9

Water and Sewer Infrastructure

This chapter evaluates the potential for the Proposed Actions in connection with the Proposed Project to result in significant adverse impacts on the City's water supply, as well as its wastewater and stormwater conveyance and treatment infrastructure.

Introduction

~~The Applicants,~~ The New York City Economic Development Corporation (NYCEDC), the Office of the Chief Medical Examiner (OCME), and the New York City Department of Citywide Administrative Services (DCAS) (collectively, the Applicants), in affiliation with the ~~NYC~~New York City Health and Hospitals Corporation (H+H), New York City Public Schools (NYCPS), the New York City School Construction Authority (SCA), and the City University of New York (CUNY), are ~~proposing to redevelop the southern 4.75-acre section of Manhattan Block 962, Lot 100 (the Development Site) located at 425 East 25th Street with multiple new buildings (illustratively shown as Buildings A, B1, and B2) (see **Figure 1-2**), comprising up to approximately 1,782,000 zsf (2.19 million gsf).[1] The Eastern Parcel would create an integrated educational campus within Building A, as described below, bringing together the Hunter College School of Nursing and departments of Physical Therapy, Speech-Language Pathology & Audiology (including the community clinic), and Medical Laboratory Sciences, Borough of Manhattan Community College (BMCC) Health Sciences, Health Studies, and Nursing Programs, and the CUNY Graduate School of Public Health & Health Policy,[2] along with a NYCPS high school focused on healthcare and sciences education. The Western Parcel would include two Life Sciences buildings, Building B1 and Building B2, and the one-story SPARC Square Pavilion~~

[1] ~~As design progresses for the Proposed Project, it is likely that the building on the eastern portion of the Development Site (i.e., Building A) would be designed as two buildings with independent utility systems to accommodate separation between the public school and CUNY facilities.~~

[2] ~~While the CUNY Hunter space on site currently contains dormitory space (711 beds), the Proposed Project would not include dormitory space on site. CUNY Hunter intends to replace the dorm space that would be lost as a result of the Proposed Project elsewhere so there would be no potential for displacement.~~

~~within the open space. Building B1 would front on First Avenue, and include space dedicated to H+H. Building B2 would be located to the east of Building B1 and would include space for OCME.~~

~~Building A located on the Eastern Parcel would be comprised of approximately 698,570 gsf (561,500 zsf), containing approximately 606,450 gsf (559,185 zsf) of community facilities (UG III(B)) space and 2,600 gsf (2,300 zsf) of commercial retail (UG VI) space.~~

~~Building B1 would contain a total of approximately 810,980 gsf (667,700 zsf), including approximately 184,000 gsf (174,550 zsf) of community facility (UG III(B)), approximately 5,600 gsf (5,060 zsf) of local retail (UG VI), and approximately 530,900 gsf (488,060 zsf) of office and laboratories (UG VII).~~

~~Building B2 would contain a total of approximately 682,470 gsf (551,800 zsf), including approximately 217,300 gsf (200,340 zsf) of community facility (UG III(B)), approximately 3,000 gsf (2,760 zsf) of local retail (UG VI), and approximately 379,400 gsf (348,680 zsf) of office and laboratories (UG VII).~~

~~The square footages described above for community facility, office and laboratories, and local retail include each programmatic element anticipated to be included on the site[3].~~seeking several Uniform Land Use Review Procedure (ULURP) and discretionary actions (collectively, the Proposed Actions) to facilitate the development of approximately 2.19 million gross square feet (gsf) of new construction of academic, healthcare, Life Sciences, and retail space and public realm improvements (the Proposed Project).

The public realm improvements would take the form of a new publicly accessible open space, a replacement bridge over Franklin D. Roosevelt (FDR) Drive at East 25th Street to make it ADA accessible, a tie-in to the ~~Kips Bay~~East Midtown Coastal Resiliency (~~KBCR~~EMCR) project's planned flood protection to the northeast along FDR Drive and protection along East 25th Street,[4] ~~including a connection to the existing floodwall at the U.S. Department of Veterans Affairs New York Harbor Healthcare System's Manhattan campus (U.S. Corbin VA Facility),~~ and a widening of the demapped portion of the former East 26th Street located between FDR Drive and First Avenue to accommodate two-way traffic flow.

