = Percent Impervious Cover	Rv = 0.65	Rv = 0.87
A = Site Area in Acres = 40.24 AC	A = 40.24 AC	A = 40.24 AC
P = 90% Rainfall Event Number = 1.25	WQv = 2.74 AC-FT	WQv = 3.64 AC-FT
Sources: New York State Stormwater Management Design Manual Chapter 4, Section 4.2 Water Quality Volume		



2013 Stormwater Flows with the Proposed Project:
 5-Year Storm Event
Figure 13-3



-  Area of Proposed Retail Center
-  Buildings
-  Other Hardscape (such as roads)
-  Landscaping and other pervious surfaces



Comparison of the 1996 Plan and the Proposed Project for the Area of the Proposed Retail Center
Figure 13-4

Gateway Estates II

A Stormwater Pollution Prevention Plan (SWPPP) for controlling runoff and pollutants from the Project Site both during and post-construction would be developed in association with the Project elements. Within the shopping center it would include on-site stormwater BMPs to remove pollutants, sediments and floatables. Stormwater BMPs being considered include pretreatment measures such as vegetated swales and rain gardens to allow some infiltration of stormwater, temporary on-site stormwater storage to detain the runoff and control the rate it is discharged to the storm sewer, catch basins fitted with hydrodynamic devices to remove oil and grit, and hoods to remove floatables.

The SWPPP for the Project Site would be consistent with the stormwater management strategies identified in DEP's Jamaica Bay Watershed Protection Plan. The strategies include:

- Promote low-impact development and BMPs for new and existing development;
- Reduce the imperviousness of new and existing development; and
- Expand water conservation programs to achieve a greater reduction in water use.

Therefore, the Proposed Project would not result in significant adverse impacts on the stormwater management system. *