Chapter 11: Water and Sewer Infrastructure

A. INTRODUCTION

This chapter considers the potential for the proposed actions to result in a significant adverse impact to the City's wastewater and stormwater conveyance and treatment system. As described in more detail in Chapter 1, "Project Description," the two applicants—DD West 29th Street LLC (Applicant A) and West 30th Street LLC (Applicant B)—are requesting discretionary actions to facilitate the redevelopment of two project sites in the West Chelsea neighborhood of Manhattan Community District 4. The Project Area consists of project site A, located at 601 West 29th Street (Block 675, Lots 12, 29, and 36), and project site B, located at 606 West 30th Street (Block 675, Lot 39). The Project Area also includes an intervening lot (Lot 38), which is not part of either project site but is assumed to be redeveloped for the purposes of environmental review. Block 675 is bounded by West 29th and West 30th Streets, Route 9A/Twelfth Avenue and Eleventh Avenue. According to the 2014 *City Environmental Quality Review (CEQR) Technical Manual*, projects that increase density or change drainage conditions on a large site require a water and sewer infrastructure analysis. Developments that would result in an exceptionally large demand for water (more than one million gallons per day [gpd]) or that are in an area that experiences low water pressure require an analysis of potential impacts on the water supply system. Developments in a combined sewer area in Manhattan exceeding incremental development thresholds of 1,000 residential units or 250,000 square feet (sf) of commercial, public facility, institutional and/or community facility space require an analysis of potential impacts on the wastewater and stormwater conveyance and treatment system. The Project Area is in a section of Manhattan that is served by a combined sewer system, and the proposed actions would result in approximately 1,242 residential units. The Project Area is not in an area that experiences low water pressure. Following the guidelines of the *CEQR Technical Manual*, an analysis of the proposed actions' potential impacts on the wastewater and stormwater conveyance and treatment system was performed. As described below, the proposed actions do not warrant an analysis of water supply.

PRINCIPAL CONCLUSIONS

The analysis finds that the proposed actions would not result in any significant adverse impacts on the City's water supply or wastewater and stormwater conveyance and treatment infrastructure. The proposed actions would result in an increase in water consumption and sewage generation on the Project Area as compared with the Existing/No Action condition. While the proposed actions would result in an incremental water demand of 397,390 gpd, this would not represent a significant increase in demand on the New York City water supply system. An analysis of water supply is not warranted since it is expected that there would be adequate water service to meet the incremental demand, and there would be no significant adverse impacts on the City's water supply.

While the proposed projects would generate 215,757 gpd of sanitary sewage, an increase of 208,218 gpd above the Existing/No Action condition, this incremental increase in sewage generation would be approximately 0.19 percent of the average daily flow at the North River Wastewater Treatment Plant (WWTP) and would not result in an exceedance of the plant's permitted capacity. The proposed projects would connect to the existing combined sewer system located in the street frontages surrounding the Project Area. The proposed site connections to these combined sewers would be reviewed and approved by New York City Department of Environmental Protection (DEP). Therefore, the proposed projects would not result in a significant adverse impact to the City's wastewater conveyance and treatment system.

The overall volume of stormwater runoff and the peak stormwater runoff rate from the Project Area is expected to increase due to the decrease in paved areas and increase of fully impervious rooftop area, as per preliminary site plans showing building coverage of project site A and project site B. 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 by DEP, would aid in the reduction of peak stormwater runoff rate.

B. METHODOLOGY

WATER SUPPLY

The *CEQR Technical Manual* recommends a preliminary water analysis if a project would result in an exceptionally large demand of water (over one million gpd), or 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 Project Area is not in an area that experiences low water pressure. While the proposed projects would result in an incremental water demand,[1] this would not represent a significant increase in demand on the New York City water supply system. Therefore, an analysis of water supply is not warranted since it is expected that there would be adequate water service to meet the incremental demand, and there would be no significant adverse impacts on the City's water supply.