According to the *2021 CEQR Technical Manual,* discretionary actions that would increase density or change the drainage conditions may warrant a water and sewer infrastructure analysis. Specifically, developments that would result in an exceptionally large demand for water (more than a million gallons per day (mgd)) or developments that are located in an area that experiences low water pressure require an analysis of potential impacts on the water supply system. Additionally, developments located in combined sewered areas exceeding incremental development thresholds (above the predicted No-Action condition) of 1,000 residential units or 250,000 square feet (sf) or more of commercial, public facility, and institution, and/or community facility space in Manhattan would warrant a sewer infrastructure analysis.

Principal Conclusions

This analysis follows the *CEQR Technical Manual* guidelines that recommend a preliminary water analysis be completed if a proposed action would result in an exceptionally large demand of water

~~[3] Program areas are based on a conceptual site plan and are subject to future modification as each building is designed.~~

[4] Absent the ~~KBCR~~EMCR project, the Proposed Project would incorporate standalone flood protections with independent utility into the design. For conservative analysis purposes, a hypothetical scenario in which there is no EMCR was referenced in the DEIS. However, that outcome is unlikely, and there are no plans to discontinue the EMCR project.

(over one million gpd) or if a project area is located in an area that experiences low water pressure (i.e., in an area at the end of the water supply distribution system such as the Rockaway Peninsula or Coney Island). The Development Site is not located in an area that experiences low water pressure, and the Proposed Actions would generate a water demand of 0.~~53~~56 mgd. Therefore, the Proposed Project does not meet the *CEQR Technical Manual* threshold requiring a detailed analysis. It is anticipated that there would be adequate water service to meet the incremental water demand and that there would be no significant adverse impacts on the City's water supply.

The Proposed Actions would result in a net incremental increase of over 250,000 gsf of commercial, public facility, institution, and community facility, as compared with the No-Action condition, in a combined sewered area. An analysis of the Proposed Actions' potential impacts on the City's wastewater and stormwater conveyance and treatment system is therefore warranted and is provided below.

Although the Proposed Actions would create new demand for water and treatment of sewage in comparison to the No-Action condition, based on the methodology set forth in the *CEQR Technical Manual*, the incremental increases would be well within the capacity of the City's systems, and the effects would not be considered significant or adverse.

Methodology

Existing and future water demand and sanitary sewage generation are calculated based on use rates set by the *CEQR Technical Manual*. The New York City Department of Environmental Protection (NYC DEP) Flow Volume Calculation Matrix is then used to calculate the overall stormwater runoff volume for four rainfall volume scenarios with varying durations. The ability of the City's sewer infrastructure to handle the anticipated demand from the Proposed Project is assessed by estimating existing sewage generation rates, and then comparing these existing rates with the No-Action and With-Action conditions, per *CEQR Technical Manual* methodology. Water consumption and wastewater generation rates applicable to the existing conditions and the Proposed Actions of the Development Site were derived from the *CEQR Technical Manual* and are provided in **Table 9-1**.

Table 9-1 Water Consumption and Wastewater Generation Rates

	Rate			
Land Use	**Domestic[1]**	**Units**	**Air Conditioning[1]**	**Units**
Residential	100	gpd/person	0.00	gpd/sf
Retail	0.24	gpd/sf	0.17	gpd/sf
School	10	gpd/seat	0.17	gpd/sf
Office[2]	0.10	gpd/sf	0.17	gpd/sf
Community Facility[3]	0.10	gpd/sf	0.17	gpd/sf
Production Lab[4]	1.20	gpd/sf	0.17	gpd/sf

Notes:

[1] Consumption rates obtained from the *2021 CEQR Technical Manual* Table 13-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment"

[2] For the Proposed Actions, dedicated hospital and medical space is categorized under office space

[3] Consistent with the *Stevenson Commons EIS*, the water consumption and wastewater generation rates for Community Facility utilizes the same CEQR rates as office space

[4] For the approximately 32,000 gsf of dedicated production lab space, water consumption rates are assumed to be five times higher than retail uses per "Types of Facilities | US EPA". https://www.epa.gov/watersense/types-facilities#Laboratories

Existing Conditions

The Development Site is currently occupied by the CUNY Hunter College Brookdale Campus. Since 1952, this campus has housed the Hunter College-Bellevue school of Nursing, dormitories for students, faculty offices, and shared amenity space. The campus consists of three buildings that create a C-shape formation surrounding a courtyard. The courtyard includes walkways, planters, and two tennis courts, which are currently used as accessory parking spaces.

