A. INTRODUCTION

This chapter assesses the potential effects of the Proposed Actions on the City's water supply, wastewater treatment, and stormwater management infrastructure in accordance with the 2014 *City Environmental Quality Review* (CEQR) *Technical Manual*. As outlined in Chapter 1, "Project Description," the Proposed Actions would facilitate the development of an approximately 654,300 gross square foot (gsf) commercial/manufacturing building (the "Proposed Development") in the Greenpoint neighborhood of Brooklyn.

B. PRINCIPAL CONCLUSIONS

An assessment of water and sewer infrastructure determined that the Proposed Actions would not result in significant adverse impacts on the City's water supply or wastewater and stormwater conveyance and treatment.

Water Supply

The Proposed Development would generate an incremental water demand of approximately 167,416 gpd (including water related to sanitary and domestic uses) compared with the No-Action condition. While this would represent an increase in demand on the New York City water supply system, it does not meet the *CEQR Technical Manual* threshold requiring a detailed analysis. Therefore, an analysis of water supply is not warranted as it is expected that there would be adequate water service to meet the incremental water demand from the Proposed Development and there would be no significant adverse impacts on the City's water supply. The New York City Department of Environmental Protection (DEP) Bureau of Water Distribution indicated that existing water infrastructure should be able to handle the estimated increase in water demand, and noted that multiple connections to the City mains would probably be necessary due to the large lot size of the Proposed Development.

Wastewater and Stormwater Conveyance and Treatment

Based on preliminary assessment, it was determined that the Proposed Actions would not result in significant adverse impacts on wastewater treatment or stormwater conveyance infrastructure. The Proposed Development is expected to generate approximately 109,847 gallons per day (gpd) of sanitary sewage, an increase of approximately 83,807 gpd compared to No-Action conditions. This incremental increase in sewage generation is less than 0.03 percent of the average daily flow at the Newtown Creek Water Pollution Control Plant (WPCP) and would not result in an exceedance of the plant's permitted capacity of 310 million gallons per day (mgd). Therefore, the Proposed Actions would not result in a significant adverse impact to the City's sanitary sewage conveyance and treatment system.

Depending on the rainfall volume and duration, the total With-Action volume to the combined sewer system could be between 0.02 and 0.26 mg. Compared to existing conditions, this would represent an

increase in combined sewer flows of up to 0.03 mg, depending on rainfall intensities. With the incorporation of selected stormwater source control best management practices (BMPs) that would be required as part of the site connection approval process, subject to the review and approval of DEP, the peak stormwater runoff rates would be reduced. Overall, the Proposed Development would not result in significant adverse impacts on the City's sewage conveyance and treatment systems.

C. METHODOLOGY

Water Supply

According to the *CEQR Technical Manual*, a preliminary water supply infrastructure analysis is needed if a project would result in an exceptionally large demand for water (e.g., more than one million gallons per day (mgd)) or is located in an area that experiences low water pressure (e.g., areas at the end of the water supply distribution system). The Development Site is located in the Greenpoint neighborhood of Brooklyn Community District (CD) 1 and is not located in an area that experiences low water pressure (i.e., it is not located at the end of the water supply distribution system, such as the Rockaway Peninsula or Coney Island). The Proposed Development would generate an incremental water demand of approximately 167,416 gpd (including water related to sanitary and domestic uses) compared with the No-Action condition. While this would represent an increase in demand on the New York City water supply system, it does not meet the *CEQR Technical Manual* threshold requiring a detailed analysis. Therefore, an analysis of water supply is not warranted as it is expected that there would be adequate water service to meet the incremental water demand from the Proposed Development and there would be no significant adverse impacts on the City's water supply.

Wastewater and Stormwater Conveyance and Treatment

For wastewater and stormwater conveyance and treatment, a preliminary sewer analysis is warranted if a project site comprises more than five acres and would result in an increase of impervious surfaces on the site, or if a project is located in a combined sewer area and would result in the incremental development of at least 400 residential units or 150,000 sf or more of commercial space in the Bronx, Brooklyn, Staten Island, or Queens or at least 1,000 residential units or 250,000 sf or more of commercial space in Manhattan. As the Development Site is located in a combined sewer area in Brooklyn and the Proposed Development would exceed the *CEQR Technical Manual* commercial floor area threshold, a preliminary assessment of wastewater and stormwater infrastructure is provided.

