

Seaside Park and Community Arts Center

Chapter 8: Water and Sewer Infrastructure

A. INTRODUCTION

According to the 2012 *City Environmental Quality Review (CEQR) Technical Manual*, the purpose of a water and sewer infrastructure analysis is to assess whether projects undergoing review may adversely affect the City's water distribution or sewer system and, if so, assess the effects of such projects to determine whether their impact is significant.

As described in Chapter 1, "Project Description," the proposed project would result in the development of a 2.41-acre publicly accessible open space, including an approximately 5,100 seat amphitheater, and the restoration and adaptive reuse of the (Former) Childs Restaurant Building. In comparison, in the absence of the proposed project (No-Action), it is anticipated that the development site would be developed with residential, commercial, and open space uses as analyzed in the *Coney Island Rezoning FEIS* (2009). The proposed project is not expected to exceed the *CEQR Technical Manual* incremental development thresholds for water supply and wastewater and stormwater conveyance and treatment. However, given (1) the location of the project area in Coney Island, an area that experiences low water pressure (e.g., an area at the end of a water supply distribution system), and (2) the extensive infrastructure planning for the surrounding area that has already been undertaken in conjunction with the redevelopment of Coney Island, a water and sewer infrastructure assessment is warranted, and is provided below.

B. PRINCIPAL CONCLUSIONS

Based on the methodology set forth in the *CEQR Technical Manual*, the proposed project would not result in a significant adverse impact on the City's water and sewer infrastructure.

Water Supply

The proposed project would result in a total water demand of approximately 54,600 gallons per day (gpd). As a result of the proposed reduction in the total residential and commercial built square footage compared to the future without the proposed project, the anticipated With-Action water demand would represent a net reduction of approximately 40 percent compared to the No-Action conditions. In addition, water infrastructure improvements in the surrounding area associated with the Amended Drainage Plan (ADP) would ensure that area water supply would operate with ample capacity. Therefore, the proposed project would not adversely affect the City's water supply or system water pressure.

Sanitary Sewage

Due to the proposed net reduction in built residential and commercial square footage on the development site, the proposed project would result in a net decrease in wastewater generation by

approximately 41 percent compared to the No-Action condition. Anticipated With-Action wastewater generation would total approximately 44,400 gpd compared to 75,240 gpd in the No-Action condition. Sanitary sewer infrastructure improvements associated with the ADP, including installation of upgraded sanitary sewers in the surrounding area would ensure that the sanitary sewers serving the development site would operate with ample capacity, and the proposed project would not result in a significant adverse impact to sanitary sewage conveyance and treatment.

Stormwater Drainage and Management

While the proposed project would result in minor increases in the amount of impervious surface area on the development site compared to existing conditions, the proposed project would also improve the development site's stormwater infrastructure by constructing new stormwater sewers, installing an underground stormwater management system to capture and treat stormwater generated on the development site, and incorporating Stormwater Best Management Practices (BMPs), as described in Section G. With the incorporation of these on-site infrastructure improvements, as well as additional infrastructure improvements currently underway in the surrounding area in accordance with the ADP, the proposed project would not result in significant adverse impacts on the stormwater conveyance and treatment infrastructure.

C. METHODOLOGY

According to the *CEQR Technical Manual*, a preliminary water supply infrastructure analysis is needed if the project would result in an exceptionally large demand for water (e.g., more than 1 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 such as the Rockaway Peninsula and Coney Island). Although the proposed project would result in minimal water demand, the project area is located in Coney Island (an area that experiences low water pressure), and therefore an assessment of water supply is warranted.

In separately sewered areas, a preliminary sewer analysis is warranted if: the project would result in 25 or more residential units or 50,000 square feet (sf) or more of commercial or community facility uses (depending on the existing zoning district); a project site is over five acres and would result in an increase of impervious surfaces on the site; or would involve construction of a new stormwater outfall that requires federal and/or state permits. The proposed project would not exceed any of the above-referenced water and sewer infrastructure analysis thresholds. However, as previously noted, extensive infrastructure planning in conjunction with the redevelopment of Coney Island has already been undertaken by the City in the surrounding area. In 2010, an ADP was prepared by the New York City Department of Environmental Protection (DEP) identifying drainage improvements for the Coney Island rezoning area and downstream of the rezoning area. The following year, the ADP was edited to reflect grade changes to West 21st Street (ULURP #C 100469 MMK), and in 2012, infrastructure improvements to improve stormwater drainage and upgrade the sanitary sewer system in accordance with the ADP were assessed in the *Coney Island Infrastructure Improvements EAS* (CEQR #11DEP045K). While the ADP accounted for redevelopment of the development site, an analysis of the proposed change of use on water and sewer infrastructure is provided to assess the potential impacts of the proposed project on the sewer infrastructure system.

As analyses of water demand and sewage generation are density-based technical analyses, only the anticipated development on the development site form the basis for this assessment; the outparcels are not part of the proposed development and are therefore excluded from the following analyses.

To assess the proposed project's potential impacts on water and sewer infrastructure, this chapter:

- Describes the existing water and sewer infrastructure on the development site and estimates water demand and sewage and stormwater generation under existing conditions and in the No-Action condition (for the 2016 analysis year). Existing and future water demands and sewage generation are calculated based on use generation rates provided in the *CEQR Technical Manual*; the 2005 *Brooklyn Bridge Park FEIS* provided the applicable open space and amphitheater consumption/generation rates. Stormwater runoff and sanitary flows are calculated using the DEP Flow Volume Calculation Matrix.
- Describes planned No-Action infrastructure improvements including the affected area, project components, and current schedules. The December 29, 2010 Coney Island ADP and 2011 edits, as well as the 2012 *Coney Island Infrastructure Improvements EAS* are the primary data sources for No-Action infrastructure improvements. The latest project schedules were provided by the New York City Department of Design and Construction (DDC).
- Forecasts water demand and sewage and stormwater generation by the projected developments induced by the proposed project based on CEQR guidelines.
- Assesses the effects of the proposed project's water demand and sewage and stormwater generation on the City's water and sewer infrastructure, pursuant to *CEQR Technical Manual* guidelines.