Water Supply

The New York City water supply system consists of a network of reservoirs, lakes, and aqueducts extending north into the Catskill region of New York State, and a grid of underground distribution mains that distributes water within the City. Approximately 1.3 billion gpd of water are consumed within New York City through this water supply system.

Most of New York City obtains water from three surface water supply systems operated by NYC DEP – Delaware, Catskill, and Croton. The watersheds of the three systems cover almost 2,000 square miles, with 19 reservoirs and three control lakes, which have a combined storage capacity of approximately 550 billion gallons.

Two of the three surface water systems, the Delaware and Catskill systems, collect water from watershed areas in the Catskill Mountains and deliver it to the Hillview Reservoir in Yonkers. From there, it is distributed to the city through three tunnels: City Tunnel 1, which runs through the Bronx and Manhattan to Brooklyn; City Tunnel 2, which goes through the Bronx, Queens, and Brooklyn (and from there through the Richmond Tunnel to Staten Island); and City Tunnel 3 (Stage 1), which goes through the Bronx and Manhattan and ends in Queens. Stage 2 of City Tunnel 3 is currently under construction in Queens and Brooklyn.

The third surface water system, the Croton system, collects water from watershed areas in Dutchess, Putnam, and Westchester 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.

Once in the city, the aqueducts distribute water into a network of water mains. Water mains up to 96 inches in diameter feed smaller mains, such as 20, 12, and 8-inch mains, which deliver water to their destination, including to fire hydrants along many of the City's streets. Nearly all of the water reaches consumers by gravity alone, with roughly four percent (generally located at the outer limits of the system where in-line pressure is lowest, at high elevations, or at pressure extremity such as Far Rockaway) being pumped to its final destination. Water pressure throughout the City's water supply system is monitored and controlled by pressure regulators.

As mentioned above, New York City consumes approximately 1.3 billion gallons of water per day from the reservoir system which has a total storage capacity of approximately 550 billion gallons.[5, 6]

Under Existing Conditions, the Development Site generates a total water demand of approximately 113,910 gpd. Existing water consumption and sewage generation for the site is shown in **Table 9-2**.

Table 9-2 Existing Water Consumption and Sewage Generation

Land Use	Area (sf)[1]	Dwelling Units/Seats	Domestic Water/Wastewater Generation (gpd)	Air Conditioning Water Generation (gpd)
Residential (Dorm Rooms)	319,752	711	71,100	-
Office	27,737	-	2,774	4,715
School	55,465	1,763	17,630	9,429
Community Facility	30,600	-	3,060	5,202
Water Consumption Subtotals			94,564	19,346
Sewage Generation Subtotal			94,564	
Total Water Consumption			113,910	
Total Wastewater Consumption			94,564	

Notes:
[1]The total area of the existing buildings is 433,554 gsf and residential space is 319,752 gsf. Office, school and community facility areas are assumed based off of the remaining 113,802 gsf.

Conveyance System

The Development Site is located in a part of New York City that is served by combined sewer systems. Two drainage areas serve the Development Site; the drainage areas align with two Combined Sewer Outfalls (CSO), including NC-039 and NC-040.

Outfall NC-039

Stormwater in the courtyard collects in a network of yard drains and discharges to a 48-inch combined sewer on East 25th Street and flows into a regulator. The combined sewer then connects to the branch interceptor located on East 25th Street. The branch interceptor flows west and connects to a 108-inch reinforced concrete interceptor on First Avenue. The First Avenue interceptor

[5] Source: New York City's Wastewater Treatment System, NYC DEP; https://www1.nyc.gov/site/dep/water/

[6] Source: *2021 CEQR Technical Manual.*

flows south to the Manhattan Pump Station located on East 13th Street, which is designed to pump an average of 170 mgd through a 102-inch force main under the East River to the Newtown Creek Water Resource Recovery Facility (WRRF) (see **Figure 9-1**). During large storm events, excess flow from the combined sewer system would bypass the regulator and flow into a pipe that discharges from CSO-039 into the East River.

