14.0 INFRASTRUCTURE

14.1 INTRODUCTION

The *CEQR Technical Manual* generally defines infrastructure as, "the physical systems that support the City's population." Accordingly, this chapter evaluates the Proposed Action's effects on existing and planned infrastructure concerning water supply, sewage treatment and stormwater management. The Proposed Action would essentially shift the demand for water by constructing a new garage that relocates the operations of three DSNY Garages to a single location; the existing MN 1 Garage would be demolished and a new salt shed would be constructed in its place for winter emergency use.

14.2 METHODOLOGY

The primary study area for the analysis of infrastructure is defined as the area within a 400 ft radius of the two sites that would be part of the Proposed Action. The study area includes the above and underground infrastructure relating to water, sewer and stormwater that are generally bounded by King Street to the north, West Street/Route 9A to the west, Greenwich Street to the east and Watts Street to the south.

Information was obtained by contacting the NYCDEP and by consulting water main maps, plans for the Newtown Creek WPCP, and the NYCDEP's Infiltration/Inflow Analysis for the Newtown Creek WPCP drainage area.

According to the *CEQR Technical Manual* (2001), the impacts of the Proposed Action on future conditions are evaluated for effects to the water supply and pressure by assessing the existing water usage, future water usage under a Future No Build condition, water demands, the existing water distribution system, and the water supply's ability to support additional demand. Potential impacts of the Proposed Action to sanitary sewage on wastewater treatment are examined by determining the capabilities of the Newtown Creek WPCP to support the increase. Stormwater impacts are evaluated by describing the direction and flow of stormwater from the proposed site, estimating the quantity of stormwater as a result of the Proposed Action, predicting future drainage under a Future No Build condition, estimating the types and quantities of pollutants found in stormwater and describing how drainage would be affected.