D. BACKGROUND

The 2009 *Coney Island Rezoning FEIS*'s water and sewer infrastructure analysis noted that as a result of the rezoning, storm and sanitary flows would exceed the capacity of existing sanitary and storm sewers in some areas and also stated that new streets proposed under the rezoning would require new separate sanitary and storm sewers to be constructed. As such, to address the anticipated infrastructure impacts of the 2009 Coney Island Rezoning project, DEP filed an ADP (CI-127) for the area generally bounded by West 26th Street to the west, Coney Island Creek to the north, West 8th Street to the east, and Riegelmann Boardwalk to the south. The ADP was filed with the Brooklyn Borough President's Office on December 29, 2010. Subsequently, the ADP was edited to reflect a City map change (approved by the Department of City Planning (DCP) on October 5, 2011 and analyzed in Technical Memorandum 004), which raised the street grades on portions of West 21st Street and adjacent portions of Ocean Way.

Specifically, the ADP includes:

- Replacing water mains, as required, to allow for the construction of the sanitary and stormwater sewer systems as per the approved ADP;
- Upgrading the existing stormwater sewer system to accommodate DEP's current 5-year storm design criteria and upgrading the existing sanitary system to accommodate wastewater flows from the proposed rezoning;
- Constructing stormwater sewer mains in areas that do not currently provide stormwater sewer mains;

- Constructing stormwater sewer mains to reroute stormwater currently discharging to the Atlantic Ocean to outfalls discharging to the Coney Island Creek where feasible;
- Upgrading private utilities (including gas and electric services) as required by the utility companies, to allow for the construction of the sanitary and stormwater systems as per the approved ADP;
- Raising the legal grades in the Coney East and Coney West subareas per the street alteration maps and mapping proposal; and,
- Defining Developer responsibilities to include site improvements related to detention, BMPs, adjacent sidewalks, street trees, electrical vaults, and connections to in-street infrastructure at the time of site development.

Phases 1, 2a, and 2b of the infrastructure improvements proposed by DEP in accordance with the ADP were analyzed in the 2012 *Coney Island Infrastructure Improvements EAS* (see Figure 8-1). The analyzed improvements included the enlargement of three existing outfalls (West 15th Street, West 21st Street, and West 12th Street), installation of new stormwater collection sewers, relocation and upgrade of distribution and trunk water mains, and relocation and upgrade of sanitary sewer lines along with the reconstruction of affected streets, as well as the design and construction of tidal wetlands at Calvert Vaux Park to address all permanent wetland impacts associated with the reconstruction and enlargement of the three stormwater outfalls.

Due to the large extent of the affected area and existing built conditions, the Coney Island infrastructure improvements assessed in the 2012 *Coney Island Infrastructure Improvements EAS* are being constructed as multiple capital projects over several years. According to the most recent DDC construction schedule, work on Phase 1 (West 15th Street outfall) is underway with an anticipated completion date of December 2014. Phase 2a (West 21st Street outfall) is similarly expected to be complete by 2016, with construction beginning in 2014 and finishing by October 2015. While work on Phase 2b (West 12th Street outfall) will begin prior to the 2016 Build Year for this proposed project, with an anticipated completion date of September 2017, infrastructure improvements associated with this phase are conservatively not included in the 2016 No-Action and With-Action conditions.

In addition to the infrastructure improvements analyzed in the 2012 *Coney Island Infrastructure Improvements EAS*, additional phases of construction in accordance with the ADP are anticipated to occur directly adjacent to the development site at a later date. Specifically, as part of Phase 4 of the project, DEP intends to expand the West 21st Street outfall drainage area to include the portion of the development site that lies to the east of West 22nd Street, thereby diverting storm flows that currently discharge directly into the Atlantic Ocean. However, as these improvements would be completed after the 2016 analysis year, they are conservatively not included in the No-Action and With-Action conditions.

E. EXISTING CONDITIONS

Water Supply

The New York City water supply system comprises a network of reservoirs, lakes, and aqueducts extending into the Catskill region and a pipe network that distributes water within the City. Because the Hudson, Harlem, and East Rivers are not potable water sources, New York City obtains nearly all of its water from the Delaware, Catskill, and Croton watersheds, which are located within 125 miles of the



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| Phase I | Amended Drainage Plan (ADP) Area |
| Phase 2a | Sewer/Utility |
| Phase 2b | Coney Island Special District |
| Project Area | Outfall Sites |

City. Water from the watersheds is stored at 19 reservoirs and three control lakes, having a combined capacity of approximately 580 billion gallons. The water is then carried into the City by a number of aqueducts. The water enters the City via City Tunnel 1 (which runs through the Bronx, Manhattan, and Queens) and City Tunnel 2 (which runs through the Bronx, Queens, and Brooklyn). The partially complete City Tunnel 3 serves the Bronx, Manhattan, and Queens, and, when fully complete, will terminate in Brooklyn. Staten Island obtains its water via the Richmond Tunnel, which is an extension of City Tunnel 2.

Once in the City, the three aqueducts distribute water into a network of water mains. Water mains up to 96 inches in diameter feed the smaller mains, which deliver water to their final destination. These are the same mains that provide water to fire hydrants. Nearly all of the water reaches its consumers by gravity alone, although some 4 percent (generally located at the outer limits of the system where in-line pressure is lowest, at high elevations, or at a pressure extremity such as Far Rockaway) is pumped to its final destination. Pressure regulators throughout the City monitor and control the water pressure.

As indicated in Chapter 1, "Project Description," the project area is located in Brooklyn Community District 13 along the western portion of the Riegelmann Boardwalk at Coney Island Beach. The development site (the focus of this analysis) is an assemblage of ten tax lots on Block 7071, as well as the beds of Highland View Avenue and a portion of West 22nd Street, and covers and aggregate lots area of approximately 130,404 sf (3.0 acres). The development site is currently underdeveloped, and is comprised of one vacant building (the (Former) Childs Restaurant Building), vehicle storage, vacant unimproved land, a decommissioned community garden, and approximately 28,516 sf of paved streets. As such, there is no water demand on the development site under existing conditions.

A new distribution water main was recently completed in the area in conjunction with the DEP Coney Island infrastructure improvements, and in accordance with the ADP. The upgraded water main was completed in July 2013, and is located along portions of West 15th Street between Surf Avenue and Coney Island Creek and portions of Surf Avenue between West 12th and West 17th Streets.