Outfall NCM-040

Based on a utility survey conducted in January 2023, the sanitary and stormwater systems of the existing buildings connect to a 90-inch by 60-inch reinforced concrete combined sewer on East 26th Street and flow east into a regulator. The combined sewer then flows south, along the FDR Drive through a 36-inch reinforced concrete pipe and connects to a 48-inch reinforced concrete branch interceptor that flows west on East 25th Street.

Stormwater from East 26th Street and associated sidewalks collect in a network of catch basins and connect to the combined sewer located within East 26th Street. During large storm events, excess flow from the combined sewer system bypasses the regulator and flows into a 48-inch cast iron pipe that discharges from CSO-040 into the East River.

For purposes of analysis, the amount of sanitary sewage is calculated as all water demand generated by the existing uses on the Development Site except water used by air conditioning, which is typically not discharged to the sewer system.

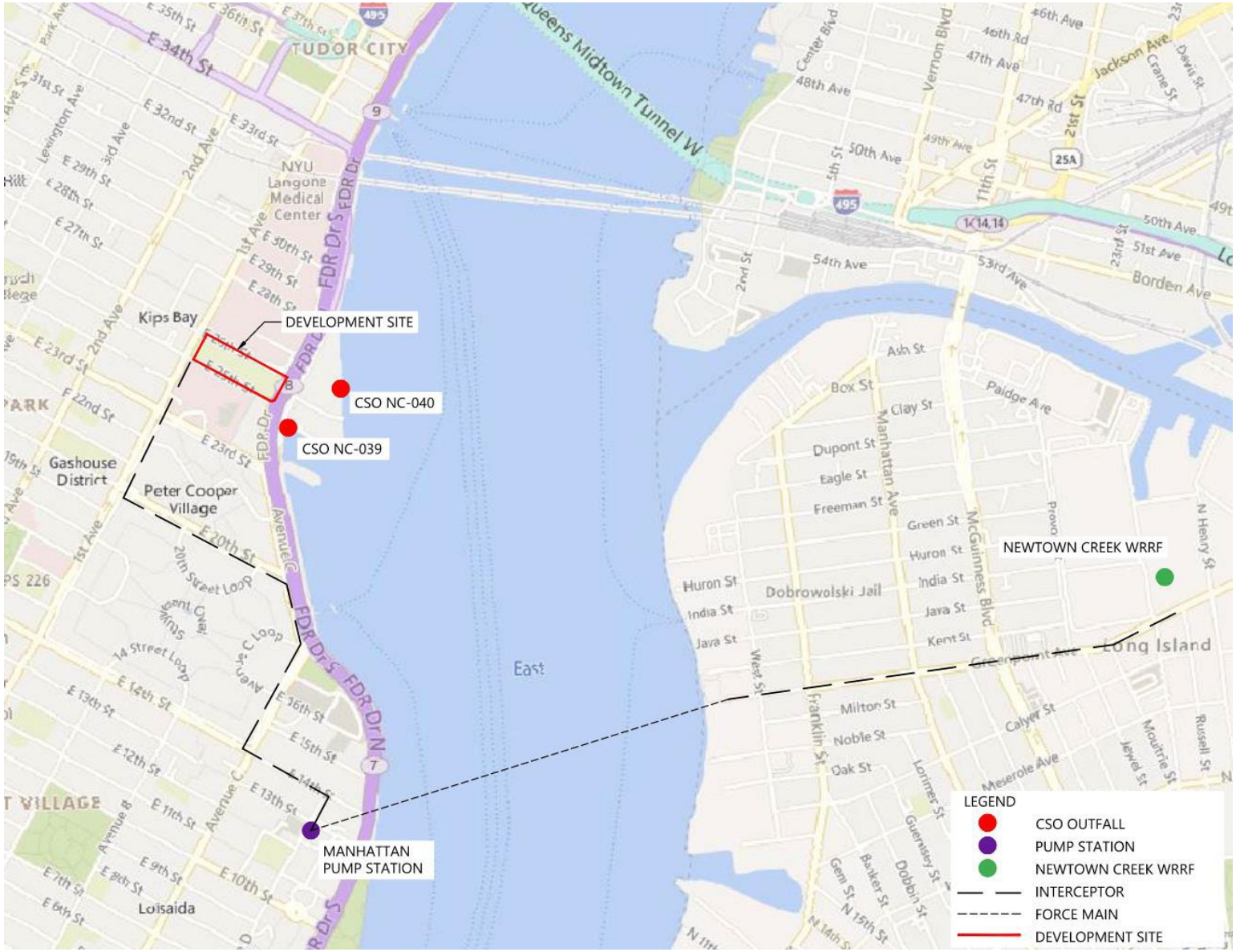
Sanitary sewage generated by the Development Site would discharge to the Newtown Creek WRRF, which has a State Pollutant Discharge Elimination System (SPDES)-permitted dry weather flow capacity of 310 mgd. The average monthly flow to Newtown Creek WRRF over a 12-month period is 182 mgd (see **Table 9-3**).

