

**FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE
CROTON WATER TREATMENT PLANT
AT THE MOSHOLU SITE**

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6.16. INFRASTRUCTURE & ENERGY

6.16.1. Introduction

This section examines the existing and potential demands upon water, wastewater, stormwater drains, electric and gas systems associated with the proposed Croton Water Treatment Plant project (Croton project) at the Mosholu Site located in Van Cortlandt Park, in the Borough of the Bronx, New York. For the purpose of this analysis, the study area encompasses a one-half mile radius around the proposed project site that could be directly impacted by the proposed project. The following analysis was performed in accordance with the methodology outlined in Section 4.16, Data Collection and Impact Methodologies, Infrastructure and Energy.

6.16.2. Baseline Conditions

6.16.2.1. Existing Conditions

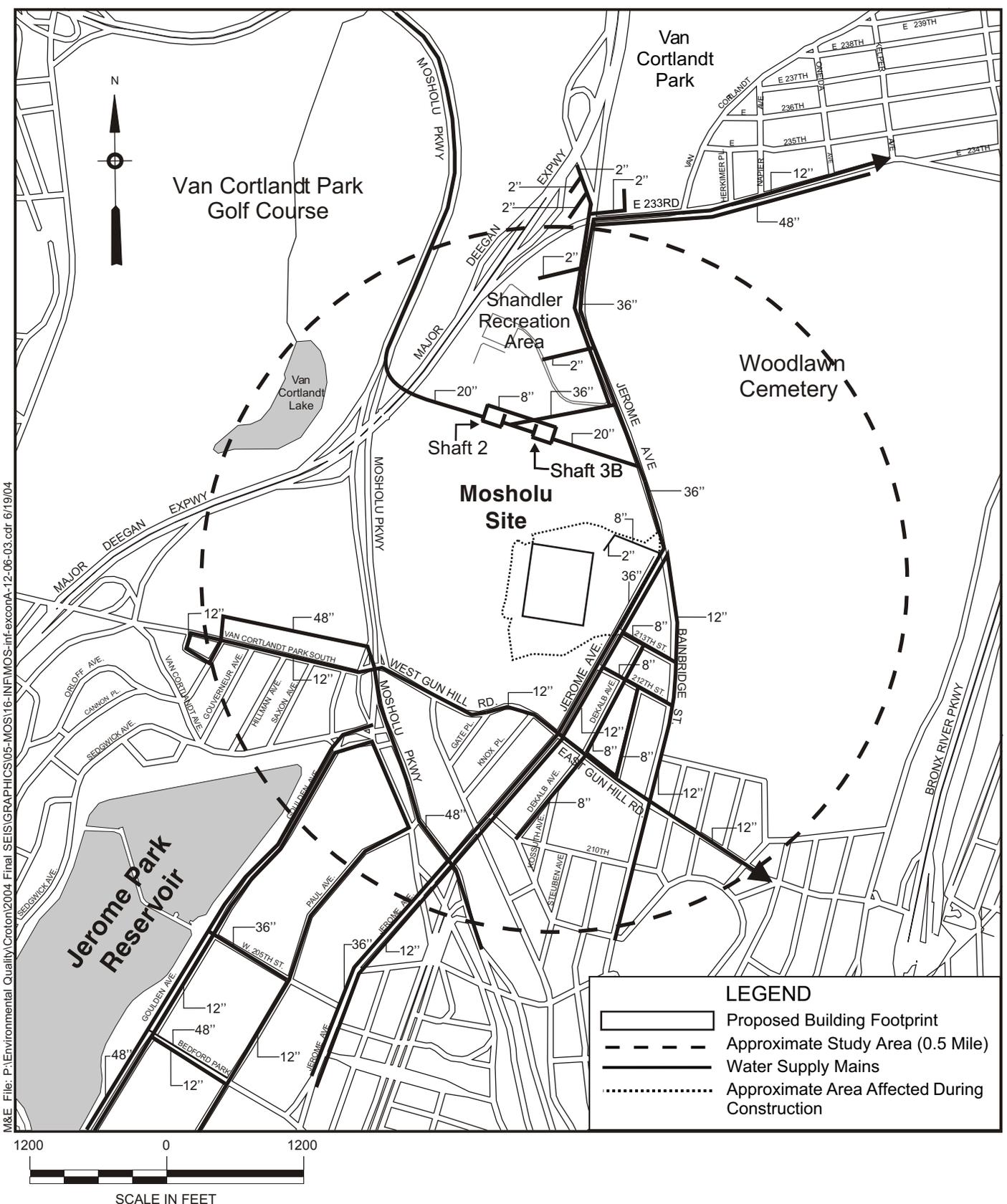
Van Cortlandt Park is bounded to the south by West Gun Hill Road, to the west by the Major Deegan Expressway, to the east by Woodlawn Cemetery and to the north by the Allen Shandler Recreation Area. Van Cortlandt Park is the third largest park in New York City and the second largest in the Bronx. The park contains large tracts of wooded land, two golf courses including the Mosholu Golf Course, several playing fields, swimming facilities, hiking and horseback riding trails, and greenhouse facilities. The Mosholu Golf Course includes a nine-hole golf course, parking lot, clubhouse, practice green, and driving range. The Mosholu Golf Course is affiliated with the First Tee Program of Metropolitan New York. The First Tee Program of Metropolitan New York is a non-profit foundation that sponsors golf and life-skill programs for disadvantaged youth.

6.16.2.1.1. Water Supply

The City of New York consumes approximately 1.4 billion gallons of water per day through the combination of Catskill/Delaware and Croton Water Supply Systems. Residents of the Bronx use approximately 200 million gallons per day (mgd) of water, of which the Croton Water Supply System supplies roughly 50 mgd¹. The Mosholu Site and associated recreational facilities, located in Van Cortlandt Park, are supplied with potable water from New York City's Catskill/Delaware Water Supply System. The facilities associated with the golf course that provide potable water are the course grounds, comfort stations and the clubhouse. Figure 6.16-1 shows water mains associated with and surrounding the proposed project site.

A 36-inch trunk main under Jerome Avenue is responsible for providing the Mosholu Golf Course with potable water. The 36-inch trunk main is connected to a 12-inch line. The 12-inch line is then connected to an 8-inch distribution main under the Mosholu Golf Course access road. A 2-inch line extending approximately 94 feet connects the 8-inch main to the Mosholu clubhouse. In addition, a network of 1.5- to 6-inch distribution lines run across the Mosholu Golf Course for irrigation and recreational purposes.

¹North River STP-Odor, Flow & Air Emissions Control Order, DEC Case No. R2-3669-9105., 2003.



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Mosholu Site Water Distribution System

Croton Water Treatment Plant

Figure 6.16-1

The Mosholu Golf Course and Driving Range is open year-round with a staff ranging from 12 to 35 employees during off-peak and peak seasons, respectively. Seventy-five percent of its business falls within an eight-month peak season (April through November), during which time the golf course maintains 35 full-time employees 5 days per week. The 35 employees utilize approximately 625 gallons per day (gpd) of potable water, based on a 40-hour work week and a maximum water consumption rate of 25 gallons per day per person (gpd/person).