14.3 EXISTING CONDITIONS

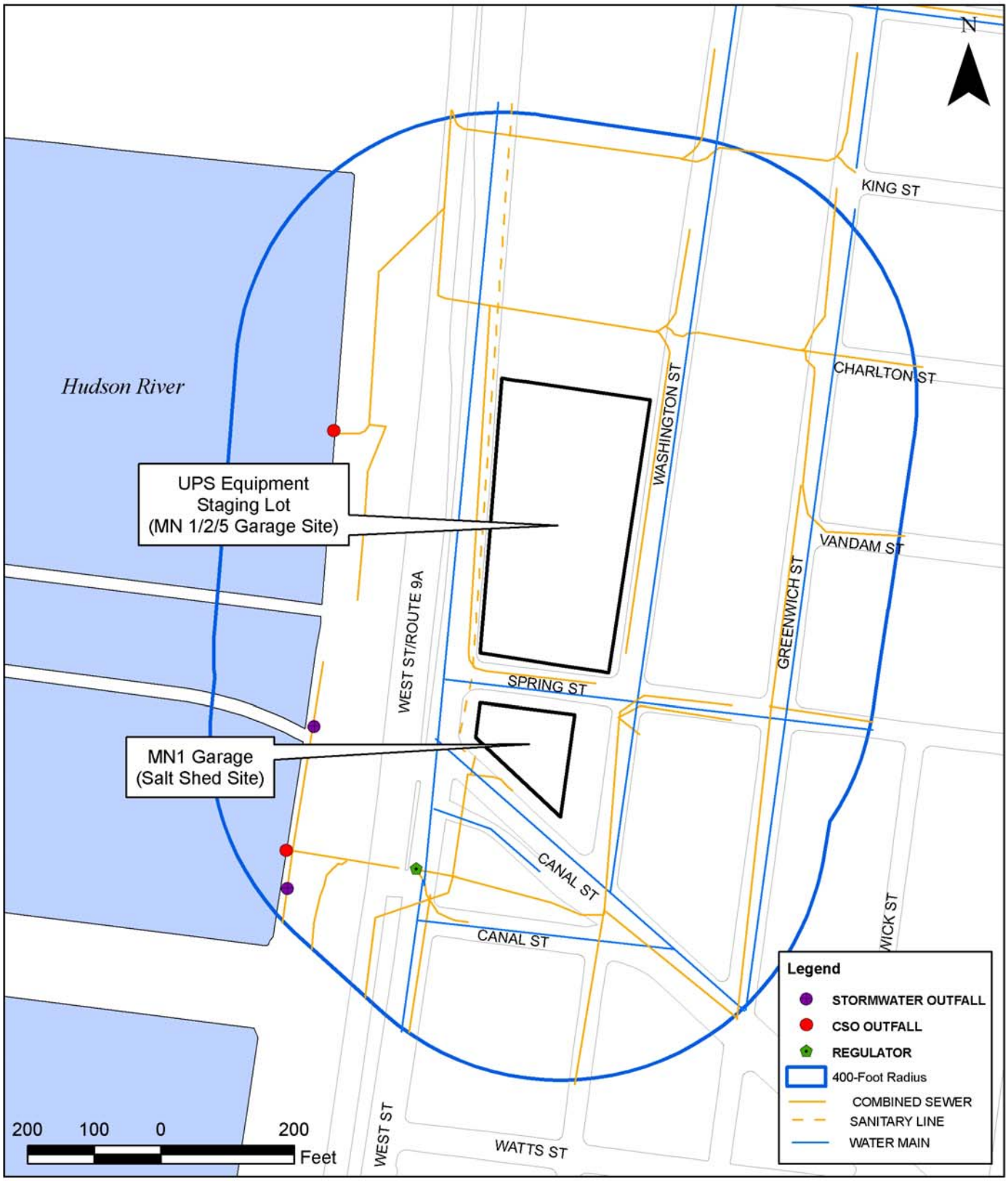
14.3.1 Water Supply and Use

The potable water supply for New York City comes from a network of reservoirs, aqueducts and tunnels that originate up to 125 miles north of the City. The Delaware, Catskill and Croton watersheds cover an area greater than 1,900 square miles in the Catskill Mountains and the Hudson River Valley and have a storage capacity of 550 billion gallons. During non-drought conditions, most water flows to consumers by way of gravity. However, during drought conditions, additional water must be pumped to ensure there is enough pressure to deliver water to consumers.

There are two watershed systems that supply potable water to New York City. One system is the Hillview Reservoir in Yonkers, which collects water from the Delaware and Catskill surface water systems and delivers approximately 90 percent of the City's water to consumers. The reservoir distributes water to different parts of the City using three tunnels: City Tunnel No. 1, which flows through the Bronx, Manhattan and Brooklyn; City Tunnel No. 2, which flows through the Bronx, Queens, Brooklyn and then continues through the Richmond Tunnel to Staten Island; and City Tunnel No. 3, which is expected to be completed in 2021 and will flow through the Bronx, Manhattan and Queens. The second potable water supply system for New York City is the Croton watershed system, which collects water in the Jerome Park Reservoir in the Bronx. From there, it is distributed to the Bronx and Manhattan.

On average, city water consumption is approximately 1,070 million gallons per day (mgd) or 133.5 gallons per person per day. The borough of Manhattan alone consumes an estimated 205 mgd (www.nyc.gov/html/dep/html/droughthist.html).

City Tunnel No. 1 currently delivers water for distribution to Lower Manhattan. The tunnel transports water into shafts that deliver large volumes of potable water to a grid of water mains that distribute the water to individual buildings. According to the NYCDEP water main distribution maps, the project area is served by 12-inch water lines beneath Washington Street, Greenwich Street, West Houston Street and Spring Street. Twenty-inch water lines are located in West Street and Canal Street. A portion of Washington Street between Spring Street and Canal Street has a 12-inch waterline, a 48-inch waterline and two six-inch waterlines. The six-inch waterlines connect to the Holland Tunnel ventilation shaft and travel north and south, respectively, along Washington Street and turn and flow east on Canal Street or Spring Street. Water mains in the vicinity of the project sites are shown in Figure 14-1.



HydroQual 1200 MacArthur Blvd. Mahwah, New Jersey 07430 (201) 529-5151 f: (201) 529-5728	Manhattan Districts 1/2/5 Garage and Salt Shed City of New York Department of Sanitation	Figure 14-1 Infrastructure November 2007

Average water pressure throughout the project area is estimated to be greater than 20 pounds per square inch (psi), which is considered sufficient to not overburden the existing system or require changes made to the system, according to CEQR.

Water is used at the existing garages (MN 1, 2 and 5) by two primary activities – personal use by employees and truck/equipment washing. For the purposes of estimating existing water use (which would be comparable to that used for the Proposed Action), it has been assumed that the average water use by employees is 25 gallons per day (gpd) (about 158 total employees on a peak day) and that half of the workers take showers at the garages which also consumes 25 gallons of water per use (79 Sanitation workers). Therefore, peak daily water use by employees at the three existing garages is estimated to be approximately 5,925 gpd.

Truck and equipment washing at the three garages uses additional water. The 62 collection trucks and 15 open dump trucks are washed bi-weekly (twice a month) and all other equipment/vehicles are washed once a month. Water use for washing the collection and open dump trucks is estimated at 120 gallons/wash. Washing of the other 51 pieces of equipment and vehicles is estimated to use 35 gallons/wash. Therefore, on an average daily operating basis, water used for truck and equipment washing at the three garages is estimated to be approximately 777 gpd.