Table 9-3 Newtown Creek Average Monthly Flows

	Month	Flow (MGD)
2022	July	178
	August	182
	September	183
	October	189
	November	181
	December	183
2023	January	177
	February	185
	March	186
	April	175
	May	182
	June	182
	Average	**182**

Note:
[1]Average Monthly flows were provided by NYC DEP

Figure 9-1 Development Site Drainage Network



Stormwater Flows

The Development Site currently consists of three buildings, a courtyard, and a demapped portion of East 26th Street. **Table 9-4** and **Table 9-5** summarize the existing surface areas as well as the weighted runoff coefficient (the fraction of precipitation that becomes surface runoff for each surface type) for outfall areas NC-039 and NC-040.

Table 9-4 Existing Surface Coverage to Outfall NC-039

Affected Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scope	Total
NCM-039[2]	Area (%)	0%	69%	0%	31%	100%
	Surface Area (sf)	0	44,481	0	19,565	64,045
	Runoff Coefficient[1]	1.00	0.85	0.85	0.20	**0.65**

Notes:
[1] Runoff coefficients for each surface type as per NYC DEP
[2] Source: CSO Locations in New York City's Waterways, CSO Locations in New York City's Waterways (arcgis.com)

Table 9-5 Existing Surface Coverage to Outfall NC-040

Affected Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scope	Total
NCM-040[2]	Area (%)	71%	27%	0%	3%	100%
	Surface Area (sf)	101,012	38,052	0	3,801	142,865
	Runoff Coefficient[1]	1.00	0.85	0.85	0.20	**0.94**

Notes:
[1] Runoff coefficients for each surface type as per NYC DEP
[2] Source: CSO Locations in New York City's Waterways, CSO Locations in New York City's Waterways (arcgis.com)

No-Action Condition

As described in **Chapter 1, Project Description**, absent the Proposed Actions, the No-Action condition, the Development Site is assumed to remain in its existing condition with only the CUNY Hunter College Brookdale Campus, or a similar use, operating on the site. Therefore, the stormwater runoff, water demand, and wastewater generation calculations would remain unchanged.

With-Action Condition

The With-Action condition would result in the development of multiple new buildings consisting of approximately 2.19 million gsf of medical and office space, including 32,000 gsf of production lab

space[7]; an NYC Public School with capacity of 1,600 students (175,800 gsf); classrooms to accommodate a capacity of 3,046 CUNY students (552,490 gsf); and approximately 15,000 gsf of local retail space. The Proposed Actions would also include publicly accessible open space. The results of the analysis of the With-Action condition on water and sewer infrastructure is described below.

Sanitary Flows

As shown in **Table 9-6**, the Proposed Project is expected to have a total water demand of ~~525,316~~560,516 gpd, with approximately ~~179,281~~214,481 gpd of daily sanitary sewage generated under the With-Action condition.