Mosholu Golf Course patrons are comprised of three groups: those patrons who use the golf course, those who use the driving range, and patrons enrolled in the First Tee program. Each individual patron consumes an estimated 5gpd/person of water. The golf course hosts approximately 22,500 rounds of golf during the peak season and 7,500 during the off-peak season (December through March). Since the numbers of rounds equal the number of tickets sold, the golf course hosts approximately 22,500 golfers per season (approximately 92 golfers per day during the peak season), utilizing approximately 460 gpd of water. The Driving Range hosts approximately 10,000 visitors during peak season (41 visitors per day) and 3,250 during off-peak seasons, utilizing approximately 205 gpd of water during the peak season. An additional 1,000 visitors during the summer months (approximately 100 days) use the Driving Range as part of the First Tee Program (10 visitors per day), utilizing approximately 50 gpd of water.

The First Tee program also hosts instructional programs where approximately 2,000 youngsters during the summer months (approximately 20 young golfers per day) attend and utilize approximately 100 gpd of water. In addition, the First Tee Program has approximately 12 employees seasonally, utilizing 214 gpd of water, based on a 40-hour work week and a maximum water consumption rate of 25 gpd per person.

The golf course putting greens and starter tees are watered twice daily from April through October. On average during the peak season, the irrigation pattern utilizes 651 gpd for the nine hole golf course². The total water consumption of the existing recreational facilities at the Mosholu Golf Course is approximately 2,305 gpd (Table 6.16-1).

TABLE 6.16-1. PEAK EXISTING WATER CONSUMPTION AT THE MOSHOLU GOLF COURSE EXISTING FACILITIES

Use	Persons/Size	Water Usage Rate Per Person	Total Water Usage Rate (gpd)
Golf Course Full-Time Employees	35	25 gpd/person	625 ⁽¹⁾
Golfers	92	5 gpd/person	460
Driving Range Visitors	41	5 gpd/person	205 ⁽²⁾
First Tee Program (practice)	10	5 gpd/person	50 ⁽²⁾

² Based on billing records for June 2002; provided by First Tee of Metropolitan New York.

TABLE 6.16-1. PEAK EXISTING WATER CONSUMPTION AT THE MOSHOLU GOLF COURSE EXISTING FACILITIES

Use	Persons/Size	Water Usage Rate Per Person	Total Water Usage Rate (gpd)
First Tee Program (clinic)	20	5 gpd/person	100 ⁽²⁾
First Tee Program Employees	12	25 gpd/person	214 ^{(1) (2)}
Golf Course Watering	9 ⁽³⁾		651
Total			2,305

Notes:

1. Calculations based on a 40-hour work week.
2. Analysis performed for summer months (June through August).
3. Nine holes golf course watered twice during April through October.

6.16.2.1.2. Upstate Water Suppliers

Many upstate (i.e., outside of New York City) water suppliers withdraw part or all of their supplies from the New York City Water Supply System. These water suppliers and their retail customers are discussed in Section 1.4, New York City Water System Users. Table 6.16-2 presents these connections and their capacities.

TABLE 6.16-2. EXISTING UPSTATE CROTON WATER SUPPLIERS UPSTREAM OF THE PROPOSED PLANT

Croton Water Consumers	Connections	Capacity (MGD)	Year 2002 Usage (Million Gallons) ¹	Other Potable Water Sources ²
Town of New Castle ³	Pump House Stanwood Consolidated Water District	10.0	19.4	Catskill System
Village of Ossining ⁴	Ossining Pumping Station	4.0	840	Indian Brook Reservoir
Village of Briarcliff Manor ⁵	Briarcliff Pump Station	4.0	474.5	Village of Ossining and United Water New Rochelle
Village of Sleepy Hollow ⁶	Croton Pump Station	2.8	1.8	Catskill System

TABLE 6.16-2. EXISTING UPSTATE CROTON WATER SUPPLIERS UPSTREAM OF THE PROPOSED PLANT

Croton Water Consumers	Connections	Capacity (MGD)	Year 2002 Usage (Million Gallons)¹	Other Potable Water Sources²
Village of Tarrytown ¹	No pump station	4.0	0	Catskill System
Village of Irvington ⁷	Pit connection locates approximately 2,000 ft below grade. Near NCA Shaft No. 12 A	2.25	77.1	Catskill and Delaware Systems. Also a small reservoir not in service since 1998.
United Water New Rochelle ⁸	Croton Pumping Station Near NCA Shaft No. 14A	17	Approx. 365	Catskill and Delaware Systems

Notes:

MGD = million gallon per day

1. Information received from the Annual Drinking Water Quality Report, 2002.
2. Other sources of potable water excluding the private wells.
3. Information provided by Gerard Moerschell, Commissioner of Public Works, October 29, 2002.
4. The Village of Ossining has the capacity to withdraw water from the New Croton Aqueduct from its connection to Shaft No. 4 and from the Croton Reservoir through the Old Croton Aqueduct. Its NCA connection is used as a backup only. Information provided by Frank Sylvester, Chief Operator, Ossining Pumping Station, October 30, 2002.
5. Information provided by George Lackowitz, Water Consultant for the Briarcliff Manor Water District, November 13, 2003. Other potable water sources are used for emergency only during non-summer months.
6. Information provided by John D. Vydareny, WTP Operator, November 19, 2003.
7. Information confirmed by Donald Casadone, Irvington Water Department, October 30, 2002.
8. Communities served by United Water New Rochelle include the City of New Rochelle, Town of Eastchester, Town of Greenburgh, Village of Ardsley, Village of Bronxville, Village of Dobbs Ferry, Village of Hastings-on-Hudson, Village of Pelham, Village of Pelham Manor, Village of Tuckahoe. The New Croton Aqueduct supplies 5% or less of the total water purchased from New York City Water Supply System. Information provided by Chris Graziano, United Water New Rochelle, November 13, 2003. Year 2002 usage was calculated by multiplying 5% times the total amount of water purchased by UWNR presented in their 2002 Annual Drinking Water Quality Report.