Wastewater Treatment

According to the *CEQR Technical Manual*, wastewater is considered to include sanitary sewage, wastewater generated by industries, and stormwater. Water used for air conditioning generates a negligible amount of wastewater as it recirculates or evaporates in the cooling and heating process.

New York City's sewer system consists of a grid of sewers beneath the streets that send wastewater flows to fourteen different water pollution control plants (WPCPs). Combined, all 14 WPCPs in New York City have a State Pollutant Discharge Elimination System (SPDES) permitted total capacity of 1.8 billion gpd. The area served by each plant is called a "drainage area" or "catchment area." While the majority of New York City's sewers are called combined sewers since they receive sanitary wastewater and stormwater runoff, some areas of the City (including the development site) operate with separate systems for sanitary sewage and stormwater. In these areas, sanitary sewage is sent to the WPCP and stormwater is sent untreated through separate sewers and outfalls into the nearest waterway.

As noted above, the development site is located in Brooklyn Community District 13 and is generally bounded by Riegelmann Boardwalk to the south, West 23rd Street to the west, West 21st Street to the east, and Surf Avenue to the north. The project area is served by the Coney Island WPCP, which discharges treated wastewater flows (or effluent) into the Jamaica Bay. As stated previously, within the Coney Island WPCP service area, sanitary and stormwater flows are managed with separate sewer

systems. The Coney Island WPCP is regulated by SPDES permit to treat and discharge up to 110 mgd of wastewater.

Due to Coney Island's flat topography and elevations near sea level, the sanitary and storm sewer systems were constructed at depths that provide less than the standard recommended cover at the upper ends of the catchment areas. Additionally, because of the topographical constraints, the sanitary and storm systems are installed at generally the same elevations, and for this reason, there are locations within the systems where conflict chambers are used to ensure the system's continued functionality. Conflict chambers are structures that allow for two pipes to cross at or near the same elevations without the pipes' flows mixing.

Sanitary Sewage

For sanitary sewage disposal, the development site relies on a system that conveys sanitary sewage to the Coney Island WPCP. The sanitary sewers direct flow from the development site to an interceptor beneath Neptune Avenue that carries the sanitary sewage to the Coney Island WPCP. As previously noted, DEP prepared an ADP in 2010 for an approximately 248-acre area in Coney Island. However, according to the most recent schedule from DDC, no improvements have been made adjacent to the development sites or to Sanitary Catchment Area B to date; as such, existing infrastructure in the project area remains widely unchanged, with the exception of selective sewer segment upgrades over the years.

As shown in Figure 8-2, Sanitary Catchment Area B collects sanitary flow along Surf Avenue between West 19th and West 23rd Streets, West 20th Street between Surf and Mermaid Avenues, West 21st Street between Rieglemann Boardwalk and Neptune Avenue, West 22nd and West 23rd Streets between the Boardwalk and midway between Mermaid and Neptune Avenues, and Mermaid Avenue between West 19th and West 24th Streets. The sewers within West 20th, West 21st, West 22nd, and West 23rd Streets convey flow towards Surf and Mermaid Avenues, which is then conveyed from Surf and Mermaid Avenues towards West 21st Streets, and finally conveyed north from the Boardwalk to the interceptor in Neptune Avenue. The sewers in this area vary in size from no smaller than 8 inches to a maximum diameter of approximately 18 inches before reaching the interceptor.

As the development site is comprised of underutilized vacant and/or undeveloped land, no sanitary sewage is generated on the development site under existing conditions.

Stormwater Drainage and Management

The analysis of stormwater management typically focuses on the body of water into which the stormwater is discharged—in this case, the Atlantic Ocean. However, actions that do not involve the addition of impermeable surfaces (or those that do not direct additional volume to storm sewers) are not usually considered to have a potential to increase stormwater discharge.

In the existing condition, the development site consists of 130,404 sf, comprised of one vacant building (the (Former) Childs Restaurant Building), vehicle storage, vacant unimproved land, and approximately 28,516 sf of paved streets. Approximately 27,700 sf (21 percent) of the development site lot area comprises rooftop area, approximately 44,220 sf (34 percent) comprises pavement and walks, and approximately 58,484 sf (45 percent) comprises permeable surfaces (see Table 8-1). For this analysis, standard DEP runoff coefficients were used to calculate the amount of stormwater runoff using the 3-month, 6-month, and 12-month storm events, with rainfall averaging from 0.00 to 2.50 inches over durations of 3.80 to 19.50 hours.