Total current water use at the existing MN 1, 2 and 5 Garages is estimated to be approximately 6,706 gpd or 2.1 million gallons per year.

14.3.2 Sanitary Sewage and Stormwater

New York City's sewer system consists of a grid of sewers beneath the streets that collects and delivers wastewater flow to 14 WPCPs that remove pollutants from the water using a variety of physical and biological processes before it is discharged into local waterways. Approximately 85 percent of the sewer system in New York City is a combined system, carrying both sanitary sewage and stormwater (some areas of Queens and Staten Island operate with separate systems). During dry weather, combined sewers function as sanitary sewers, sending all flows to the WPCPs for treatment. Wet weather can cause water entering the system to exceed the capacity of the treatment plant and result in the release of a combined sewer overflow (CSO) into a waterway.

The study area is serviced by the Newtown Creek WPCP located in the Greenpoint area of Brooklyn. Table 14-1 shows the maximum, minimum and average monthly flow of sewage and stormwater treated at Newtown Creek in 2005. The Newtown Creek WPCP treated an average flow of 230 mgd during 2005, which includes the sanitary and stormwater flow. The maximum monthly flow occurred in November (710 mgd) and the minimum monthly flow

occurred in May (101 mgd). Effluent from the WPCP is discharged into the East River and is regulated by NYSDEC under the SPDES. The current SPDES permit restricts the daily flow at Newtown Creek WPCP to 310 mgd.

Table 14-1. Maximum, Minimum and Average Monthly Flows for the Newtown Creek Water Pollution Control Plant

Month (2005)	Maximum Monthly Flow (mgd)	Minimum Monthly Flow (mgd)	Average Monthly Flow (mgd)
January	674	124	232
February	631	118	229
March	637	124	231
April	671	113	229
May	564	101	200
June	672	107	228
July	688	123	234
August	686	115	230
September	552	120	218
October	702	122	280
November	710	113	225
December	655	116	222
12-month average			**230**

Source: NYCDEP

The 52-acre Newtown Creek WPCP is currently undergoing a major upgrade, which would bring the plant into compliance with secondary treatment requirements mandated by the Clean Water Act. According to NYCDEP, these upgrades are scheduled to be completed in 2007.

Stormwater runoff is collected in catch basins, which drain into the combined sewer system. In the project area, a typical combined sewer has regulators that normally direct the wastewater and stormwater flows to the interceptor sewers, which in turn deliver the combined flows to the Newtown Creek WPCP. The regulators are designed to allow two times the mean dry weather flow into interceptors. Sewage flows into the interceptors during dry weather conditions. For the duration of storm events, twice the mean dry weather sewage is diverted to interceptors. Excess wastewater flows are diverted to the CSOs, which discharge directly to the Hudson River and other waterbodies within the Newtown Creek WPCP drainage area.

There are two regulators located in proximity to the project sites (but outside of the study area) that direct a mixture of stormwater and sanitary waste via an interceptor to the Newtown Creek WPCP during dry conditions, and release excess flows of stormwater and sanitary waste into the Hudson River during significant rainfall because the capacity of the combined sewer is exceeded (Figure 14-1). There are two permitted, combined sewer outfalls located in proximity to these regulators, identified as M-1 and M-2; M-1 (48-inch diameter) is located at Clarkson

Street and West Street/Route 9A; M-2 is located north of Canal Street at West Street/Route 9A (66-inch diameter).

The majority of the project area is serviced by combined sanitary and sewer lines that run under the streets.

Near the UPS Equipment Staging Lot there are combined sanitary and stormwater lines (typically four-foot by two-foot eight-inch) that extend west towards West Street beyond the intersections of Charlton and King Streets with Greenwich Street. There are combined sewer and sanitary lines (typically four-foot by two-foot eight-inches) that also run beneath West Houston and Spring Streets.

There are three separate combined sewer and sanitary lines that serve the area from Spring Street to West Houston Street along Washington Street. Between West Houston and the underground extension of King Street, there is a combined sewer and sanitary lines (three-foot six-inch by two-foot four-inch) that runs south beneath Washington Street where it joins another line flowing west towards West Street/Route 9A. A 12-inch combined sanitary and sewer line is located beneath Washington Street between the King Street and Charlton Street extensions. The line flows south beneath Washington until it connects with another line that extends beyond the western end of Charlton Street to West Street. A combined sanitary and sewer line (three-foot ten-inch by twelve-foot ten-inch) flows north on Washington Street from Spring Street until it connects with the underground line that extends beyond Charlton Street and meets West Street/Route 9A.