Table 9-6 With-Action Water Consumption and Sewage Generation

Land Use	Area (sf)	Dwelling Units/Seats	Domestic Water/Wastewater Generation (gpd)	Air Conditioning Water Generation (gpd)
Office[1]	1,260,210	-	126,021	214,236
Production Lab Space[2]	32,000	-	38,400	5,400
School[1]	728,290	4,646	46,460	123,809
Retail[1]	15,000	-	3,600	2,550
Water Consumption Subtotals			214,481	346,035
Sewage Generation Subtotal			214,481	
Total Water Consumption			560,516	
Total Wastewater Consumption			214,481	

Notes:

[1] Consumption rates obtained from the *2021 CEQR Technical Manual* Table 13-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment."

[2] For the approximately 32,000 gsf of production lab space, water consumption rates are assumed to be five times higher than retail uses per "Types of Facilities | US EPA". https://www.epa.gov/watersense/types-facilities#Laboratories

The incremental sanitary sewage generated by the With-Action condition, as compared with the No-Action condition, would be ~~84,717~~119,917 gpd. This increase in wastewater generation would be approximately 0.~~03~~04 percent of the Newtown Creek WRRF capacity of 310 mgd.

Under the Proposed Project, it is assumed that the proposed buildings would connect to the combined sewer located on former East 26th Street and most of the stormwater from the publicly accessible open space would discharge to the combined sewer located on East 25th Street.

In accordance with the New York City Plumbing Code (Local Law 33 of 2007), the Proposed Project would be required to utilize low-flow plumbing fixtures, which would reduce sanitary flows to the plant. Therefore, the With-Action condition would not result in a significant adverse impact to the City's sanitary sewage conveyance and treatment system.

[7] For the approximately 32,000 gsf of production lab space, water consumption rates are assumed to be five times higher than retail uses per "Types of Facilities | US EPA". https://www.epa.gov/watersense/types-facilities#Laboratories

Stormwater Flows

Table 9-7 summarizes the surface areas and weighted runoff coefficient for outfall area NC-039, which consists of mostly public open space for the With-Action conditions. **Table 9-8** summarizes the surface areas and weighted runoff coefficient for outfall area NC-040, which consists of the three proposed buildings and widening of East 26th Street for the With-Action conditions.

Table 9-7 With-Action Surface Coverage to Outfall NC-039

Affected Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scope	Total
NCM-039[2]	Area (%)	0%	79%	0%	21%	100%
	Surface Area (sf)	0	31,936	0	8,465	40,401
	Runoff Coefficient[1]	1.00	0.85	0.85	0.20	**0.71**

Source: DCP Building Footprint; aerial photographs
Notes:
[1] Runoff coefficients for each surface type as per NYC DEP
[2] Source: CSO Locations in New York City's Waterways, CSO Locations in New York City's Waterways (arcgis.com)

Table 9-8 With-Action Surface Coverage to Outfall NC-040

Affected Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scope	Total
NCM-040[2]	Area (%)	65%	34%	0%	1%	100%
	Surface Area (sf)	109,017	56,964	0	528	166,509
	Runoff Coefficient[1]	1.00	0.85	0.85	0.20	**0.95**

Source: DCP Building Footprint; aerial photographs
Notes:
[1] Runoff coefficients for each surface type as per NYC DEP
[2] Source: CSO Locations in New York City's Waterways, CSO Locations in New York City's Waterways (arcgis.com)

The NYC DEP Flow Volume Calculation Matrix was completed for the Existing and the With-Action conditions. The calculations from the Flow Volume Calculation Matrix help to determine the change in wastewater flow volumes to the combined sewer system from Existing and With-Action conditions and include four rainfall volume scenarios with varying durations. The summary tables of the Flow Volume Calculation Matrix to both NC-039 and NC-040 are included in **Table 9-9**, **Table 9-10**, **Table 9-11**, and **Table 9-12** respectively.