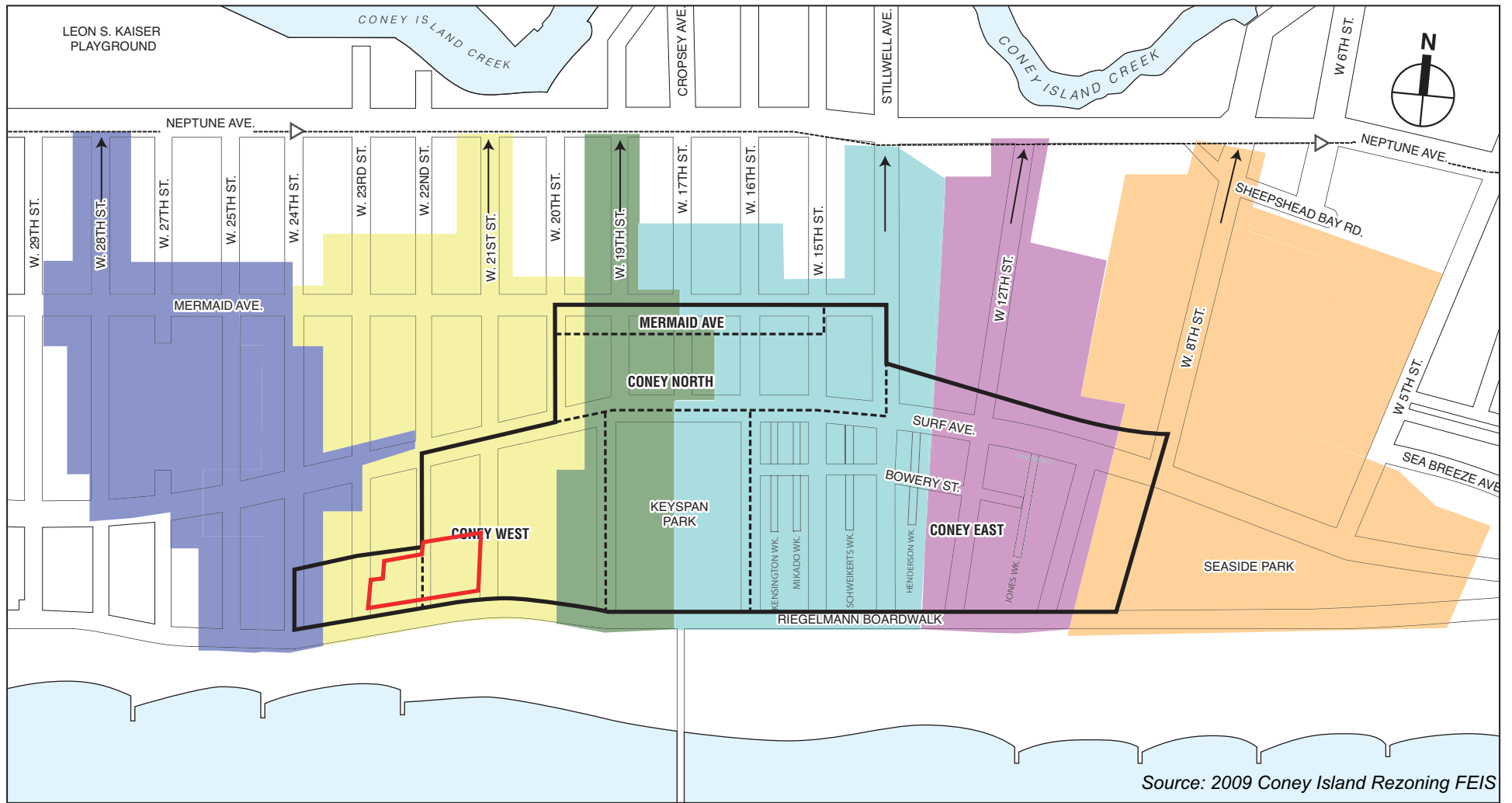


TABLE 8-1
Existing Development Site Surface Types

	Existing Weighted Runoff Coefficient, C					
	Surface Type	Roof ¹	Pavement and Walks	Other	Grass and Softscape	Total
Development Site	Area (%)	21%	34%	0%	45%	100%
	Surface Area (SF)	27,700	44,220	0	58,484	130,404
	Runoff Coefficient ²	1.00	0.85	0.85	0.20	0.59

Notes:

¹ Total roof areas on site.

² Runoff coefficients for each surface type are as per NYCDEP.

Table 8-2 shows the existing stormwater runoff for the development site. As indicated in the table, the development site currently generates between 0.00 and 0.12 mg of stormwater for different rainfall intensities.

TABLE 8-2
Existing Development Site Stormwater Runoff

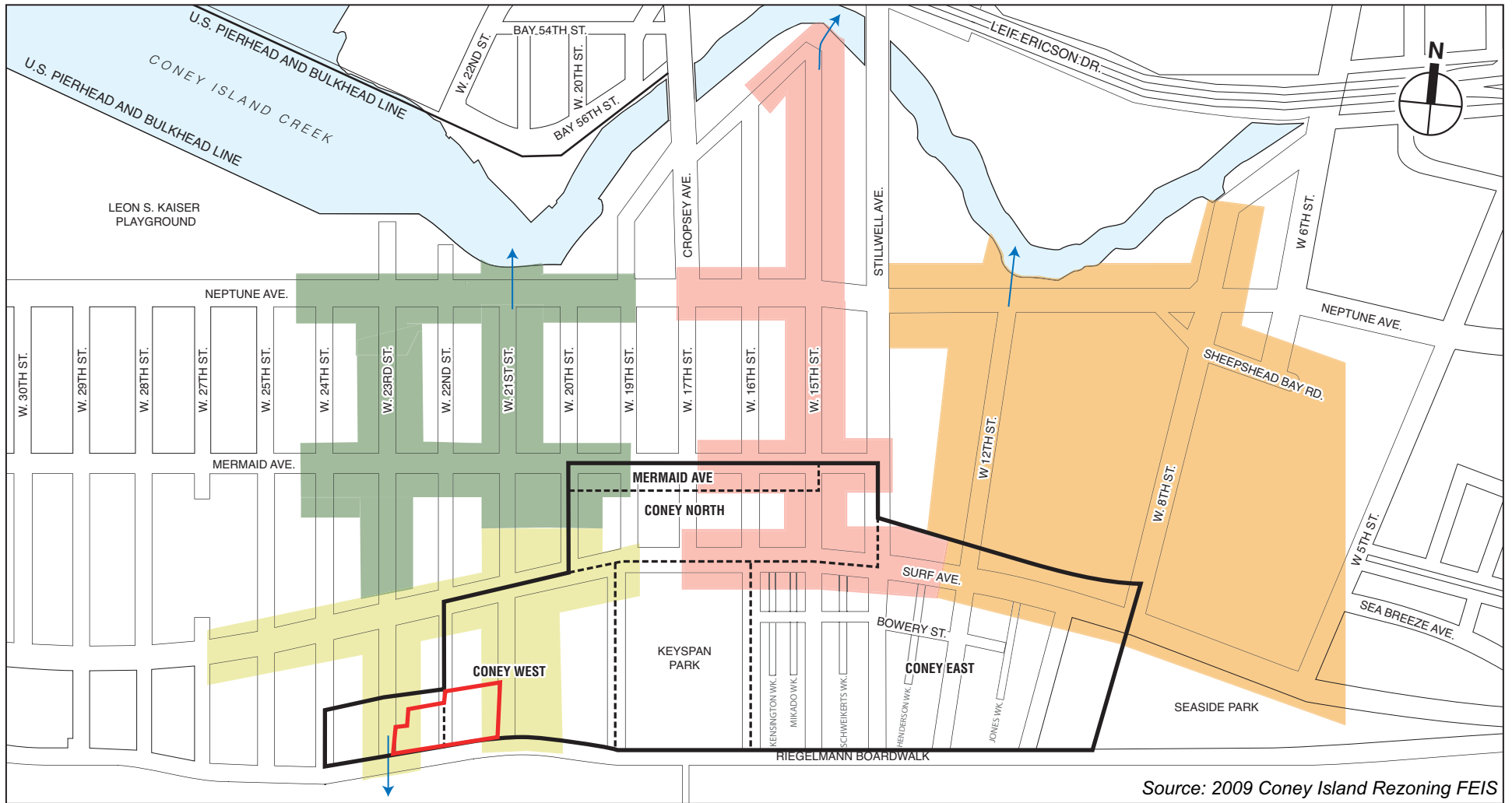
	Storm Event Type	Rainfall (Inches)	Duration (Hours)	Total Area (Acres)	Stormwater to Storm Sewer (MG)
Development Site		0.00	3.80	3.0	0.00
	3-Month	0.40	3.80	3.0	0.02
	6-Month	1.20	11.30	3.0	0.06
	12-Month	2.50	19.50	3.0	0.12