Existing and future sanitary sewage generation is calculated for the Development Site based on use generation rates set forth in Table 13-2 of the *CEQR Technical Manual*, as well as information provided by the Applicant. The New York City Department of Environmental Protection's (DEP's) Volume Calculation Matrix is then used to calculate the overall combined sanitary sewage and stormwater runoff volume discharged to the combined sewer systems for four rainfall volume scenarios with varying durations. Stormwater runoff volumes are determined by estimating the amount of pervious and impervious surfaces on the Development Site. The ability of the City's water and sewer infrastructure to handle the estimated demand/generation that is anticipated from the Proposed Development is assessed by estimating existing, No-Action, and With-Action water demand and sewage generation. Future With-Action water demand and wastewater generation is compared to the No-Action condition, and future With-Action combined stormwater runoff and wastewater generation volumes are compared to existing conditions.

D. EXISTING CONDITIONS

Wastewater Conveyance System

The majority of New York City's wastewater treatment system is comprised of the sewer network beneath the streets and the fourteen Water Pollution Control Plants (WPCPs) located throughout the City. The majority of New York City's sewers are called combined sewers as they receive sanitary wastewater and stormwater runoff. Wastewater generated in a "drainage basin" (the area served by a WPCP) is conveyed through a network of combined sewers to the WPCP. The Development Site is served by combined sewers that collect both sanitary sewage and stormwater. The Development Site is located within the drainage basin for the Newtown Creek WPCP, which is the largest wastewater treatment facility in the City, located approximately 0.8 miles to the northeast, at 320 Freeman Street in Greenpoint, Brooklyn.

Collection sewers can be one to two feet in diameter on side streets, and three or four feet in diameter under larger roadways, which connect to trunk sewers, generally five to seven feet in diameter. During dry weather, regulators built into the combined sewer system direct flows to interceptor sewers leading to the WPCPs. These large interceptor sewers (often up to ten or twelve feet in diameter) bring the wastewater to the WPCPs for treatment. In the vicinity of the Development Site, there is a 12-inch combined sewer pipe under Banker Street, a 15-inch combined sewer pipe under Gem Street, a 36-inch combined sewer pipe under Meserole Avenue, an 84-inch combined sewer pipe under Wythe Avenue, as well as a 12-inch combined sewer pipe under the adjacent segment of North 15th Street.

At the Newtown Creek WPCP, wastewater is fully treated by physical and biological process before it is discharged into the East River. The quality of the treated wastewater (effluent) is regulated by a State Pollutant Discharge Elimination System (SPDES) permit issued by the New York State Department of Environmental Conservation (NYSDEC), which establishes limits for effluent parameters (i.e., suspended solids, fecal coliform bacteria, and other pollutants). As the volume of flow to a WPCP affects the level of treatment a plant can provide, the maximum permitted capacity for the Newtown Creek WPCP is 310 mgd. As presented in Table 9-1, below, the average daily flows to the Newtown Creek WPCP for the 12-month period ending in July 2019 was approximately 213 mgd, which is well below the maximum permitted capacity of 310 mgd.

TABLE 9-1
Existing Newtown Creek WPCP Average Daily Sewer Flows

Year	Month	Average Daily Flows (mgd)
2018	September	229
	October	214
	November	231
	December	234
2019	January	200
	February	197
	March	200
	April	196
	May	218
	June	212
	July	213
	August	207
12-Month Average		213

Source: DEP "Monthly Operating Efficiency" tables, 2018 and August 2019.

During and immediately after wet weather events, combined sewers can experience a much larger flow due to stormwater runoff collection. Stormwater runoff from impermeable surfaces is collected by catch basins along the street and conveyed by the City's combined sewer system to the Newtown Creek WPCP. During storm events, the regulators built into the system allow only twice the dry weather design flow into interceptor sewers, and any excess flow is directed to outfalls into the local waterway (e.g., the East River, etc.) as combined sewer overflow (CSO). In the vicinity of the Development Site, there are several CSO outfalls discharging into the East River. The two most proximate CSO outfalls to the Development Site are located on the western terminus of North 12th Street and the western terminus of Quay Street. During storm events, excess flow from the combined sewers serving the Development Site would be directed to CSO outfalls via intercepting force mains.