As shown in **Table 9-9**, depending on the rainfall volume and duration, the total volume to the combined sewer system from the Development Site under the existing conditions for outfall area NC-039 would be between approximately 0 mg and 0.065 mg. As shown in **Table 9-10**, for the With-Action condition, the combined sewer system flow would be between 0 mg and 0.045 mg.

Table 9-9 NYC DEP Flow Volume Matrix – Existing Conditions to NC-039

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Stormwater Runoff (MG)[4]	Sanitary to CSS (MG)[5]	Total Volume to CSS (MG)
0.00	3.80	1.47	0.65	0.000	0.000	0.000
0.40	3.80	1.47	0.65	0.010	0.000	0.010
1.20	11.30	1.47	0.65	0.031	0.000	0.031
2.50	19.50	1.47	0.65	0.065	0.000	0.065

Notes:
[1] Storm event rainfalls per NYC DEP Volume Calculation Matrix.
[2] Total surface area onsite for Proposed Project within the subcatchment area.
[3] Runoff coefficients for surface type area as per NYC DEP.
[4] Stormwater runoff derived from NYC DEP Volume Calculation Matrix.
[5] Sanitary volumes derived using methodology and consumption rates per the *2021 CEQR Technical Manual*
MG = million gallons

Table 9-10 NYC DEP Flow Volume Matrix – With-Action Conditions to NC-039

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Stormwater Runoff (MG)[4]	Sanitary to CSS (MG)[5]	Total Volume to CSS (MG)
0.00	3.80	0.93	0.71	0.000	0.000	0.000
0.40	3.80	0.93	0.71	0.007	0.000	0.007
1.20	11.30	0.93	0.71	0.021	0.000	0.021
2.50	19.50	0.93	0.71	0.045	0.000	0.045

Notes:
[1] Storm event rainfalls per NYC DEP Volume Calculation Matrix.
[2] Total surface area onsite for Proposed Project within the subcatchment area.
[3] Runoff coefficients for surface type area as per NYC DEP.
[4] Stormwater runoff derived from NYC DEP Volume Calculation Matrix.
[5] Sanitary volumes derived using methodology and consumption rates per the *2021 CEQR Technical Manual*
MG = million gallons

Table 9-11 NYC DEP Flow Volume Matrix – Existing Conditions to NC-040

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Stormwater Runoff (MG)[4]	Sanitary to CSS (MG)[5]	Total Volume to CSS (MG)
0.00	3.80	3.28	0.94	0.000	0.015	0.015
0.40	3.80	3.28	0.94	0.033	0.015	0.048
1.20	11.30	3.28	0.94	0.100	0.045	0.145
2.50	19.50	3.28	0.94	0.209	0.078	0.287

Notes:
[1] Storm event rainfalls per NYC DEP Volume Calculation Matrix.
[2] Total surface area onsite for Proposed Project within the subcatchment area.
[3] Runoff coefficients for surface type area as per NYC DEP.
[4] Stormwater runoff derived from NYC DEP Volume Calculation Matrix.
[5] Sanitary volumes derived using methodology and consumption rates per the *2021 CEQR Technical Manual*
MG = million gallons

Table 9-12 NYC DEP Flow Volume Matrix – With-Action Conditions to NC-040

Rainfall (inches)[1]	Duration (hours)	Total Area (acres)[2]	Weighted Runoff Coefficient[3]	Stormwater Runoff (MG)[4]	Sanitary to CSS (MG)[5]	Total Volume to CSS (MG)
0.00	3.80	3.82	0.95	0.000	0.034	0.034
0.40	3.80	3.82	0.95	0.039	0.034	0.073
1.20	11.30	3.82	0.95	0.118	0.101	0.219
2.50	19.50	3.82	0.95	0.247	0.174	0.421

Notes:
[1] Storm event rainfalls per NYC DEP Volume Calculation Matrix.
[2] Total surface area onsite for Proposed Project within the subcatchment area.
[3] Runoff coefficients for surface type area as per NYC DEP.
[4] Stormwater runoff derived from NYC DEP Volume Calculation Matrix.
[5] Sanitary volumes derived using methodology and consumption rates per the *2021 CEQR Technical Manual*
MG = million gallons

As shown in **Table 9-11**, depending on the rainfall volume and duration, the total volume to the combined sewer system from the Development Site under the existing conditions for outfall area NC-040 would be between approximately 0.015 mg and 0.287 mg. As shown in **Table 9-12**, for the With-Action condition, the combined sewer system flow would be between 0.~~028~~034 mg and 0.~~393~~421 mg.