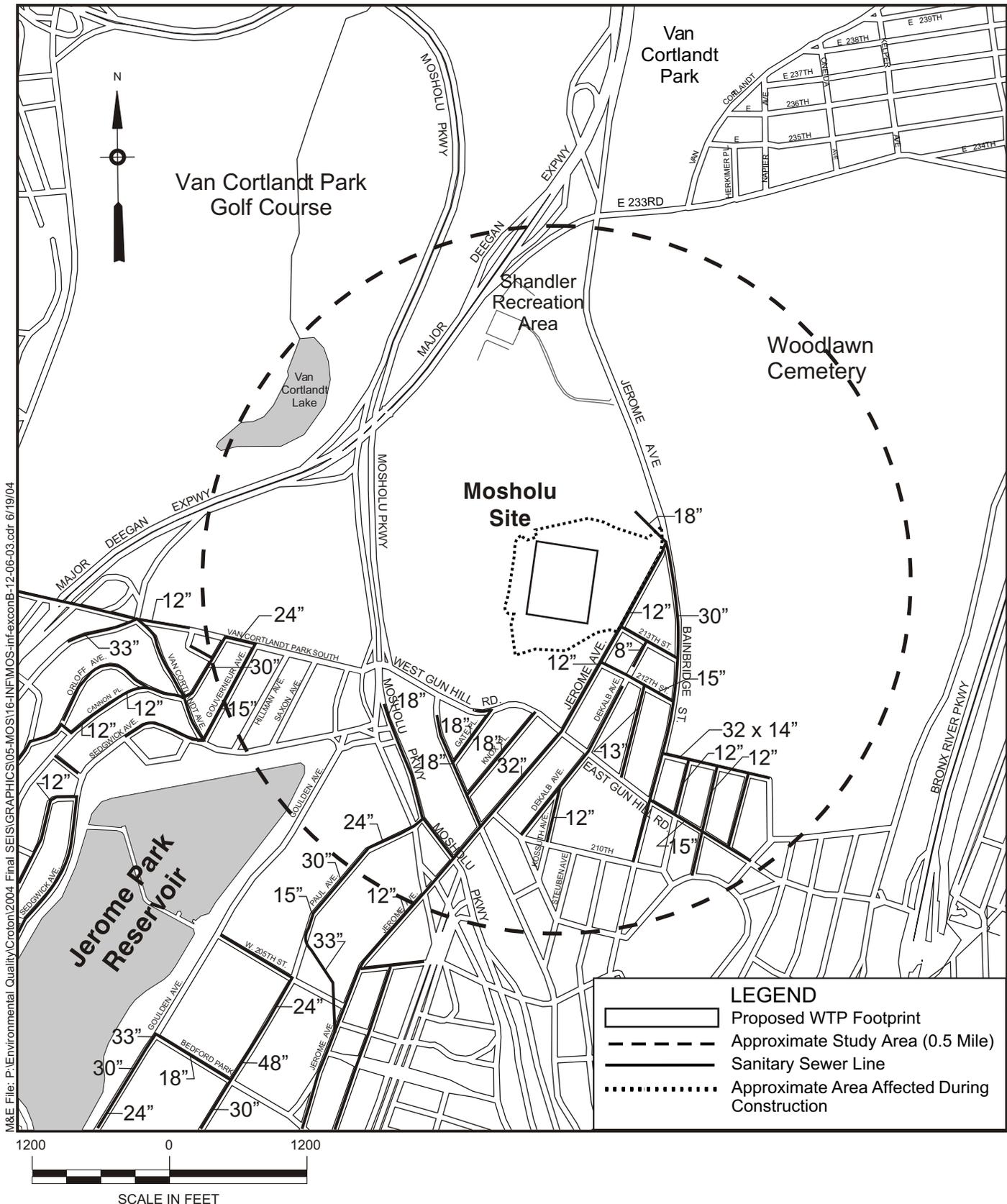
6.16.2.1.3. Sanitary Sewage

The area surrounding the Mosholu Golf Course is serviced by the New York City combined sewer and stormwater system. Sewer lines are located to the east and south of the proposed project site along Jerome Avenue and Van Cortlandt Park South. A 6-inch sewer pipe connects the clubhouse to the sewer line located along Jerome Avenue. This sewer line transitions from a 12-inch to 15-inch diameter line between East 213th Street and Bainbridge

Avenue. It runs northward along Jerome Avenue to Bainbridge Avenue, where a 30-inch interceptor continues southeast along Bainbridge to interceptors that convey the flow to the Wards Island Water Pollution Control Plant (WPCP). Figure 6.16-2 shows the sewer lines servicing the proposed project site.

The proposed project site is located within the service area of the Wards Island Water Pollution Control Plant (WPCP). The Wards Island WPCP State Pollutant Discharge Elimination System (SPDES) permit limit for dry-weather flow is 250 mgd. The annual average dry-weather flow for the plant was 184 mgd in 2000 and 2001. The average daily flow was approximately 195 mgd in 2001; the WPCP design capacity is 275 mgd. The Wards Island drainage area consists of sanitary, storm, and combined sewer systems. During dry weather, the combined sewers function as sanitary sewers, bringing sewage flows to Wards Island WPCP. During wet weather, large volumes of rainfall runoff enter the combined system through storm drains and catch basins in the streets and mix with the sanitary sewage being sent to the WPCP. In the event that wet weather flow exceeds the WPCP design capacity, the combined sewage is discharged into the East River.

The amount of sanitary sewage generated is anticipated to be equivalent to the amount of water consumed by the employees and visitors to the proposed project site. Existing sewer lines provide adequate access for the collection and disposal of the approximately 2,305 gpd of sanitary sewage generated by the employees and visitors to the proposed project site.



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Mosholu Site Combined Sanitary Sewer System

Croton Water Treatment Plant

Figure 6.16-2

6.16.2.1.4. Stormwater Infrastructure

The stormwater infrastructure at the Mosholu Golf Course consists of catchbasins near the existing clubhouse, a stone-lined drainage ditch delivering water to the combined sewer system, and an outfall discharging runoff to the forested wetland. Several catchbasins are located throughout the site, including the parking lot area, Mosholu Golf Course access road, courtyard in front of the golf course and clubhouse. These catchbasins discharge to the combined sewer system along Jerome Avenue. Field measurements of the catchbasins and the pipes discharging from the area indicated that each of these catchbasins has a capacity of approximately 1 cfs (cubic feet per second). In addition, the stone-lined drainage ditch located 220 feet northeast of the existing golf course clubhouse is responsible for discharging water from the forested wetland to an existing 18-inch combined sewer line through a concrete headwall. The forested wetland is located immediately north of the Mosholu Golf Course access road. The maximum elevation of surface water in the forested wetland is limited to an elevation 164.6 ft by the stone-line drainage ditch. Also, there is an outfall located on the north side (forested wetland) of the Mosholu Golf Course access road. Stormwater overflow from the catchbasin located at the eastern edge of the clubhouse parking lot discharges to the forested wetland from this location.

For the purpose of this document, the stormwater infrastructure study concentrated on the catchbasins and stormwater flows into and out of the forested wetland that are directly affecting the proposed project site. The results indicate that the runoff volume entering the forested wetland during a 3-month storm event is 0.1 acre-ft. The contour elevations at the Mosholu Site indicated that most of the stormwater runoff drains out of the water treatment plant site. There is no history of flooding at the proposed project site. Section 6.15, Water Resources, discusses the surface water sources, water quality and quantities in detail.

6.16.2.1.5. Energy Demand

The New York Power Authority (NYPA) sells electricity to the Consolidated Edison Company of New York (Con Edison) and government customers. Electric power is distributed and transmitted by Con Edison throughout most of Westchester County and New York City.

Con Edison supplies electricity to the recreational facilities at the Mosholu Golf Course through low voltage (4 KV) overhead lines along Jerome Avenue. Utility and light poles are located along the Mosholu Golf Course access road, connecting the overhead line along Jerome Avenue to the pole-mounted transformer near the parking lot, and ultimately supplying electricity to the Mosholu clubhouse and Driving Range.