WASTEWATER AND STORMWATER CONVEYANCE AND TREATMENT

As described above, the Project Area is in a combined sewer area in Manhattan, and the proposed projects would exceed the *CEQR Technical Manual* threshold of 1,000 residential units. Therefore, this chapter includes an analysis of the proposed projects' potential impacts on the City's wastewater and stormwater conveyance and treatment infrastructure. Existing and future water demand and sanitary sewage generation are calculated based on use rates set by the *CEQR Technical Manual*.[2] The DEP Flow Volume Calculation Matrix is used to calculate the overall combined sanitary sewage and stormwater runoff volume discharged to the combined sewer system for four rainfall volume scenarios with varying durations in the two combined sewer overflow (CSO) areas. The ability of the City's sewer infrastructure to handle the anticipated demand from the proposed projects is assessed by estimating existing sewage generation rates and comparing these existing rates with the With Action condition, per *CEQR Technical Manual* methodology.

---

[1] See **Tables 11-1 and 11-3**, which include calculations of the Project Area's total water demand in the Existing condition and the With Action condition.

[2] *CEQR Technical Manual*, March 2014, Table 13-2.

C. EXISTING CONDITIONS

CONVEYANCE SYSTEM

The Project Area is in a part of New York City served by a combined sewer system that collects both sanitary sewage and stormwater. In periods of dry weather, the combined sewers (sized to convey an amount of sanitary sewage that is based on density levels according to zoning regulations) in the adjacent streets convey only sanitary sewage. The Project Area is served on all three streets by large combined sewers. Two combined sewers measuring 72- by 120- inches and 60- by 72-inches are located in West 30th Street and convey wastewater west to Regulator NR-N45 located underneath Twelfth Avenue at West 30th Street. A combined sewer measuring 60- by 28-inches and 72- by 28-inches is located in West 29th Street and conveys wastewater westward to Regulator NR-N45. A 28- by 42-inch combined sewer is located in Eleventh Avenue and conveys wastewater to regulator NR-N46 located underneath Twelfth Avenue at West 26th Street. Regulators are structures that control the flow of sewage to interceptors, i.e., larger sewers that connect the combined sewer system to the City's sewage treatment system. From Regulator NR-N45 and NR-N46, wastewater flows into the North River WWTP from an 11-mile-long intercepting sewer that extends along Manhattan's west side.[3]

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 (DEC), which establishes limits for effluent parameters (i.e., suspended solids, fecal coliform bacteria, and other pollutants). Since the volume of flow to a WWTP affects the level of treatment a plant can provide, the maximum permitted capacity for the North River WWTP is 170 million gallons per day (mgd).[4] The average monthly flow to the WWTP over the past 12 months is 110 mgd, which is well below the maximum permitted capacity. [5]

During and immediately after wet weather, combined sewers can experience a much larger flow due to stormwater runoff collection. To control flooding at the North River WWTP, the regulators built into the system allow only approximately two times the amount of design dry weather flow into the interceptors. The interceptor then takes the allowable flow to the WWTP, while the excess flow is discharged to the nearest waterbody as CSO. The Project Area is located within two CSO drainage areas: approximately 13 percent of the Project Area is located within the drainage area of CSO outfall NR-026, while the rest of the Project Area is located within the drainage area of CSO outfall NR-027. In wet weather, sanitary flow and stormwater runoff from 1.58 acres of the Project Area is conveyed through Regulator NR-N45 to CSO outfall NR-027, which is located at the end of West 30th Street, where it is discharged into the Hudson River. Flow from 0.23 acres of the Project Area is conveyed through Regulator NR-N46 to CSO outfall NR-026, which is located at the end of West 26th Street, where it is discharged into the Hudson River.

[3] NYC Website: North River WWTP http://www.nyc.gov/html/dep/html/wastewater/northri.shtml