Sanitary Flows

As described in Chapter 1, "Project Description," the Development Site with a lot area of approximately 116,756 sf, is currently occupied by a number of buildings housing predominantly industrial and open storage uses. This includes four interconnected one- to two-story buildings with a total of approximately 72,885 gsf of built floor area that are occupied by the Acme Smoked Fish processing plant and smokehouse, a stone supplier occupying a two-story building (approximately 21,500 gsf of floor area) and an adjacent storage area, a vacant one-story building with approximately 3,800 gsf, and the field office and open storage for a utility construction company that occupies a paved area (with a trailer and two small sheds) at the southern end of the block. As presented in Table 9-2, the existing uses are estimated to generate approximately 67,424 gpd of daily sanitary sewage, with a total water demand of approximately 83,469 gpd. Existing sanitary flows generated on the Development Site are conveyed to the Newtown Creek WPCP during dry weather events via the existing combined sewers serving the site.

TABLE 9-2
Existing Water Consumption and Wastewater Generation on the Development Site

Land Use	Rate[1]	GSF	Domestic Water/ Wastewater Generation (gpd)	A/C (gpd)
Industrial – Acme	N.A. See Note.	72,885	57,534	12,390
Industrial – Non-Acme	Domestic: 0.46 gpd/sf; A/C: 0.17 gpd/sf	21,500	9,890	3,655
Office	Domestic: 0.10 gpd/sf; A/C: 0.17 gpd/sf	0	0	0
Retail	Domestic: 0.24 gpd/sf; A/C: 0.17 gpd/sf	0	0	0
Total Water Consumption (Domestic Water + A/C)			***83,469 gpd***	
Total Wastewater Generation			***67,424 gpd***	

Notes:
[1] Based on *CEQR Technical Manual* water demand rates from Table 13-2. For industrial/manufacturing uses, as no rate is provided in the *CEQR Technical Manual*, domestic generation rate for non-Acme uses is from DEP's *Draft Rules and Regulations Governing the Construction of Private Sewers and Drains*. Assume 10,000 gpd per acre multiplied by zoning district factors (2.00 for existing M3-1), which is the equivalent of 0.46 gpd/sf for existing/No-Action. Use retail/office rate for A/C. For Acme, estimates for total water usage and wastewater generation provided by the Applicant (approximately 21,000,000 gallons annually for water usage and 21,000,000 annually for wastewater generation for existing conditions).

Stormwater Flows

The Development Site has a total lot area of approximately 116,756 sf. As noted above, most of the Development Site is currently occupied by one-to two-story buildings, with the remaining portions of the site occupied by paved surfaces (used predominantly for open storage). As such, the Development Site is currently comprised entirely of impervious surfaces (roofs and pavement), resulting in an existing runoff coefficient of 0.97, as presented in Table 9-3.

TABLE 9-3
Existing Surface Types on the Development Site

Surface Type	Roof[1]	Pavement and Walks	Other	Grass and Softscape	Total
Area (%)	77	23	0	0	100
Surface Area (sf)	89,960	26,796	0	0	116,756
Runoff Coefficient[2]	1.0	0.85	0.85	0.20	0.97

Notes:
[1] Total roof area on site.
[2] Runoff coefficients for each surface type are as per DEP.

For this analysis, standard DEP runoff coefficients were used to calculate the amount of stormwater runoff for various rainfall intensities and durations, with rainfall ranging from 0.00 inches to 2.50 inches over durations of 3.80 to 19.50 hours. Table 9-4 shows the combined stormwater runoff and wastewater generation for the Development Site under existing conditions. As indicated in the table, the Development Site currently generates between 0.00 and 0.18 mg of stormwater within the Newtown Creek WPCP for the different rainfall intensities.