The annual amount of energy consumed by the existing recreational facilities is estimated to be 8.46×10^8 BTUs/year (Table 6.16-3). The total instantaneous energy demand of the existing recreational facilities is 28.3 kilowatts. Instantaneous energy at a particular site refers to the total electrical demand available at one particular moment. Figure 6.16-3 shows the electrical cables and transformers servicing the clubhouse and Driving Range.

TABLE 6.16-3. ANNUAL ELECTRICAL CONSUMPTION OF THE RECREATIONAL FACILITIES AT THE MOSHOLU SITE⁽¹⁾

Facility	Consumption Load Demand	Estimated Annual Consumption	
	KW	KWH	BTUs/year
Clubhouse	14.5	5,454	4.13×10^8
Driving Range	13.8	480	4.34×10^8
Total	28.3	5,934	8.46×10^8

Notes:

1. Based on billing records for May 2003; reported by The First Tee Metropolitan New York.

6.16.2.1.6. Gas Demand

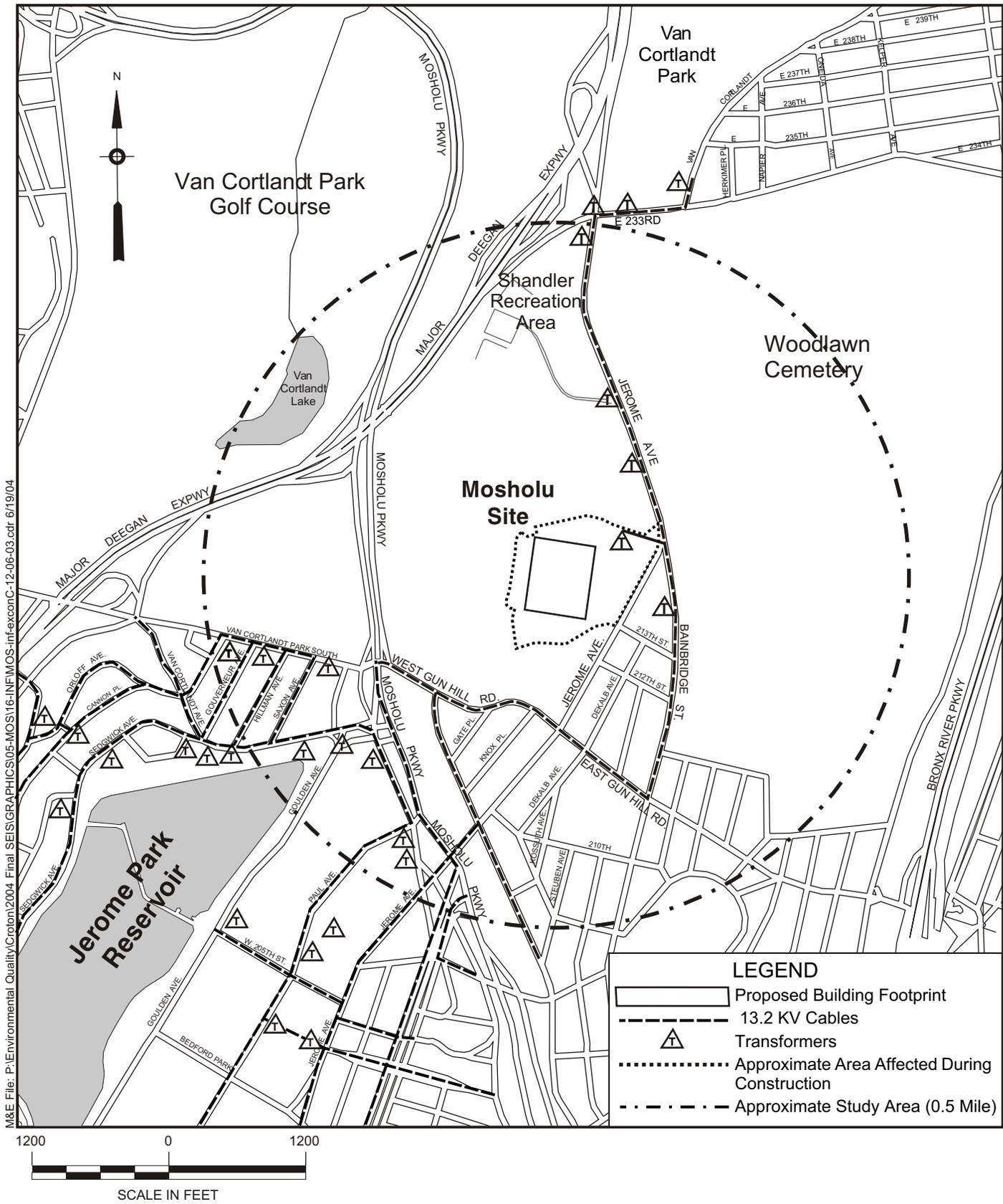
Con Edison supplies natural gas to the Boroughs of Manhattan, the Bronx, portions of Queens, and to Westchester County. Natural gas is commonly used for heating and non-heating purposes in residential, commercial, and industrial uses.

Con Edison maintains low pressure gas mains in the vicinity of the proposed project site along Jerome Avenue and Gun Hill Road. The existing recreational facilities at the proposed project site do not currently use natural gas.

6.16.2.2. Future Without The Project

The Future Without the Project conditions were developed for the anticipated peak year of construction (2010) and the anticipated year of operation (2011) for the proposed project. The anticipated peak year of construction is based on peak truck traffic and the peak number of workers. In the Future Without the Project, the amount of water consumed, sewage generated, stormwater drainage utilities, and energy used at the proposed project site are anticipated to remain essentially at the current levels.

Future plans for the Mosholu Golf Course that are being considered by The First Tee of Metropolitan New York include the construction of a Lew Rudin Youth Golf Center and a range complex that would allow for year round golf instructional programs. These plans are still pending; therefore, their impact could not be quantified. No substantial change in the number of people at the proposed project site is anticipated; therefore, the amount of infrastructure and utility service is anticipated to remain essentially unchanged.



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Mosholu Site

Existing Electrical Cables and Transformers

6.16.3. Potential Impacts

6.16.3.1. Potential Project Impacts

The anticipated year of operation for the proposed plant is 2011. Therefore, potential project impacts have been assessed by comparing the Future With the Project conditions against the Future Without the Project conditions for the year 2011. During operating years of the proposed project, the Mosholu Golf Course and Driving Range would see several changes, including a reconfigured golf course, a new clubhouse, and a new driving range.

6.16.3.1.1. Water Supply

The proposed plant would require water for all plumbing services, including fire protection, plant operational demands, and domestic uses. Operational demands include wash down service water, laboratory and workshop water, centrifuge flushing water, seal water, and make-up water to boilers/chillers. Domestic usage would include all employee amenities such as bathrooms, kitchen, and locker room facilities. Table 6.16-4 shows the water requirements at the proposed plant.