[4] DEP Map of WWTPs

[5] Monthly Sewage Flows for 12-month period through March 2017

SANITARY FLOWS

As described in Chapter 1, "Project Description," the Project Area has a history of auto-related and industrial uses dating back prior to the 1890s. A variety of industrial uses occurred on the Project Area, including automobile/truck repair, freight businesses, a lumber yard, a smelting and refining facility, iron works, and warehouses. Aside from the New York City Department of Sanitation (DSNY) building built in 1994, existing structures on Lots 12 and 29 were built in the early twentieth century and were converted to the Jeff Koons art facility within the last twenty years. Lot 36 has been used as a gas station since 1927. Lot 39 has been used since the 1970s for equipment storage/maintenance. Today, the Project Area contains 75,386 gsf comprising industrial (auto repair) and commercial uses. The amount of sanitary sewage is estimated as all water demand generated by the occupied portions of the Project Area, excepting water used by air conditioning, which is typically not discharged to the sewer system. Table 13-2 of the *CEQR Technical Manual* provides water generation estimates for commercial uses, but does not provide estimates for industrial uses. Therefore, for the purposes of this analysis, any industrial use areas and commercial use areas will be considered together as 75,386 gross square feet (gsf) of commercial space. The commercial space is estimated to have water demand and sewage generation at the rates of commercial office space as outlined in the *CEQR Technical Manual*. As shown on **Table 11-1**, the Project Area currently generates an estimated 7,539 gpd of sanitary sewage with a total water demand of 20,355 gpd.

Table 11-1
Existing Water Consumption and Sewage Generation

Use	Floor Area	Rate*	Consumption (gpd)
Commercial Office			
Domestic	75,386 gsf	0.10 gpd/sf	7,539
Air Conditioning	75,386 gsf	0.17 gpd/sf	12,816
Total Water Supply Demand			**20,355**
Total Sewage Generation			**7,539**
Note: * Rates are from the *CEQR Technical Manual*, Table 13-2.			

STORMWATER FLOWS

The Project Area has a total area of approximately 79,000 sf (1.81 acres). About 1.58 acres is conveyed to CSO outfall NR-027 and about 0.23 acres are conveyed to CSO outfall NR-026. As noted above, the Project Area comprises project site A, project site B and Lot 38. The surface area of the Project Area that flows to CSO NR-027 under existing conditions is approximately 70 percent rooftop area, and 30 percent pavement or walkways. The surface area of the Project Area that flows to CSO NR-026 (approximately 13 percent of the Project Area) is also composed of approximately 70 percent rooftops and 30 percent pavement or walkways. **Table 11-2** summarizes the existing surface coverage of the Project Area, as well as the weighted runoff coefficient (the fraction of precipitation that becomes surface runoff).

Table 11-2
Existing Surface Coverage

Affected CSO Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scape	Total
NR-027	Area (percent)	70%	30%	0%	0%	**100%**
	Surface Area (acres)	1.10	0.48	0	0	**1.58**
	Runoff Coefficient*	1.00	0.85	0.85	0.20	**0.95**
NR-026	Area (percent)	70%	30%	0%	0%	**100%**
	Surface Area (acres)	0.16	0.07	0	0	**0.23**
	Runoff Coefficient*	1.00	0.85	0.85	0.20	**0.95**

Notes: * Weighted Runoff Coefficient calculations based on the DEP Flow Volume Calculation Matrix provided in the *CEQR Technical Manual*, retrieved May 2017.

D. THE FUTURE WITHOUT THE PROPOSED ACTIONS

As described in Chapter 1, "Project Description," in the future without the proposed actions (the No Action condition), the Project Area is assumed to remain as it would under existing conditions. The sanitary and stormwater flows would therefore remain unchanged.

CONVEYANCE SYSTEM

In the No Action condition, there would be no changes to the wastewater conveyance system serving the Project Area. Wastewater would continue to be conveyed to Regulators NR-N45 and NR-N46 and the North River WWTP, and CSOs would continue to be discharged to the Hudson River through outfall NR-027 and NR-026. While it is anticipated that the North River WWTP will witness the development of cogeneration facilities to enhance the reliability of this critical facility during emergency events like Superstorm Sandy, there are no plans to expand the capacity of the WWTP at the time of this assessment.[6] New York City launched the NYC Green Infrastructure Plan and CSO Long Term Control Plans (LTCPs) which is a 20-year effort to improve water quality standards in New York. Part of this program is to capture the first inch of runoff in ten percent of impervious surfaces citywide which would result in approximately 1.5 billion gallons of CSO reductions annually by 2030.

SANITARY FLOWS

The water demand and sewage generation of the No Action condition is expected to be the same as existing conditions.

STORMWATER FLOWS

Under the No Action condition, it is anticipated that the buildings in the Project Area would remain and site coverage would remain as in existing conditions. Therefore, the stormwater flows would be unchanged from existing conditions and the runoff coefficient would remain as 0.95.