Notes:

MG = million gallons

As stated previously, within the Coney Island WPCP service area, sanitary and stormwater flows are managed with separate sewer systems. The stormwater sewers direct runoff from roofs, lots, and street drainage to existing outfalls. Runoff from impervious areas on the development site either flows into the stormwater sewer system where available and is discharged either into the Atlantic Ocean or the Coney Island Creek, or infiltrates into the subsurface. While the stormwater sewer system in the surrounding area is currently limited, stormwater sewers are located adjacent to the development site. Specifically, portions of the development site are served by Stormwater Catchment Area A, which serves portions of West 21st and West 23rd Streets and Surf Avenue (between West 19th and West 27th Streets) and discharges stormwater into the Atlantic Ocean at the southern terminus of West 23rd Street (see Figure 8-3). Stormwater sewers in Stormwater Catchment Area A include 18-, 20-, 24-, 30-, 36-, and 42-inch mains. As indicated in Figure 8-3, there are currently no stormwater sewers on West 22nd Street. For the portion of the development site that is not located within a Stormwater Catchment Area, runoff from impervious areas either infiltrates into the subsurface or flows directly into the Atlantic Ocean to the south.

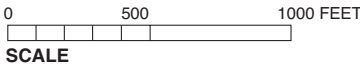
While work associated with the Phase 1 of the Coney Island infrastructure improvements began in May 2013, the improvements completed to date are associated with Stormwater Catchment Area C and therefore have no effect on the portion of the development site that is located in Catchment Area A.



Source: 2009 Coney Island Rezoning FEIS

- Coney Island Special District
- Coney Island Special District Subdistricts
- Stormwater Discharge Point
- Development Site

- Storm Catchment Area A
- Storm Catchment Area B
- Storm Catchment Area C
- Storm Catchment Area D



F. THE FUTURE WITHOUT THE PROPOSED PROJECT (NO-ACTION)

In the absence of the proposed project (No-Action), it is anticipated that the development site would be redeveloped as analyzed in the *Coney Island Rezoning FEIS* (2009). The (Former) Childs Restaurant Building on Lot 130 would be restored and adaptively reused at its current floor area and the remainder of the site would be redeveloped with residential, commercial, and open space uses. Furthermore, several infrastructure improvements are anticipated in the surrounding area in the 2016 No-Action condition. These anticipated improvements are described in greater detail in the following sections.

Water Supply

Table 8-3 shows the anticipated No-Action uses on the development site, including 223 residential units (consists of approximately 223,000 sf), 33,978 sf of local retail, a 60,000 sf restaurant, and 1.27 acres of open space, as well as the associated water consumption and wastewater generation rates used in this analysis. Based on these consumption rates, it is estimated that the No-Action uses on the development site would consume approximately 75,240 gpd of water for domestic uses and approximately 15,976 gpd of water for air conditioning, for a total of 91,216 gpd (0.09 mgd) of water.

TABLE 8-3
2016 No-Action Water Consumption and Wastewater Generation on the Development Site

Use	Area (sf)	Water Consumption/ Wastewater Generation Rates (gpd) ¹	Domestic Water/ Wastewater Generation (gpd)	Air Conditioning (gpd)
Residential	223,000 sf (223 DUs)	Domestic: 100 gpd/person ² Air Conditioning: 0 gpd/sf	52,405	0
Local Retail	33,978 sf	Domestic: 0.24 gpd/sf Air Conditioning: 0.17 gpd/sf	8,155	5,776
Restaurant ³	60,000 sf	Domestic: 0.24 gpd/sf Air Conditioning: 0.17 gpd/sf	14,400	10,200
Open Space	1.27 acres (56 visitors) ⁴	Domestic: 5 gpd/person ⁵ Air Conditioning: 0 gpd/sf	280	0
Water Consumption Subtotals			75,240	15,976
Sewage Generation Subtotal			75,240	
Total Water Consumption			91,216	
Total Wastewater Consumption			75,240	

¹ Consumption rates obtained from the *CEQR Technical Manual*, Table 13-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment," unless otherwise indicated.

² Calculations for residents are based on the Brooklyn Community District 13 average of 2.35 persons per household (Source: Demographic Profile, NYC DCP; 2010 Census). This equates to 235 gpd/DU.

³ Assumes the retail consumption/generation rate.

⁴ Assumes the *CEQR Technical Manual* weekday trip generation rate (44 visitors per acre), which is lower than the Saturday trip generation rate to ensure that the incremental increase in water consumption/wastewater generation associated with the proposed project is conservatively high.

⁵ Brooklyn Bridge Park FEIS (2005)

Infrastructure Improvements

In the future without the proposed project, the overall water supply in New York City is not expected to change substantially. However, certain changes are expected to the water supply system. The City has initiated a comprehensive water conservation program that seeks to reduce water through a metering program and the requirement that all new plumbing fixtures in the City, including those in existing and

new structures, be of low-flow design (Local Law No. 29, 1989). Other measures—including leak detention programs, water meters, and locking fire hydrant caps—are aimed at further reducing the City’s water needs and would serve to reduce water demand and flows to sewage facilities. DEP projects that the savings from these conservation measures would offset some of the expected increase in water demand from consumers in the coming years. In addition, when construction of City Tunnel 3 is completed, it will enhance and improve the adequacy and dependability of the entire water supply system and improve service and pressure to outlying areas of the City, such as Coney Island. Completion of City Tunnel 3 will also allow DEP to inspect and repair City Tunnel 1 for the first time since it was activated.