TABLE 6.16-4. INFRASTRUCTURE NEEDS FOR POTABLE WATER AND SANITARY FLOWS

Usage	Operations	
	Average Rate (gpd)	Peak Rate (gpm)
WTP Operational demand		
Wash Down Service Water	21,600	120
WTP Laboratory and workshop	1,000	10
Seal Water ⁽¹⁾	89,280	62
Make-Up Water Boiler/Chiller	7,200	25
Domestic Uses	1,325	237
Total Demand	120,405	454
Fire Protection Flow		1,250

Notes:

gpd=gallons per day; gpm=gallons per minute

¹Seal water is required for the lubrication system of the pumps.

The proposed plant would be staffed 24 hours per day, 7 days per week. NYCDEP would employ approximately 53 people to operate the proposed plant. There would be a maximum of 41 employees working Monday to Friday (8 AM to 4 PM); Monday to Friday would also have two off-shifts (4 PM to 12 AM & 12 AM to 8 AM). On Saturday and Sunday, three off-shifts (8 AM to 4 PM, 4 PM to 12 AM, & 12 AM to 8 AM) would operate the proposed plant. Each off-shift would require a total of 12 employees. The average domestic water consumption by the employees at the proposed plant is estimated to be 1,325 gallons per day (gpd), based on a consumption rate of 25 gpd per person and the maximum number of employees (53 persons) that could be present at the water treatment plant. This estimate is conservative and accounts for the presence of visitors at the water treatment plant. The peak rate for domestic use and the proposed

laboratory are based on the number of water outlets such as sinks, showers, and toilets in the vicinity of the proposed plant, and is in compliance with the *Plumbing Code, Mechanical Code and Fuel Gas Code of New York State* (May 2002). The water demand estimates for the wash down service and the boiler/chiller were calculated using the best engineering estimates, while seal water calculations was based on the pumping requirements.

Two 12-inch connections would be made to a new 16-inch line connected to an existing 36-inch water main that currently runs along Jerome Avenue to supply the proposed plant with potable water and water for fire protection. This connection would require permit approval from the City's Bureau of Water supply and Operations. The estimated pressure in the 12-inch pipe would be 45 to 50 psi. One of the two 12-inch pipes would serve fire protection supply, operational demands, and domestic uses, and the second pipe would serve as a backup. Each of these pipes could draw 750 gpm under peak flow conditions. The 36-inch water main would be sufficient to supply water without reducing the pressure of the existing network. In addition, the new clubhouse would be supplied with water by an existing 8-inch line along Mosholu Golf Course access road, which currently supplies water to the existing clubhouse. Water demands from the new clubhouse and surrounding areas are anticipated to remain unchanged. No significant impact is anticipated to the existing water supply network in the study area from the new connection.

The fire protection system would also receive water from a 12-inch diameter spur off of the new 16-inch diameter line connected to the existing 36-inch water main that currently runs along Jerome Avenue. This source would have no significant impact on the pressure of the existing water supply network.

6.16.3.1.2. Upstate Water Suppliers

The location of the proposed project would affect the availability of treated water supplied to the current upstate suppliers. Existing upstate Croton water suppliers are listed in Table 6.16-2. None of the upstate suppliers have been granted filtration avoidance and only the Town of New Castle and the Village of Ossining have built filtration plants³.

The Villages of Sleepy Hollow, Tarrytown, and Irvington have already installed connections to other sources, and their NCA connections (raw water) would only be used as an emergency backup. The Village of Briarcliff Manor is completing negotiations to obtain water from other suppliers that would serve as their primary source. Only United Water New Rochelle would continue to use the NCA as a primary supply to meet peak demands that exceed the capacity of its two Catskill Aqueduct connections.

United Water New Rochelle would be required to filter Croton water if it continues using its connection to the NCA. However, United Water New Rochelle has been actively pursuing New York City approval to develop a new connection to the Delaware Aqueduct Shaft No. 21 to replace its NCA connection.

³ Information received from the Annual Drinking Water Quality Report, 2002.

Contingency plans put in place by the individual upstate supplier agreements to divert from the usage of Croton water to other sources would enable upstate suppliers to meet their water supply needs if treated Croton water is not available to them, thus preventing significant impacts from occurring to those systems.

6.16.3.1.3. Sanitary Sewage

Three wastewater sources (process wastewater, laboratory, and sanitary waste) would be collected and discharged from the proposed plant through a new sanitary connection line to the NYC Wards Island Water Pollution Control Plant (WPCP). In addition, liquid waste from cleaning the Ultraviolet (UV) disinfection units would be discharged to the sanitary sewer system; however, due to the intermittent discharges it is not accounted as a regular source of sewage.

A drainage system would be provided to collect process wastewater and wash-down water from the Operating Level, and Lower Level. Also, at the Foundation Level, flows would be pumped and discharged into the main sanitary drainage system. The estimated amounts of flows collected are as follows: wash-down service water - 21,600 gpd; seal water - 89,280 gpd; and make-up water boiler/chiller - 7,200 gpd. In addition, wastewater from the laboratory would be drained to the chemical waste neutralizing tanks and then discharged to the plant sanitary drainage system. The chemical sumps and chemical waste drainage system would be directed to the centrate tanks from each drip sump, and then discharged to the proposed sanitary sewer.

Sanitary sewage would be generated from domestic uses. Domestic usage would include all of the employee amenities such as the bathrooms, kitchen, and locker room facilities. The total amount of sewage generated by employees is estimated to be 1,325 gallons per day, which is assumed to be equivalent to the amount of domestic water consumed. These uses make up the rest of the 120,405-gpd water demand. It is anticipated that that the new sanitary sewer piping would connect to the existing combined sewer system. The main plant sanitary pipe would collect sewage from the proposed water treatment plant and connect to an existing sewer that runs along Jerome Avenue. The new clubhouse would be served by an existing 6-inch sewage line connected to an existing sewer along Jerome Avenue. Sewage generated by the new clubhouse is anticipated to remain unchanged.

The 2001 average daily flow to the Wards Island WPCP is approximately 195 mgd and the SPDES permit limit is 250 mgd. The maximum possible sewage flows to be generated by the proposed plant are approximately 0.120 mgd, which is equivalent to less than 0.1 percent increase in daily average flow to Wards Island WPCP. This would be an insignificant increase in the amount of sewage to be handled by the Wards Island WPCP.

Cleaning of UV lamps is a significant operation and maintenance issue, and its frequency is dependent on the fouling of quartz sleeves. Fouling of sleeves is a result of water quality effects such as precipitation of iron, calcium, aluminum, and manganese salts along with other inorganic and organic constituents. Fouling is also dependent on the type of lamp used; medium pressure lamps operate at much higher temperatures and irradiance concentrations than low pressure lamps and therefore foul much more quickly. Phosphoric acid would be used as the cleaning

solution for the Ultraviolet (UV) disinfection units. Phosphoric acid is a non-hazardous acid that can be discharged to the sewer or hauled off-site for disposal. Currently this phosphoric acid is added to the water supply for corrosion control. Approximately, 200 gallons per month of phosphoric acid would be used to clean the UV disinfection units. Disposal of spent acid and related liquid waste would be intermittent and is estimated to be 16,000 gallons per month.