There is one combined sewer and sanitary line that flows north on West Street towards the M-1 regulator. The combined line has varying sizes, from a three ft by two ft line to a six ft by twelve ft line. A second 54-inch line flows south beneath West Street/Route 9A towards its final destination at the Newtown Creek WPCP.

Since all of the water used in the garage is directed to the sanitary sewer system, the estimated sanitary sewage generation is the same as that for water use – approximately 6,706 gpd or 2.1 million gallons annually.

14.4 FUTURE WITHOUT THE PROPOSED ACTION (FUTURE NO BUILD)

Under the Future Without the Proposed Action, infrastructure located in the study area surrounding the project sites would be expected to be similar to existing conditions. The existing 12-inch waterlines located between West Street/Route 9A and Hudson Street would likely be replaced with 20-inch waterlines by the year 2012 (NYCDEP, December 18, 2006). This would

provide an enhanced supply of potable water to the study area. No other significant infrastructure improvements have been identified as being in place in this timeframe.

The projects anticipated to be completed by 2012 in the vicinity of the Proposed Action would increase the residential population in the study area by an estimated 2,274 people. The resultant demands on water supply and wastewater would therefore increase by approximately 254,688 gpd. This increase would not cause average daily flow to exceed the WPCP's 310 mgd design flow.

It would also be likely that the near completion of the Hudson River Park would attract additional visitors to the area that would place temporary local increased demands, primarily in the daylight hours, on the water supply and wastewater infrastructure systems. However, the integration of the park into the city's infrastructure system is being addressed within the park planning and design process.

The commercial facility that is projected to be constructed on the site above the UPS Staging operations would increase the daytime population by an estimated 1,389 people. Using water usage and sewage generation rates from the *CEQR Technical Manual* there would be an estimated total demand of 69,450 gdp (employee use and air conditioning). Combined with the anticipated projects in the study area in 2012, the total increased water demand would be an estimated maximum of 324,138 gpd. This increase would not cause the Newtown Creek WPCP to exceed its average daily design flow of 310 mgd. There would be a slight increase in the amount of impervious surface on the site, slightly increasing stormwater flows.

14.5 FUTURE WITH THE PROPOSED ACTION (FUTURE BUILD)

14.5.1 Water Supply and Use

According to the *CEQR Technical Manual*, because the City has a large water supply system, any given action's water consumption is not likely to be a significant city-wide impact. The *CEQR Technical Manual* has established a one mgd demand on the City's water supply as a threshold; an increase in demand less than this threshold is not considered to result in a significant adverse effect on the City's water supply system.

Because the Proposed Action would provide a base of operations for three existing garages, water use and wastewater generation would be a shift, rather than an increase in overall demand. Therefore, water use would be generally comparable to that estimated for the collective current conditions at the three existing garages (6,706 gpd or 2.1 million gallons per year). For purposes of a conservative estimate water use from the proposed office space component of the Proposed Action (approximately 43,564 sq ft) has been assumed to represent a new use of water

(air conditioning is available in portions of the three existing garages). Therefore, for purposes of this analysis there would be an additional use of water by the Proposed Action estimated at 4,356 gpd (0.1 gpd/sq ft). This volume increase is less than the one mgd necessary to affect water supply infrastructure in the area surrounding the project site.

The Proposed Action increase in demand would be below the CEQR impact threshold, does not require a detailed assessment on water supply pressure or demand, and would not have a significant adverse impact on the City's water supply system.

14.5.2 Sanitary Sewage and Stormwater

The projected flows (conservatively estimated to be equivalent to water use) would represent about less than 0.001 percent addition to the average flow of the Newtown Creek WPCP. The average wastewater flows into the WPCP combined with the 324,138 gpd flow of the Future No Build projects and the 4,346 gpd wastewater from the Proposed Action (a total of 328,484 gpd) would not exceed the plant's 310 mgd design capacity. Consequently, no significant adverse impacts to the sanitary sewage treatment facilities would result.

The Proposed Action would transform a vacant site with a combination of pervious and impervious surfaces into a new garage building covering the site with a structure including a green vegetated roof. Stormwater that is not captured for building use would drain from the site to the City's combined sewer and stormwater system for treatment at the WPCP during dry weather; in wet weather when the capacity of the collection system would be exceeded, stormwater would be directed toward the Hudson River as it is designed to do in the study area.

DSNY also intends to integrate sustainable building features into the garage design such as green roof technology and reuse strategies to further reduce net stormwater runoff.

The relocation of the MN 1, 2 and 5 Garage facilities would cause a minimal increase in sanitary wastewater flows. There would be no expected increase in CSO frequency or severity.

The Proposed Action would not cause a significant adverse impact to the City's infrastructure.