DEP is planning future water supply improvements within Coney Island to improve water pressure in the area. Most proximate to the development site, a 36-inch trunk main will be required along Surf Avenue between Stillwell Avenue and West 31st Street, in addition to other areas in the greater Coney Island neighborhood. Furthermore, distribution and trunk water mains in the area will continue to be relocated and upgraded, as required, in conjunction with Phases 2a and 2b of the Coney Island infrastructure improvements. Specifically, the most recent DDC construction schedule indicates that by 2016, underground infrastructure improvements along West 21st Street between Surf Avenue and Coney Island Creek as well as portions of Mermaid Avenue and Surf Avenue on the blocks bordering West 21st Street are expected to be complete; underground infrastructure work associated with Phase 2b (along portions of Stillwell Avenue, West 12th Street, and Neptune Avenue) are expected to be ongoing in the 2016 No-Action Condition. It is anticipated that in the 2016 No-Action condition, these water main improvements will improve the delivery of water to the development site and surrounding area.

Assessment

As previously stated, in the future without the proposed project, water usage on the development site would be approximately 91,216 gpd (75,240 gpd for domestic use and 15,976 gpd for air conditioning), compared to no water demand from the development site in existing conditions. As the 2009 *Coney Island Rezoning FEIS* concluded, this incremental water demand anticipated on the development site in the 2016 No-Action condition is not large enough to significantly impact the ability of the City’s water system to deliver water. Furthermore, as stated above, DEP trunk main projects are proposed to improve the delivery of water to the development site and the greater Coney Island area. With these proposed improvements, the existing system and grid of water mains serving the development site are expected to continue to provide adequate water supply and pressure in the future without the proposed project.

Sanitary Sewage

As indicated in Table 8-3, in the future without the proposed project, sewage flows are assumed to be the same as the domestic water demand, for a total sanitary sewage generation of approximately 75,240 gpd (compared to 0 gpd in existing conditions).

Infrastructure Improvements

In conjunction with DEP’s Coney Island infrastructure improvements, sanitary sewer lines within certain street segments in the surrounding area will be relocated and upgraded. As all underground infrastructure work associated with Phases 1 and 2a are expected to be completed in the 2016 No-Action condition, it is anticipated that sewer lines along certain roadways in Sanitary Catchment Area B (within which the development site is located) will be upgraded. Specifically, in the 2016 With-Action

condition, sanitary sewer lines would be relocated and upgraded along portions of West 21st Street between Surf Avenue and Coney Island Creek as well as portions of Surf Avenue and Neptune Avenue on the blocks immediately adjacent to West 21st Street. These anticipated upgrades along West 21st Street would be consistent with the road grade changes approved in 2011.

Assessment

As previously stated, No-Action uses on the development site would generate approximately 75,240 gpd of sanitary sewage. This represents less than 0.1 percent of the Coney Island WPCP's SPDES permitted capacity. Furthermore, as stated in the 2009 *Coney Island Rezoning FEIS*, upgrades associated with the ADP are anticipated, including upgrading Sanitary Catchment Area B sanitary sewer lines and establishing new street grades that will potentially increase pipe slope, capacity, and velocity, as well as minimizing pipe conflicts due to existing topographical constraints. As such, No-Action uses on the development site would not result in a significant adverse impact to area sanitary sewers.

Stormwater

In the 2016 No-Action condition, with the anticipated development of a mix of residential, commercial, and open space uses on the development site, it is anticipated that the amount of impermeable surface area on the development site would increase, resulting in a higher runoff coefficient of approximately 0.65 (see Table 8-4). Calculations of surface area are based on the RWCDs plans analyzed in the 2009 *Coney Island Rezoning FEIS*, and, for this analysis, it is assumed that the park developed on the western portion of the development site would be comprised of approximately 70 percent softscape and 30 percent pavement and walks. It is further assumed that development on Block 7071, Lot 142 would include a interior courtyard (comprising approximately 25 percent of the lot area). For conservative analysis purposes it is assumed that the interior courtyard would be comprised entirely of pervious floor area.¹

TABLE 8-4
No-Action Development Site Surface Types

	Existing Weighted Runoff Coefficient, C					
	Surface Type	Roof ¹	Pavement and Walks	Other	Grass and Softscape	Total
Development Site	Area (%)	43%	17%	0%	40%	100%
	Surface Area (SF)	56,139	21,544	0	52,721	130,404
	Runoff Coefficient ²	1.00	0.85	0.85	0.20	0.65

Notes:

¹ Total roof areas on site.

² Runoff coefficients for each surface type are as per NYCDEP.

As shown in Table 8-5, with the anticipated No-Action development described above, stormwater runoff to adjacent storm sewers would remain comparable to existing conditions, with a minor increase during typical 12-month storm events (0.01 mg); the amount of stormwater to the storm sewers in dry weather and typical 3- and 6-month storm events would remain as in existing conditions.

¹ Assuming that the interior courtyard of the residential development on Lot 142 would be comprised entirely of pervious surface area in the No-Action condition ensures that the incremental increase in impervious surface area associated with the proposed project is conservatively high.

TABLE 8-5
No-Action Development Site Stormwater and Sanitary Volumes

	Storm Event Type	Rainfall (Inches)	Duration (Hours)	Total Area (Acres)	Stormwater to Storm Sewer (MG)	Sanitary Volume to WPCP (MG)	Total Volume to WPCP (MG)
Development Site		0.00	3.80	3.0	0.00	0.01	0.01
	3-Month	0.40	3.80	3.0	0.02	0.01	0.01
	6-Month	1.20	11.30	3.0	0.06	0.04	0.04
	12-Month	2.50	19.50	3.0	0.13	0.06	0.06

Notes:

MG = million gallons

Infrastructure Improvements

As previously stated, based on the most recent DDC construction schedule for DEP's Coney Island infrastructure improvements, the majority of the proposed improvements are expected to be complete by 2016. The specific project elements relevant to the stormwater drainage and management analysis for the development site include the installation of new gravity flow stormwater collection sewers in accordance with the ADP and DEP design standards. The stormwater collection sewers will include new catch basins designed to DEP standards and equipped to capture and reduce floatables in the sewer system and Coney Island Creek, or the receiving waterbody. As indicated in the ADP, adjacent to the development site new stormwater sewers will be installed along the currently undeveloped Ocean Way and West 21st Street. The upgraded stormwater collection sewers will also reflect the street grade changes along these two thoroughfares, potentially increasing pipe slope, capacity, and velocity, as well as potentially minimizing pipe conflicts due to existing topographical constraints.