The residuals handling facility would recover a substantial amount of the generated process wastewater. The residuals handling facility would serve to reclaim filter-to-waste water (e.g. water wasted during the start-up of a filter after backwashing), and waste backwash water. The reclaimed wastewater would be recycled to the head of the plant for treatment. The floated coagulated material from the DAF (Dissolved Air Flootation) process used by the proposed plant would flow to the floated solid storage tanks. Floated solids and sedimentation from the filter-to-waste and waste backwash water would also be directed to the floated solid storage tanks. The design average and maximum mixed solids flow rates of 2 percent solids would be approximately 121,000 gpd and 284,000 gpd, respectively. The mixed solids from the floated solids storage tanks would be pumped through two proposed six-inch force mains (each would be able to handle the maximum flow) to the Hunts Point WPCP, which is located in the South Bronx, NY, approximately seven miles from the proposed project site. The solids would be dewatered at the Hunts Point WPCP dewatering facility.

There are three solids storage tanks at the Hunts Point WPCP, which receives flow from Newtown Creek WPCP and the Hunts Point WPCP. The quantity of mixed solids from the proposed plant would not compromise these storage tanks or the dewatering facilities at the Hunts Point WPCP. The Hunts Point WPCP dewatering facility maintains 13 centrifuges, each with a capacity of 250 gpm. Typically, the centrifuges are operated four to nine at a time with a combined capacity of 1,000 gpm to 2,250 gpm, depending on the amount of received. The maximum flow of 197 gpm of mixed solids from the proposed plant would not impact the operation of these centrifuges.

6.16.3.1.4. Stormwater Infrastructure

A storm sewer network of storm pipes and catch basins would be designed and sized according to the amount of flow that they would be required to convey. The flow rate to each individual catch basin would accommodate for the 10-year 24-hour storm (5.1 inches)⁴ except “Critical path” pipes, which would be designed for the 25-year storm. Critical path pipes are the main collector pipes of the storm sewer network, which would convey off-site flows through the site as well as on-site runoff. These pipes would be designed for a larger design storm to account for any unanticipated flows that may drain to the associated catch basins from off-site. With the storm sewer network in place, the runoff would be discharged to the existing combined sewer on Jerome Avenue.

⁴ 1961. Technical Paper No. 40. Rain fall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years. Prepared by David M. Hershfield, Cooperative Studies Division, Hydrologic Services Division, for Engineering Division, Soil Conservation Service, U.S. Department of Agriculture. Washington, D.C.

Stabilization and structural best management practices (BMPs) would be implemented during the operation phases of the proposed project in order to ensure that peak flows would be dissipated to avoid on-site erosion and that the pre-construction stormwater runoff volumes would be maintained to avoid impacts on the combined sewer and stormwater system, and wetland hydrology. A complete description of the BMPs proposed for stormwater management at the project site was included in the Stormwater Pollution Prevention Plan (SWPPP) (Appendix G). The SWPPP for the proposed project site would be prepared in accordance with the requirements stipulated in the New York State Department of Environmental Conservation (DEC) State Pollutant Discharge Elimination System (SPDES) general permit for stormwater discharges from construction activity, and includes each of the components listed in Part III.D.2a [and] 2b of GP-02-01. The pollution prevention plan conforms with the New York technical standards referenced in the general permit for construction activities, including standards and specifications for erosion and sediment control⁵ and the design manual⁶.

The permanent above ground structures, which are also described in Section 6.1, Introduction and Project Description, would consist of a chemical fill building, an arrivals and receiving building, and a guard house. Each building would have a roof drainage system that would convey water by gravity via piping to the site stormwater collection system. The key component of the post-construction stormwater management system is the facility roof infiltration collection system. The surface of the proposed water treatment plant building would be covered with about two feet of crushed stone, sand, and topsoil, and returned to use as part of the driving range. Either artificial turf or grass with an irrigation system would be installed on the new driving range. Part of the precipitation falling on the roof would flow as runoff on the grassy surface, and part would infiltrate the subsurface loam. All the precipitation during the three month storm would be absorbed by the ground cover without any surface runoff. A drainage board and membrane waterproofing would be placed above the roof slab and below the soil fills. The drainage board would carry any rainwater that penetrates the soil profile to the perimeter collection system which would discharge to the combined sewer on Jerome Avenue. The existing combined sewer system is adequately sized to accommodate this volume.

The site stormwater collection system would consist of stormwater pipes that would collect stormwater from site access roadways, parking lots, and roof drainage. The structural pollution prevention BMPs would also be provided for localized treatment of runoff from impervious areas. These BMPs would be designed to remove oil and sediment from stormwater during frequent wet weather events. They would be sized to treat the peak flow from the 2-year 24-hour storm, and would provide removal of approximately 80 percent of total suspended solids. After the localized treatment, the stormwater would be discharged to the existing sewer system along Jerome Avenue. No significant long-term impact is anticipated to the existing stormwater system in the study area.

In addition, to avoid the potential for long-term impacts related to the proposed permanent facility dewatering, an infiltration gallery and trench would be installed between the water treatment plant building and the forested wetland. The gallery/trench system would prevent

⁵ New York Guidelines for Urban Erosion and Sediment Control, (NY, 1997).

⁶ New York State Stormwater Management Design Manual, New York City DEC, (NY, 2001)

water from draining from the wetland into the cone of depression caused by dewatering of the foundation. The infiltration system would be supplied with City water during both the construction and operation period to maintain the hydrology of the forested wetland in a state that mimics existing conditions.

6.16.3.1.5. Energy Demand

The electrical power distribution system for the proposed plant would comply with all Federal, State and City codes. The design would consider safety, reliability, flexibility, ease of operation and maintenance, life cycle costs, and energy conservation; this would be in accordance with the *Energy Policy Act* of 1992, and the *New York State Energy Conservation Construction Code*, 2002.

Electric power for the proposed plant would be furnished by the New York Power Authority (NYPA), which has a contract to supply electricity to New York City government facilities. NYPA generates, buys, and transmits electrical power on a wholesale basis. NYPA would supply electrical power through the Con Edison distribution system. The distribution of electricity to the proposed plant would be the responsibility of Con Edison. Electric supply for the proposed plant would be provided from the Con Edison Washington Street Substation in Mount Vernon via a combination of overhead and underground feeders using triplexed shield cables.

The Washington Street Electrical Substation is located at the corner of South Fulton Avenue and Washington Street in Mount Vernon. Conceptually half of the feeders from the electrical substation would run west on Washington Street, turn south on Franklin Avenue, and west onto 4th Street/241st Street/Wakefield Avenue. The other half of the feeders would run south along South Fulton Avenue and turn left onto 5th Street/Nereid Avenue/McLean Avenue. These feeders would meet at Mosholu Parkway North and Kimball Avenue, following Mosholu Parkway North and later Jerome Avenue. All feeders would enter the water treatment plant site underground and would be connected to a step-down substation located to the north of the main treatment building. The proposed plant would require up to six underground service feeders, each at 13.2-kV. The on-site substation would receive the incoming underground service feeders and step down the voltage to 4.16-kV for distribution throughout the proposed plant. The main substation would consist of the 13.2-kV service switchgear, service transformers, 4.16-kV main and distribution switchgear, 4.16-kV bus ducts, current-limiting reactors and 125-VDC battery banks and control system.