Table 9-13 compares the estimated total volume under Existing and With-Action conditions using the NYC DEP Flow Volume Calculation Matrix. As shown in the table, depending on the rainfall volume and duration, the With-Action increment would be between 0.~~013~~019 and 0.~~086~~134 mg. Typically, an increase of five percent or more at the site over existing conditions would warrant further review by NYC DEP, in which the implementation of BMPs would help mitigate that increase. Although the five percent threshold is exceeded, these increments represent only a 0.004 to 0.03 percent increase of the Newtown Creek WRRF capacity and a 0.01 to 0.~~05~~08 percent increase in capacity to the Manhattan Pump Station located on East 13th Street.

Table 9-13 Existing and With-Action Total Volume to Newtown Creek WRRF

		Total Volume to Combined Sewer System (MG)		
Rainfall (inches)[1]	Duration (hours)	Existing Conditions	With-Action Condition	Increment
0.00	3.80	0.015	0.034	0.019
0.40	3.80	0.058	0.080	0.022
1.20	11.30	0.176	0.240	0.064
2.50	19.50	0.352	0.466	0.114

The Flow Volume Matrix calculations do not reflect the use of any sanitary and stormwater source control BMPs to reduce sanitary flow and stormwater runoff volumes to the combined sewer system. As noted above, the Proposed Project would incorporate low flow plumbing fixtures to reduce sanitary flow in accordance with the New York City Plumbing Code. In addition, stormwater BMPs would be required in accordance with the NYC DEP Unified Stormwater Rule (USWR) guidelines,

which includes requirements for bringing the Development Site into compliance with the allowable stormwater release rate.

The USWR increases on-site stormwater detention requirements and updates release rates for developments discharging to combined sewer systems and requires a retention first approach to stormwater management practice (SMP) design. The water quality requirement (WQv) aims to manage and reduce runoff from small, frequent storms that often trigger the majority of CSO events. The USWR manual defines this event as the 90th percentile rain event. Runoff reduction (RR) criteria aims to maintain a minimum level of RR during small storms, and which is generally always met when treating the entire WQv. If site constraints make it impossible to treat the WQv, then a minimum Runoff Reduction Volume (RRv) for all newly constructed impervious areas must be met. The sewer operations volume (Vv) and maximum release rate (Qdrr) requirements are associated with the 10-year event, and work in tandem to maintain optimal flow rates in the City's combined sewer system to further limit the amount of CSO events. The existing buildings on the Development Site were developed prior to the USWR; however, the proposed redevelopment of the site is required to meet the new stormwater requirements, for which the calculations are based on the entire tributary area to the existing site connection. Therefore, the entire area tributary to the existing site connection will be brought into compliance as part of the Proposed Project.

Based on the USWR guidelines, the required WQv and Vv is equal to 23,559 cubic feet and 27,893 cubic feet, respectively. If using infiltration SMPs to manage the WQv, then half of the water quality volume provided can be counted towards the Vv, so the total required storage volume is approximately 39,673 cubic feet. The maximum release rate (Qdrr) is equal to 0.1 cfs/acre, which is approximately 0.48 cfs for the site.

To achieve this release rate, stormwater could be managed by utilizing one or a combination of detention or infiltration techniques identified in the manual. Green technologies, such as green and blue roofs, subsurface detention and infiltration, and permeable pavement, could be implemented to retain or release stormwater with slowed discharge rates to control peak runoff rates. Specific BMP methods will be determined with further refinement of the building design and in consultation with NYC DEP.

The incorporation of the appropriate sanitary flow and stormwater source control SMPs would reduce the overall volume of sanitary sewer discharge and stormwater runoff as well as the peak stormwater runoff rate from the Development Site. Sewer treatment capacity at the Newtown Creek WRRF could adequately handle wastewater flow resulting from the Proposed Project.