While in the long-term, DEP intends to redirect storm flows from a portion of the development site to the newly expanded West 21st Street outfall, thereby diverting storm flows that currently discharge directly into the Atlantic Ocean, as previously stated, this phase of infrastructure improvements (Phase 4) will not be complete in the 2016 analysis year. Therefore, in the No-Action condition, stormwater generated on the development site would continue to flow to the outfall located at the southern terminus of West 23rd Street, as described above.

Assessment

The potential stormwater impacts of No-Action development anticipated on the development site was previously assessed in the 2009 *Coney Island Rezoning* FEIS. The analysis concluded that, with implementation of infrastructure improvements in accordance with the ADP, no significant adverse impacts on stormwater drainage and management would occur. As stated above, DEP's Coney Island infrastructure improvements, which were developed in anticipation of the Coney Island development analyzed in the 2009 FEIS, are currently underway. While certain improvements directly affecting the development site, including expanding the West 21st Street outfall drainage area to include a portion of the development site, are not expected to be complete in the 2016 analysis year, upgraded stormwater sewers on adjacent West 21st Street will ensure that the City's stormwater drainage and management system will operate with adequate capacity in the interim.

G. PROBABLE IMPACTS OF THE PROPOSED PROJECT (WITH-ACTION)

In the future with the proposed project (With-Action), the (Former) Childs Restaurant Building would also be restored and adaptively reused at its current floor area. In addition, the remainder of the site would be developed with a publicly accessible open space containing an approximately 5,100-seat amphitheater. Relevant to the water and sewer infrastructure analysis, construction of the proposed project would also entail the relocation and termination of underground utilities within the southern end of West 22nd Street, the installation of new underground utilities, including water mains and sanitary and storm sewers, the replacement of existing plumbing infrastructure within the (Former) Childs Restaurant Building, and the installation of new utility services, including sanitary and storm sewers and domestic and fire water utilities, on West 21st Street in connection with the rehabilitation of the adjacent (Former) Childs Restaurant Building.

Water Supply

Table 8-6 presents the With-Action water consumption and wastewater generation compared to No-Action demand. As shown in the table, the proposed project would result in a net decrease in total water demand by approximately 40 percent (from 91,216 gpd to 54,600 gpd). With-Action domestic water consumption would be approximately 44,400 gpd and With-Action water consumption for air conditioning uses would be approximately 10,200 gpd.

Assessment

Given the net reduction in water demand associated with the proposed project and the No-Action improvements to area water supply infrastructure associated with the 2010 ADP, including the installation of new water mains, the proposed project would not result in a significant adverse impact on the City's water supply or system water pressure; the anticipated net decrease in water demand would be an improvement over the No-Action condition.

Sanitary Sewage

As indicated in Table 8-6, the proposed project would also result in a net reduction (approximately 41 percent) in wastewater generation, compared to the No-Action condition: the proposed project would generate approximately 44,400 gpd of sanitary sewage compared to approximately 75,240 gpd in the future without the proposed project. As in existing and No-Action conditions, sanitary sewage generated on the development site would flow to the Coney Island WPCP.

As stated in the 2009 *Coney Island Rezoning FEIS*, self-certification of site connection applications are not permitted by the Department of Buildings in connection with any development in the rezoned area. The Applicant would be required to submit a site-specific hydraulic analysis to DEP to establish the adequacy of the existing sanitary sewers serving the development site, in order to obtain site connection approval.

TABLE 8-6
Comparison of Water Consumption and Wastewater Generation in the Future With and Without the Proposed Project

Use	Water Consumption/ Wastewater Generation Rates (gpd) ¹	No-Action Condition			With-Action Condition			Incremental Change			
		Area (sf)	Domestic (gpd)	A/C (gpd)	Area (sf)	Domestic (gpd)	A/C (gpd)	Area (sf)	Domestic (gpd)	A/C (gpd)	
Residential	Domestic: 100 gpd/person ² Air Conditioning: 0 gpd/sf	223,000 sf (223 DUs)	52,405	0.00	0.00	0.00	0.00	-223,000 sf (-223 DU)	-52,405	0.00	
Local Retail	Domestic: 0.24 gpd/sf Air Conditioning: 0.17 gpd/sf	33,978 sf	8,155	5,776	0.00	0.00	0.00	-33,978 sf	-8,155	-5,776	
Restaurant ³	Domestic: 0.24 gpd/sf Air Conditioning: 0.17 gpd/sf	60,000 sf	14,400	10,200	60,000 sf	14,400	10,200	0.00	0.00	0.00	
Open Space	Domestic: 5 gpd/person ⁴ Air Conditioning: 0 gpd/sf	1.27 acres (56 visitors) ⁵	280	0.00	0.00 ⁶	0.00	0.00	-1.27 acres (-56 visitors)	280	0.00	
Amphitheater/ Open Space	Domestic: 5 gpd/person ⁷ Air Conditioning: 0 gpd/sf	0.00	0.00	0.00	2.41 acres (6,000 attendees)	30,000	0.00	2.41 acres (6,000 attendees)	30,000	0.00	
Water Consumption Subtotals			75,240	15,976		44,400	10,200		-30,840	-5,776	
Sewage Generation Subtotal			75,240			44,400			-30,840		
Total Water Consumption			91,216			54,600			-36,616		
Total Wastewater Consumption			75,240			44,400			-30,840		

¹ Consumption rates obtained from the *CEQR Technical Manual*, Table 13-2 "Water Usage and Sewage Generation Rates for Use in Impact Assessment," unless otherwise indicated.

² Calculations for residents are based on the Brooklyn Community District 13 average of 2.35 persons per household (Source: Demographic Profile, NYC DCP; 2010 Census). This equates to 235 gpd/DU.

³ Assumes the retail consumption/generation rate.