The feeders supplying the proposed plant would be independent of the existing electric distribution grid and therefore would not pose a significant impact on the local community. Table 6.16-5 shows the total electrical loads for the proposed plant. The electrical demands of the proposed plant were calculated for the following three scenarios: connected load, maximum capacity and normal capacity. The connected load is the energy demand that would result if all equipment, including standby units, were operating simultaneously, and represents the amount of power that must be made instantaneously available to the facilities by the power generator/supplier (NYPA/Con Ed). Maximum demand represents the total load of all electrical

equipment operating simultaneously at the short-term maximum plant capacity flow of 290 mgd. Normal demand reflects the total load of all normally operating equipment during the long-term maximum treatment capacity (150 mgd).

TABLE 6.16-5. TOTAL ELECTRICAL LOADS

Total Croton Water Treatment Plant Demand	Estimated Load	
	kW	kVA ¹
Connected load	39,630	41,706
Maximum Operating Load (290 mgd)	27,616	28,606
Average Operating Load (150 mgd)	18,191	18,614
Emergency Load (0 mgd)	1,145	1,174

Notes:

1. kW = kVA x pf, where pf is the power factor (a measure of electrical efficiency).

The proposed plant would also be provided with an emergency power system. The emergency power system would be available for smoke purging, emergency elevators, alarms, firm pumps, communications, and other emergency equipment in case of fire or other emergency conditions. Emergency power would also be provided for the security system, communications system, lighting protection system, plant control system, and other safety related equipment. The emergency power system would not be provided to operate the proposed plant. In case all Con Edison feeders are out of service, approximately 1,145 kW of electrical power would be generated on-site using two emergency diesel generators. Each generator would be rated at 1,500 kW (480 volts) one operating and the other as a backup. Three thousand gallons of underground fuel storage tank would be provided, based on 24 hours of continuous full-load operation of one generator, and would be located near the generator room, at least 20 feet away from any means of egress. In addition, two 750-kv load banks for exercising the diesel engine (once a month) would be provided. The electric usage from the new clubhouse is anticipated to remain the same during operating years.

6.16.3.1.6. Gas Demand

Con Edison would deliver natural gas to the gas meter room. Natural gas would supply hot water heaters, HVAC boilers, and laboratory uses. Table 6.16-6 shows natural gas loads at the proposed plant during normal operation. The proposed plant would require an approximately 40,000 cubic feet per hour (cfh) gas load at 2 to 4.5 psi pressure.

TABLE 6.16-6. NATURAL GAS DEMANDS AT THE CROTON WATER TREATMENT PLANT

Demands	Loads (cfh)
Hot Water Heaters and Laboratory Use	1,600
Boilers	30,200
Total Demands	40,000

Notes:

cfh = cubic feet per hour

Con Edison maintains a 6-inch diameter natural gas main that runs along Jerome Avenue. Conceptually, this gas line could potentially supply the proposed plant with natural gas. Natural gas main service would run westward of Jerome Avenue and would continue running up to the gas meter. A gas meter would be located at the east side of the above grade arrival and receiving building. Con Edison would determine a means of meeting the natural gas demand of the proposed plant without causing a significant impact on the existing natural gas distribution system.

6.16.3.2. Potential Construction Impacts

The anticipated year of peak construction for the proposed plant is 2010. Therefore, potential project impacts have been assessed by comparing the Future With the Project conditions against the Future Without the Project conditions for the year 2010. During construction years, a temporary clubhouse would be installed and the golf course would be reconfigured. The location of the temporary facilities would be adjacent to the existing golf course and driving range in the Allen Shandler Recreation Area. This would avoid interruptions in the operation of the Mosholu Golf Course.

The initial activities include clearing and grubbing and developing site haul roads. Perimeter fencing would be installed, stormwater runoff BMPs would be established, and the residential engineer’s field office complex would be constructed. Temporary site utilities for electrical power, telephones, site lighting, water, and sewer would be installed at this initial stage. Any underground activities entail the potential interruption of utility services. Locating and preserving the safety of any electric and natural gas lines would be responsibility of Con Edison, while water and sanitary sewer utility safety would be the responsibility of the contractor and construction manager.

6.16.3.2.1. Water Supply

Initially, the water supply utility on the construction site would be provided by water tankers. An estimated 5,000 gallons would be delivered by the water tankers every other day. Sufficient storage tanks would be provided on-site for an uninterrupted water supply service. However, the contractor would be responsible for selecting a method of supplying water to best suit their method of working. An existing 8-inch line along the access road that currently

supplies water to the clubhouse would be used as an alternate method of water supply. No significant impact is anticipated to the existing water supply network in the study area from the new connection.

During the peak construction, an estimated 660 construction personnel would consume an estimated 16,500 gpd of potable water, based on an estimated rate of 25 gpd per person in a 5-day work week. Estimated water use for construction activities would be on the order of 500,000 gallons over the 5½ years of construction. Water would be used for wetting exposed soil and roadways during excavation, washing down concrete trucks during pouring operations and general clean up. Wetting operation would be required to prevent fugitive dust from entering the air during construction. The existing 8-inch pipe and the temporary water storage tanks would be able to adequately supply the construction site with 100 percent redundancy.

The temporary clubhouse located north of the golf course would be supplied with potable water by an existing connection to the nearby comfort station located in the Allen Shandler Recreation Area. Water demands from the temporary clubhouse and surrounding areas are anticipated to resemble those presented in the existing conditions. There would be no anticipated impact on the city water supply. The supply drawn to the construction site would equate to less than 0.002 percent of the total flow of approximately 1,400 mgd, which is normally supplied to the City by the City's Catskill/Delaware Water Supply system. Therefore, no significant impact is anticipated.

Temporary shutdowns of the NCA during construction are necessary to connect the proposed water treatment plant to the NCA and activities related to this action. Portions of the Bronx and Manhattan obtain potable water from the Croton Water Supply System through the NCA (refer to Section 1.4.3 Existing Croton Water Supply Users, Introduction and History). The existing water regulators and boundary valves in the City's Water Supply System would supply water to the low level service (typical Croton service area) from the high level service (typical Catskill/Delaware service area) in the event of a Croton System shutdown or loss of pressure in the low service area. No special action other than adjusting the existing water regulators and valves is required to provide normal New York City Croton users with water when the Croton System is not operational. No significant adverse impact to the New York City Croton users is anticipated from temporary shutdown of the NCA.

6.16.3.2.2. Upstate Water Suppliers

During the construction period, the NCA is anticipated to be shutdown for short periods of time when connections to the water treatment plant are being made.

Throughout the periodic shutdown for construction, the Town of New Castle, the Village of Irvington, the Village of Ossining, the Village of Sleepy Hollow, and the Village of Tarrytown would draw on their already existing alternate source for potable water supply (see existing conditions for the available alternate sources). The Village of Briarcliff Manor would obtain water from other suppliers currently under negotiation and anticipated to be online prior to Fall 2006. If the Village of Briarcliff Manor is unable to obtain connection to other sources the Bureau of Water Supply could place a temporary impoundment in the aqueduct just below the

connection used by Briarcliff Manor (to prevent flow further down the NCA from this connection) and supply water to meet the Briarcliff Manor demand.