[6] A Stronger, More Resilient New York. Chapter 12, "Water and Wastewater." http://www.nyc.gov/html/sirr/downloads/pdf/final_report/Ch_12_WaterWaste_FINAL_singles.pdf

E. THE FUTURE WITH THE PROPOSED ACTIONS

With the proposed actions, the Project Area would be redeveloped with a mix of uses including approximately 1,135,636 gsf of residential area containing 1,242 residential units. These units would generate approximately 2,049 residents. The Project Area would also include approximately 40,028 gsf of commercial retail uses, 252 parking spaces and 12,500 gsf anticipated as a Fire Department of the City of New York-Emergency Medical Services (FDNY-EMS) Station. This analysis considers the proposed projects without the parking/mechanical floor area because parking does not require water service nor does it generate sewage.

CONVEYANCE SYSTEM

It is anticipated that the combined sewers in Eleventh Avenue, West 30th and West 29th Streets would be available for connection upon the review and approval of the site connection proposal by DEP. Wastewater would continue to be conveyed to Regulators NR-N45 and NR-N46 and the North River WWTP, and CSO would continue to be discharged to the Hudson River through outfalls NR-027 and NR-026.

SANITARY FLOWS

Table 11-3 summarizes the water demand and sewage generation of the proposed projects, which includes residential, retail, and space for an EMS station. For the purposes of this analysis, the 12,500 gsf EMS space is considered as commercial office space. The domestic residential water demand is estimated by the number of residents and the domestic air conditioning water demand is estimated by the gsf of residential floor area. As noted above, water demand for air conditioning does not usually return to the sewer system resulting in differing totals for water demand and sewer demand. Overall, the proposed projects are expected to have a total water demand of 417,745 gpd and would generate an estimated 215,757 gpd of daily sanitary sewage.

The incremental sanitary sewage generated by the proposed projects, as compared with the No Action condition, would be 208,218 gpd. This incremental increase in sewage generation is approximately 0.19 percent of the average daily flow at the North River WWTP (110 mgd) and would not result in an exceedance of the plant's permitted capacity of 170 mgd. In addition, in accordance with the New York City Plumbing Code (Local Law 33 of 2007), the proposed projects would be required to utilize low-flow plumbing fixtures, which would reduce the sanitary flows to the WWTP. Therefore, the proposed projects would not result in a significant adverse impact to the City's sanitary sewage conveyance and treatment system.

Table 11-3
Water Consumption and Sewage Generation for the Proposed Projects

Use	Floor Area/Units/Persons	Rate[1]	Consumption (gpd)
Residential			
Domestic	2,049 persons[2]	100 gpd/person	204,900
Air Conditioning	1,135,636 gsf	0.17 gpd/sf	193,058
Retail			
Domestic	40,028	0.24 gpd/sf	9,607
Air Conditioning	40,028	0.17 gpd/sf	6,805
Commercial/Office (EMS space)			
Domestic	12,500	0.10 gpd/sf	1,250
Air Conditioning	12,500	0.17 gpd/sf	2,125
Total Water Supply Demand			**417,745**
Total Sewage Generation			**215,757**

Notes: [1] Rates are from the *CEQR Technical Manual*, Table 13-2.
[2] Residential population based on Manhattan Community District 4 average household size of 1.65 persons per household, applied to the total number of proposed residential units

STORMWATER FLOWS

Preliminary roof area site plans for the proposed projects on project site A and project site B indicate that the entirety of the lots will be covered in rooftop providing no pavement, walkways, or pervious surfaces. It is anticipated that Lot 38 would also contain a structure with 100 percent rooftop coverage. Therefore for the purposes of this analysis, the Project Area proposed surface coverage is estimated as 100 percent roof coverage. **Table 11-4** summarizes the surface coverages and the weighted runoff coefficients for the portions of the Project Area in each of the two CSO areas that would receive flows.

Table 11-4
Proposed Surface Coverage

Affected CSO Outfall	Surface Type	Roof	Pavement and Walkways	Other	Grass and Soft Scape	Total
NR-027	Area (percent)	100%	0%	0%	0%	**100%**
	Surface Area (acres)	1.58	0	0	0	**1.58**
	Runoff Coefficient*	1.00	0.85	0.85	0.20	**1.00**
NR-026	Area (percent)	100%	0%	0%	0%	**100%**
	Surface Area (acres)	0.23	0	0	0	**0.23**
	Runoff Coefficient*	1.00	0.85	0.85	0.20	**1.00**

Notes: * Weighted Runoff Coefficient calculations based on the DEP Flow Volume Calculation Matrix provided in the *CEQR Technical Manual*, retrieved May 2017.
Totals may not sum due to rounding.