⁴ Brooklyn Bridge Park FEIS (2005).

⁵ Assumes the *CEQR Technical Manual* weekday trip generation rate (44 visitors per acre), which is lower than the Saturday trip generation rate to ensure that the incremental increase in water consumption/wastewater generation associated with the proposed project is conservatively high.

⁶ Included in the proposed amphitheater/open space area.

⁷ Assumes the open space consumption/generation rate and peak concert attendance.

Assessment

The proposed project would result in a net decrease in wastewater generation compared to the No-Action condition. In addition, sewer infrastructure improvements in the surrounding area associated with the 2010 ADP, including the installation of new sanitary sewers, would ensure that area sanitary sewers and the Coney Island WPCP would continue to operate with additional capacity. As the proposed project would decrease the total wastewater flows conveyed to the Coney Island WPCP compared to No-Action uses on the development site and the Applicant would submit a site-specific hydraulic analysis to DEP to obtain site connection approval, the proposed project would not result in a significant adverse impact to sanitary sewage conveyance and treatment.

Stormwater

The proposed project would result in an incremental decrease in the amount of roof area and grass and softscape on the development site, compared to existing conditions, while increasing the total area of

pavement and walkways (see Table 8-7).² In addition, as stated in Chapter 1, “Project Description,” during the summer concert season the proposed amphitheater would be covered by a tensile fabric roof canopy that would be harnessed by truss structural supports. As indicated in Figures 1-6 and 1-7, this sail-like structure would cover the amphitheater portion of the proposed open space, and during storm events, it is anticipated that rain collected on the fabric roof canopy would fall to the adjacent open space on the development site, and therefore would not significantly alter the total amount of stormwater generated on the development site. As indicated in Table 8-7, the development site’s weighted runoff coefficient in the With-Action condition would increase from 0.59 to approximately 0.78.

TABLE 8-7
With-Action Development Site Surface Types

	Existing Weighted Runoff Coefficient, C					
	Surface Type	Roof ¹	Pavement and Walks	Other	Grass and Softscape	Total
Development Site	Area (%)	20%	65%	0%	15%	100%
	Surface Area (SF)	25,900	84,271	0	20,233	130,404
	Runoff Coefficient ²	1.00	0.85	0.85	0.20	0.78

Notes:

¹ Total roof areas on site.

² Runoff coefficients for each surface type are as per NYCDEP.

As a result of the increase in impermeable surface area on the development site, increased flows and volume would be conveyed to the stormwater sewers in the future with the proposed project. As shown in Table 8-8, in the With-Action condition, depending on the type of storm event and the duration, the total volume of stormwater from the development site that would flow to the stormwater sewers would range from 0.0 to 0.16 mg, compared to a maximum of 0.12 mg in existing conditions (see Table 8-2). However, the table presents only total volume to the stormwater sewer system and does not account for stormwater flow rate. As described below, with the incorporation of stormwater BMPs and adherence to the new DEP regulations governing the flow rate of stormwater to the sewer system, the rate of discharge to the stormwater sewer system would be improved over existing conditions.

TABLE 8-8
With-Action Development Site Stormwater and Sanitary Volumes

	Storm Event Type	Rainfall (Inches)	Duration (Hours)	Total Area (Acres)	Stormwater to Storm Sewer (MG)	Sanitary Volume to WPCP (MG)	Total Volume to WPCP (MG)
Development Site		0.00	3.80	3.0	0.00	0.01	0.01
	3-Month	0.40	3.80	3.0	0.03	0.01	0.01
	6-Month	1.20	11.30	3.0	0.08	0.02	0.02
	12-Month	2.50	19.50	3.0	0.16	0.04	0.04

Notes:

MG = million gallons

² Conservatively assumes that the open space/amphitheater would be comprised of 80% pavement and walks and 20% grass and softscape; the proposed hardwood seating areas (which have a lower runoff coefficient than pavement and walks) are conservatively not included.

As Phase 4 of DEP's Coney Island infrastructure improvements (which would expand the West 21st Street outfall drainage area to include the eastern portion of the development site) would not be completed in the 2016 analysis year, stormwater generated on the development site in the future with the proposed project would flow to the outfall located at the southern terminus of West 23rd Street. The stormwater sewer infrastructure improvements on the development site outlined in the ADP and described in the No-Action scenario above would similarly be constructed in conjunction with construction of the proposed project. In addition, the Applicant would be required to submit a site-specific hydraulic analysis to establish the adequacy of existing storm sewers serving the development site before receiving site connection approval from DEP.

Stormwater Best Management Practices

The proposed project could minimize potential impacts to the City's stormwater management and drainage system through implementation of stormwater BMPs. The following discussion outlines several additional stormwater management and BMP strategies that could be implemented on the development site to reduce the peak stormwater discharge.

In conjunction with the development of the proposed park on the development site, the Applicant intends to install an underground stormwater management system, which would capture and treat a percentage of the stormwater from both the park and amphitheater areas. The stormwater management system would utilize on-site underground detention practices with a regulating outlet device. The on-site detention system would be sized based on the 10-year storm event at an approved release rate.

Infiltration or biofiltration (gravel beds, rain gardens, vegetated swales, permeable pavements, etc.), with an underdrain and/or overflow to a control structure system could also be used where subsurface conditions allow. However, unfavorable subsurface conditions associated with the water table level may limit such infiltration practices. As such, groundwater and soil testing would be needed to confirm infiltration capacity on the development site for the use of these BMPs. In addition to detention BMPs, retention BMPs such as rain barrels or cisterns may be more suitable for the development site.

Enhanced stormwater management throughout the City is consistent with recent policies, including the NYC Green Infrastructure Plan, and Mayor Bloomberg's PlaNYC 2030 and Sustainable Stormwater Management Plan.

Assessment

As stated above, the proposed project would result in an increase in the total volume of stormwater to the stormwater sewers. However, it is expected that, with the implementation of the stormwater BMPs described above, as well as DEP site-connection approval contingent upon the site-specific hydraulic analysis, the proposed project would reduce the flow rate of stormwater from the development site. In addition, the proposed project would result in improvements to the existing stormwater infrastructure, including the installation of new stormwater sewers adjacent to the development site. As such, the proposed project would not result in a significant adverse impact on stormwater drainage and management.