During the temporary NCA shutdowns, United Water New Rochelle (UWNR) would not have an option to use the NCA as a primary supply to meet peak demands (i.e. when the capacity of its two Catskill Aqueduct connections are exceeded). UWNR's Catskill connection would only be operationally affected in the event the Catskill Aqueduct needed to be shut down from Kensico Reservoir. In that situation, UWNR's Catskill connection would be supplied by backfeeding into the Catskill Aqueduct from Hillview Reservoir, which would be supplied by the Delaware Aqueduct. The elevation in Hillview Reservoir must remain above 291 feet for the UWNR connection to function. During diurnal peak demand periods in the City's distribution system, this elevation has – on occasion – not been able to be maintained, causing UWNR to temporarily lose this supply. When the flow control structure now being constructed at Shaft 18 in Mount Pleasant is complete and in service, scheduled to occur in summer 2004, it would facilitate maintaining the minimum elevation in Hillview to assure the UWNR supply through this connection.

Contingency plans put in place by the individual upstate supplier agreements to divert from the usage of Croton water to other sources would enable upstate suppliers to meet their water supply needs if Croton water is not available to them, thus preventing significant impacts from occurring to those systems.

6.16.3.2.3. Sanitary Sewage

In the initial stage of the 5½ year construction period, portable rest rooms would be made available for the construction personnel. In addition, the residential engineer's field office complex would be provided with a temporary sanitary sewer connection. The total amount of sewage generated (16,500 gpd) by employees during the peak construction period at the construction site is assumed to be equivalent to the amount of water consumed. The sanitary sewage from the portable restrooms would be collected and properly disposed of through a contract with a private hauler. The sanitary sewage discharge to the existing sewer system would be directed to the Wards Island WPCP. Due to the limited capacity of the temporary sanitary sewage connection no significant impact is anticipated. The temporary clubhouse would be served by an existing sewer line that currently serves the comfort station. Sewage generated by the temporary clubhouse is anticipated resemble those presented in the existing conditions and also be directed to the Wards Island WPCP.

The 2001 average daily flow to the Wards Island WPCP is approximately 195 mgd and the SPDES permit limit is 250 mgd. The amount of sewage to be generated by the construction site is equivalent to less than 0.01 percent increase in daily average flow to Wards Island WPCP. This would be an insignificant increase in the amount of sewage to be handled by the Wards Island WPCP. Therefore, no significant impact is anticipated.

6.16.3.2.4. Stormwater Infrastructure

During construction, the sedimentation and erosion controls and stormwater management practices, which are described in Section 6.15, Water Resources, in more detail, may potentially be employed to minimize erosion, and prevent sedimentation impacts to the combined sewer and stormwater system, and wetland hydrology. However, the final design of the erosion and sedimentation control measures during construction of the proposed plant would be the responsibility of the contractor. Control measures would include stabilization for disturbed areas, and structural controls to divert runoff and remove sediment. In addition to managing stormwater runoff and erosion, Best Management Plans (BMP) would help to ensure that measures are taken to prevent accidental releases of fuels, lubricating fluids, or other hazardous materials. The project contractor is responsible for developing and implementing a Sedimentation and Stormwater Control Plan (SSCP). The SSCP would be consistent with the level of stormwater, and erosion and sediment control to be described in the SWPPP.

Stormwater management, erosion and sedimentation control measures would be implemented in a phased approach during construction. Phase I, which is relatively short-term, includes installation of the construction area perimeter fencing, noise barriers, preliminary erosion control measures (silt fencing and temporary sedimentation basins), and concrete jersey barriers to protect designated trees within the construction area. This initial phase also includes demolition of the existing golf club facilities, and construction of the site access roads, and temporary facilities for construction management and site security. Finally, Phase I includes the clearing and grubbing of trees within the proposed building footprint. Phase II, which would last approximately two years, includes excavation of the building footprint to depths 50 feet - 90 feet below grade. The first step in the excavation process would be to remove the topsoil and overburden to expose the top of rock in the area to be excavated. Early on in Phase II, before the excavation proceeds into bedrock, the infiltration trench and gallery system would be constructed to maintain adjacent wetland elevations near existing levels. Phase III includes construction of the water treatment facility and the permanent site road system, installation of water, sewer and stormwater lines, and final landscaping.

Structural BMPs would provide treatment of runoff from these impervious areas (access roadways, parking area). These pollution prevention devices would be designed to remove oil and sediment from stormwater during frequent wet weather events. They would be sized to treat the peak flow from the 2-year 24-hour storm, and would provide removal of approximately 80 percent of total suspended solids. The NYCDEP maintains sewer lines in the vicinity of the proposed project site (refer to the existing conditions). After the localized treatment, the stormwater would be discharged to the sewer system through sewer lines along Jerome Avenue. The existing catch basins and combined sewers are sufficient to receive the stormwater runoff from the water treatment plant site without exceeding their permitted capacities.

The BMPs would be in compliance with state and local requirements cited previously. There is no anticipated impact from the stormwater runoff from the proposed project site to the existing infrastructures.

6.16.3.2.5. Energy Demand

Four temporary feeders each supplying 2,500 kVA would be provided by Con Edison to supply power during the construction period at the proposed project site. The temporary feeders would originate from the Washington Street Substation in Mount Vernon northeast of the construction site. The 5,000 kVA of the total temporary demand would supply the tunnel work that includes the tunnel boring machine (TBM) and welding. An additional 2,500 kVA would supply electricity to other construction equipment, site lighting, and field offices for contractors, resident engineers and NYCDEP personnel. The outstanding 2,500 kVA feeder would serve as a back up. These feeders would be provided independent of the existing grid in the study area. Therefore, this source of power would be sufficient for all construction activities without resulting in a significant impact to the existing electrical utilities. The temporary clubhouse would be supplied with electricity by electrical feeders that currently supply electricity to the comfort station. The energy demand for the temporary clubhouse is anticipated to be the same as the demand for the existing clubhouse. Therefore, no significant impact is anticipated as a result of the operation of the temporary clubhouse.

In addition to the feeders, a number of 1,500 kVA diesel generators would be available on a temporary basis during construction for uses in a localized construction area such as for providing power to an emergency escape elevator and dewatering from deep excavation. The generator would be sufficient for any emergency uses on the construction site without resulting in a significant impact to the existing electrical utilities (see Section 6.10, Noise, and Section 6.11, Air Quality, for additional information on the operation of the generator).

6.16.3.2.6. Gas Demand

Natural gas would not be utilized during the construction of the proposed plant. In addition, the temporary clubhouse would not use natural gas. During the final stages of the construction process, a connection would be made to an existing natural gas line along Jerome Avenue. The connection would be used for the UPS for the UV disinfection system (see potential project impacts for details). Proper procedures would be followed during the connection process; therefore, no significant impact is anticipated.

Based on the analyses presented above, the proposed Croton project at the Mosholu Site would have no significant adverse impacts on Infrastructure and Energy. For comparison purposes, this is true of the Eastview and Harlem River sites as well.