TABLE 9-4
Existing Combined Stormwater Runoff and Wastewater Generation

Rainfall (inches)	Duration (Hours)	Total Area (Acres)	Runoff Coefficient[1]	Stormwater Runoff to CSS (MG)[2]	Sanitary to CSS (MG)[3]	Total Volume to CSS (MG)
0.00	3.80	2.68	0.97	0.00	0.011	0.01
0.40	3.80			0.03	0.011	0.04
1.20	11.30			0.08	0.032	0.12
2.50	19.50			0.18	0.055	0.23

Notes:
[1] Refer to Table 9-3.
[2] Conservatively assumes that all stormwater runoff from the Development Site would be conveyed to the combined sewer system, with no direct discharge.
[3] Derived from Table 9-2.
MG = million gallons

E. THE FUTURE WITHOUT THE PROPOSED ACTIONS (NO-ACTION CONDITION)

As described in Chapter 1, "Project Description," in the future without the Proposed Actions, it is anticipated that the existing buildings on the Development Site would be re-occupied by a mix of eating/drinking/entertainment establishments, creative office and warehouse uses, and Lot 125 would be redeveloped with a new 3-story commercial building with distillery, office, dance studio and restaurant uses. Overall, the No-Action condition for the Development Site is assumed to consist of a total of 169,485 gsf, comprised of approximately 35,225 gsf of restaurant/entertainment uses, 66,750 gsf of creative office space, 28,610 gsf of warehousing spaces, and 17,500 gsf of industrial space (distillery), as well as an estimated 21,400 gsf of accessory parking (107 spaces).

Sanitary Flows

In the future without the Proposed Actions, sanitary discharges resulting from the No-Action uses on the Development Site would be directed to the Newtown Creek WPCP. As indicated in Table 9-5, the No-Action uses are expected to generate approximately 26,040 gpd of daily sanitary sewage, with a total water demand of approximately 51,214 gpd. As there is available capacity at the Newtown Creek WPCP for the incremental wastewater flows from the Development Site, the facility would continue to operate within its current design capacities in the 2024 No-Action condition.

TABLE 9-5
No-Action Water Consumption and Wastewater Generation on the Development Site

Land Use	Rate[1]	GSF	Domestic Water/ Wastewater Generation (gpd)	A/C (gpd)
Industrial – Non-Acme	Domestic: 0.46 gpd/sf; A/C: 0.17 gpd/sf	17,500	8,050	2,975
Office + Warehouse	Domestic: 0.10 gpd/sf; A/C: 0.17 gpd/sf	95,360	9,536	16,211
Retail + Restaurant	Domestic: 0.24 gpd/sf; A/C: 0.17 gpd/sf	35,225	8,454	5,988
Total Water Consumption (Domestic Water + A/C)			***51,214 gpd***	
Total Wastewater Generation			***26,040 gpd***	

Notes:
[1] Based on *CEQR Technical Manual* water demand rates from Table 13-2. Apply office rate to warehouses use, and apply retail rate to restaurant/entertainment use. For industrial/manufacturing uses, as no rate is provided in the *CEQR Technical Manual*, domestic generation rate is from DEP's *Draft Rules and Regulations Governing the Construction of Private Sewers and Drains*. Assume 10,000 gpd per acre multiplied by zoning district factors (2.00 for existing M3-1), which is the equivalent of 0.46 gpd/sf for existing/No-Action.

Stormwater Flows

In the future without the Proposed Actions, stormwater runoff from the Development Site would continue to be collected and directed through the combined sewer system and then conveyed to the Newtown Creek WPCP for treatment. As noted above, it is assumed that the existing buildings on the Development Site would be re-occupied in the No-Action condition, and a new 3-story commercial building would be developed on Lot 125. The new development anticipated on Lot 125 under the No-Action condition would result in an increase of the roof area on the Development Site, with a corresponding decrease in the area comprised of pavement/walks. As a result, the amount of stormwater runoff generated on the Development Site would increase slightly, as compared to existing conditions.

F. THE FUTURE WITH THE PROPOSED ACTIONS (WITH-ACTION CONDITION)

In the 2024 With-Action condition, the Development Site would be redeveloped with approximately 654,300 gsf of commercial/manufacturing uses. As described in Chapter 1, "Project Description," the Proposed Development would be comprised of a 4-story, approximately 109,300 gsf, Acme Smoked Fish processing facility, a nine-story commercial building with approximately 496,800 gsf of office uses and 33,800 gsf of local retail, as well as 150 off-street accessory parking spaces (14,400 gsf). The two buildings comprising the Proposed Development would occupy the entirety of the Development Site. As described in Chapter 1, the Proposed Development is anticipated to include partially covered landscaped open areas at the southern portion of the Development Site, with approximately 12,880 sf of those spaces open to the sky.