Using these sanitary and stormwater flow calculations, the DEP Flow Volume Calculation Matrix was completed for the existing conditions and the proposed projects (the With Action condition). The calculations from the Flow Volume Calculation Matrix help to determine the change in wastewater flow volumes to the combined sewer system from existing to With Action conditions, and include four rainfall volume scenarios with varying durations. The summary tables of the Flow Volume Calculation Matrix are included in **Table 11-5**.

Table 11-5
DEP Flow Volume Matrix: Existing and Build Volume Comparison

Rainfall Volume (in.)	Rainfall Duration (hr.)	Runoff Volume to Direct Drainage (MG)	Runoff Volume to CSS (MG)*	Sanitary Volume to CSS (MG)	Total Volume to CSS (MG)	Runoff Volume to River (MG)	Runoff Volume to CSS (MG)*	Sanitary Volume to CSS (MG)**	Total Volume to CSS (MG)	Increased Total Volume to CSS (MG)***
NR-027		Existing				With Action				**NR-027 Increment**
		68,998 square feet (1.58 acres)				68,998 square feet (1.58 acres)				
0.00	3.80	0.00	0.00	0.00	**0.00**	0.00	0.00	0.03	**0.03**	0.03
0.40	3.80	0.00	0.02	0.00	**0.02**	0.00	0.02	0.03	**0.05**	0.03
1.20	11.30	0.00	0.05	0.00	**0.05**	0.00	0.05	0.09	**0.14**	0.09
2.50	19.50	0.00	0.10	0.00	**0.10**	0.00	0.11	0.15	**0.26**	0.16
NR-026		Existing				With Action				**NR-026 Increment**
		10,000 square feet (0.23 acres)				10,000 square feet (0.23 acres)				
0.00	3.80	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**	0.00
0.40	3.80	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.01**	0.00
1.20	11.30	0.00	0.01	0.00	**0.01**	0.00	0.01	0.01	**0.02**	0.01
2.50	19.50	0.00	0.01	0.00	**0.02**	0.00	0.02	0.02	**0.04**	0.02

Notes: * Assumes no on-site detention or BMPs for purposes of calculations.
** Daily sanitary sewage generation per CEQR Technical Manual in MGD calculated by 87% of flow being directed to NR-027 and 13% of flow being directed to NR-026.
*** Totals may not sum due to rounding**.**
CSS = Combined Sewer System; MG = Million Gallons

As shown in **Table 11-5**, in all rainfall volume scenarios flow to the regulator NR-N45 and NR-N46 drainage areas would increase. The increase in flow is attributable to the increase in sanitary flow resulting from the proposed projects: the existing uses (including a gas station, an artist space, and a low-rise office building) have relatively little water demand and sewage generation on the Project Area under existing conditions.[7] Due to the increase in rooftop area, the proposed projects would also result in an increase in fully impervious surface area.

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 projects 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 as part of the DEP site connection approval process in order to bring the building into compliance with the required stormwater release rate. Specific BMP methods will be determined with further refinement of the building design and in consultation with DEP, but could include on-site stormwater detention systems such as rooftop detention, pavers, underground storage tanks, and/or tanks within the buildings. A hydraulic analysis of the existing sewer system may be required at the time of the site connection proposal application to determine whether the existing sewer system is capable of supporting higher density development and the related increase in wastewater flow.

The incorporation of the appropriate sanitary flow and stormwater source control BMPs that would be required as part of the site connection approval process would help reduce the overall additional volume of sanitary sewer discharge as well as the peak stormwater runoff rate from the Project Area. Sewer conveyance near the Project Area and the treatment capacity at the North River WWTP is sufficient to handle wastewater flow resulting from the proposed projects;

[7] The Flow Volume Calculation Matrix compares runoff and sanitary flows between existing and With Action conditions. The no action condition analyzed would be the same as existing conditions.

therefore, there would be no significant adverse impacts on wastewater treatment or stormwater conveyance infrastructure. ✷