Sanitary Flows

As described previously, the Development Site is located in an area served by combined sewers. In the future with the Proposed Actions, wastewater from the Development Site would continue to be treated by the Newtown Creek WPCP, which has a SPDES-permitted dry weather flow capacity of 310 mgd. As shown in Table 9-6, the Proposed Development would generate approximately 109,847 gpd of sanitary sewage, with a total water demand of approximately 218,630 gpd. This sanitary sewage generation represents a net increase of approximately 83,807 gpd (0.08 mgd) over the No-Action condition. While this represents an increase in sanitary flows, it is equivalent to less than 0.03 percent of the average daily flow at the Newtown Creek WPCP, and would not result in an exceedance of the plant's permitted capacity of 310 mgd.

TABLE 9-6
With-Action Water Consumption and Wastewater Generation on the Development Site

Land Use	Rate[1]	Area (gsf)	Domestic Water/ Wastewater Generation (gpd)	A/C (gpd)
Industrial – Acme	Domestic: See Note; A/C: 0.17 gpd/sf	109,300	52,055	18,581
Office	Domestic: 0.10 gpd/sf; A/C: 0.17 gpd/sf	496,800	49,680	84,456
Local Retail	Domestic: 0.24 gpd/sf; A/C: 0.17 gpd/sf	33,800	8,112	5,746
Water Consumption				
Total Water Consumption			***218,630***	
Incremental Water Consumption (Compared to No-Action)			***+167,416***	
Wastewater Generation				
Total Wastewater Generation			***109,847***	
Incremental Wastewater Generation (Compared to No-Action)			***+83,807***	

Notes:
[1] Based on *CEQR Technical Manual* water demand rates from Table 13-2 unless otherwise noted. For industrial/manufacturing uses, as no rate is provided in the *CEQR Technical Manual*, estimates for Acme's total water usage and wastewater generation was provided by the Applicant (approximately 19,000,000 gallons annually for water usage and 19,000,000 annually for wastewater generation for With-Action conditions). Use retail/office rate for A/C.

Connecting to the City's sewer system requires certification from DEP as part of the building permit process, which is not a discretionary approval. The Applicant would be required to file a site connection proposal for approval from DEP to tie into the sewer system. In order to obtain a sewer connection permit from DEP, the Applicant would be required to demonstrate that the existing system could handle the increased flows due to the Proposed Development. As part of the site connection approval process, a hydraulic analysis of the existing sewer system would likely be required to determine whether the existing sewer system is capable of supporting higher density development and the related increase in wastewater flow, or whether there will be a need to upgrade the existing sewer system. In addition, there may be a need to amend the existing drainage plan based on the hydraulic analysis calculations. Any analysis and improvements, if required, would be undertaken prior to construction of the Proposed Development and would be coordinated with DEP for review and approval. In addition, in accordance with the New York City Plumbing Code (Local Law 33 of 2007), while not accounted for in the quantitative analysis, the Proposed Development would be required to utilize low-flow plumbing fixtures, which would reduce sanitary flows to the plant. Therefore, the Proposed Development would not result in a significant adverse impact to the City's sanitary sewage conveyance and treatment.

Stormwater Flows

In the future with the Proposed Development, the existing one- to two-story buildings and paved surfaces on the site would be replaced by the two buildings comprising the Proposed Development, which would occupy the Development Site in its entirety. As discussed above, the Proposed Development is anticipated to include partially covered landscaped open areas at the southern portion of the Development Site, with approximately 12,880 sf of those areas open to the sky. For analysis purposes, that area which is open to the sky is assumed to be 75% paved and 25% grass/softscape. Table 9-7 shows the surface types that are expected on the Development Site under 2024 With-Action conditions. As presented in Table 9-7, the runoff coefficient for the Development Site would remain 0.97 in the future with the Proposed Actions.

TABLE 9-7
With-Action Surface Types on the Development Site

Surface Type	Roof[1]	Pavement and Walks	Other	Grass and Softscape	Total
Area (%)	89	8	0	3	100
Surface Area (sf)	103,599	9,660	0	3,220	116,756
Runoff Coefficient[2]	1.0	0.85	0.85	0.20	0.97

Notes:
[1] Total roof area on site.
[2] Runoff coefficients for each surface type are as per DEP.

Table 9-8 compares the estimated combined flows (stormwater runoff and sanitary flows) to the combined sewer system under existing and With-Action conditions using the DEP Flow Volume Calculation Matrix. As shown in the table, depending on the rainfall volume and duration, the total With-Action volume to the combined sewer system (both stormwater and sanitary) could be between 0.02 and 0.26 mg. Compared to existing conditions, this would represent an increase in combined sewer flows of up to 0.03 mg.

TABLE 9-8
Existing and With-Action Combined Stormwater Runoff and Wastewater Generation

		Existing Conditions			With-Action Condition			
Rainfall (inches)	Duration (Hours)	Stormwater Runoff to CSS (MG)	Sanitary to CSS (MG)	Total to CSS (MG)	Stormwater Runoff to CSS (MG)	Sanitary to CSS (MG)	Total to CSS (MG)	Increased Total Volume to CSS (MG)
0.00	3.80	0.00	0.011	0.01	0.00	0.017	0.02	0.01
0.40	3.80	0.03	0.011	0.04	0.03	0.017	0.05	0.01
1.20	11.30	0.08	0.032	0.12	0.08	0.052	0.14	0.02
2.50	19.50	0.18	0.055	0.23	0.17	0.089	0.26	0.03

Notes:
MG = million gallons

The Development Site is located in an area that is well-served by combined sewer infrastructure. As previously noted, the wastewater collection system at the Development Site consists of a 12-inch combined sewer pipe under Banker Street, a 15-inch combined sewer pipe under Gem Street, a 36-inch combined sewer pipe under Meserole Avenue, an 84-inch combined sewer pipe under Wythe Avenue, as well as a 12-inch combined sewer pipe under the adjacent segment of North 15th Street. Given the size of the combined sewer facilities in the vicinity of the Development Site, it is anticipated that there is ample capacity in the adjacent sewer infrastructure to accommodate the additional combined flows generated by the Proposed Actions. As noted above, the Applicant would be required to file a site connection proposal for approval from DEP to tie into the City's sewer system. As part of the site connection approval process, a stormwater analysis would be required in order to ensure that the Proposed Development complies with the required stormwater release rate.

Stormwater Best Management Practices

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. Stormwater BMPs would be required as part of the DEP site connection approval process in order to bring the Proposed Development into compliance with the required stormwater release rate. Based on the DEP Guidelines for Detention Facility Design, dated November 19, 2012, for new developments, the required stormwater release rate for the Proposed Development is required to be 0.25 cubic feet per second (cfs)

or ten percent of the allowable flow. Specific BMP methods will be determined with further refinement of the building design and in consultation with DEP.

A broad range of BMPs could be implemented on the Development Site to facilitate stormwater source controls and limit the stormwater release rate to the required 0.25 cubic feet per second (cfs) or ten percent of the allowable flow per the drainage plan, whichever is greater. The implementation of low-flow fixtures, as per the New York City Plumbing Code, Local Law 33 of 2007, and the U.S. Environmental Protection Agency's WaterSense Program, would help control sanitary flows. To further offset these increases, on-site stormwater control measures of BMPs could be implemented to retain or slowly release stormwater runoff with controlled discharge rates to the City's combined sewer system.

The following typical BMP measures could be used to help manage stormwater flows: the implementation of BMPs described in the New York City Green Infrastructure Plan and/or green technologies, such as blue and green roofs, subsurface detention and infiltration, porous pavement, enhanced tree pits, and rain cisterns, depending on site conditions. The design of detention tanks, green roofs, and/or other chosen stormwater control BMPs, would be required to meet the overall release rate of 0.25 cfs or ten percent of DEP's allowable flow rate (whichever is greater) from the Development Site.

Therefore, with the incorporation of appropriate BMPs that would be required as part of the site connection approval process to be reviewed and approved by DEP, the overall volume of sanitary sewer discharge and stormwater runoff, as well as the peak stormwater runoff rate, would be reduced. Sewer conveyance near the Development Site and the treatment capacity at the Newtown Creek WPCP is sufficient to handle wastewater flow resulting from the Proposed Development. Therefore, there would be no significant adverse impacts on wastewater treatment or stormwater conveyance infrastructure as a result of the Proposed Actions.