INSITE
ENGINEERING, SURVEYING &
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Preliminary Wastewater Engineering Report

For

1 Croton Point

Croton Point Ave.
Croton-On-Hudson, New York

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Prepared By

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1.0 INTRODUCTION

1.1 Project Description

The subject project consists of a proposed 100-unit, for sale affordable condominium development consisting of 46 one-bedroom and 54 two-bedroom homes in a to be constructed 5-story building with requisite parking and amenities (the "Development") to be located on lands fronting on Croton Point Avenue consisting of (i) Tax Map Parcels 79.17-1-5 & 3 owned by the Village ("Lot A"); and (ii) Tax Map Parcel 79.17-1-3 owned by Croton Point Realty Inc (the "CPR Parcel"). Lot A is currently in use as a Village commuter parking lot. The CPR Parcel is improved with an office building which is proposed to be demolished for the Development.

The proposed brick and metal panel building will be served by 100 parking spaces to be located in a below grade parking level and two outdoor parking areas, including five (5) Level 2 EV charging stations. Amenities within the building will include a community room, a fitness center, a co-working lounge, a bike storage room and a roof-top deck providing expansive scenic views overlooking Croton Point Bay and the Hudson River.

Sustainable building design features will likely include full electrification, solar readiness, high efficiency HVAC equipment (cold climate air source heat pumps) and appliances (Energy Star Multifamily New Construction Program) and low-flow water fixtures.

In total the property consists of 1.8 ± acres and is located in the LI (Light Industrial with a Transoriented Development Overlay) zoning district, the Village of Corton-on-Hudson Water District and the Ossining Sanitary Sewer District.

1.2 Existing Site Conditions

The subject project is located on Croton Point Avenue across from Veterans Plaza in the Village of Croton-On-Hudson. As previously stated, the site currently exists as a Village Parking lot and commercial development with several buildings, parking areas, walkways, and other appurtenances. It currently exists as some office buildings as well as overflow parking for the Croton-Harmon train station.

1.3 Proposed Site Conditions

It is proposed to construct a 21,500 sf ± (footprint area) affordable condominium development with associated parking and various site appurtenances. The new five-story building will contain one hundred units. There will be 46 one-bedroom units and 54 two-bedroom units. Amenity spaces will also be constructed which will be used by the residents of the building. As part of the proposed development, there will be a new sewer service connection to the building, pump station, and valve pit. The new sewer service will exit the building on the west side and will tie into the existing 8" polyethylene force main on Croton Point Ave. The sewer flow in the new sewer service lines will be greater than 2,000 gallons per day (gpd), thus requiring a permit from the Westchester County Department of Health. (WCDOH).

2.0 PROJECT DESIGN FLOWS

Design maximum daily wastewater flows for the proposed project, are based on the hydraulic loading rates given in the New York State Department of Environmental Conservation (NYSDEC) publication *Design Standards for Intermediate Sized Wastewater Treatment Works – 2014* (DEC 14). The design maximum daily water use is a conservative design flow on which the water infrastructure will be designed. This value does not represent the average daily flow which is expected to be substantially less.

The design flow rates for the residential units are based on the number of bedrooms per the tables below. The following table calculates the hydraulic loading rates and the design flow rates (gallons per day or gpd) for the proposed project:

Table 2.1: Croton Point Ave. - Design Maximum Daily Flow Rate

Proposed Use	# of Units	Hydraulic Loading Rate	Design Maximum Daily Flow (gpd)
One Bedroom Units	46 Units	110 gpd/bedroom	5,060
Two Bedroom Units	54 Units	110 gpd/bedroom	11,880
Total			**16,940**

The anticipated design average daily flows for the project are expected to be significantly less than the design maximum daily flow rate. The design maximum daily flows represent conservative flows to ensure that the proposed sewer service line is designed with an ample factor of safety. The anticipated actual flows are based on anticipated occupancy rates and measured data for water use. Statistical data (obtained from *Rutgers University, Center for Urban Policy Research*, *Residential Demographic Multipliers*, June 2006) for the average number of occupants in rental units (based on number of bedrooms) was used to calculate the expected number of residents anticipated for the project as shown in the table below. Data from the American Water Works Association (AWWA) Water Conservation Division Subcommittee Report, Water Conservation Measurement Metrics Guidance Report, dated January 2010 shows that the average in home water use is 69.3 gpd per person. This number is reduced to 43.5 gpd per person when water saving fixtures are used, which is the case for this project. The following table below will be used to calculate flow to the existing sewer main. The 45 gpd per person was used to calculate the proposed anticipated average daily design as water saving fixtures will be used. See the table below for the calculation of the design average daily flow rates in the existing and proposed conditions.

Table 2.3: Croton Point Ave. - Proposed Design Average Daily Flow Rate

Proposed Use	Occupancy Rate	Total Anticipated Residents	Water Use Per Resident (gpd)	Water Use (gpd)
46 – One Bedroom Units	1.86 people/unit	86	43.5	3,741
54 –Two Bedroom Units	1.88 people/unit	102	43.5	4,437
Total Anticipated Wastewater Generated (gpd)				**8,178**

As demonstrated above, through the use of water saving fixtures as required by current building code, a design maximum flow of 16,940 gpd is proposed for the project, while the actual anticipated flows are 8,178 gpd.

The peak hourly flow is calculated using a peaking factor that is based on the maximum daily design flow. A peaking factor of four will be used for the project based on Figure 1 from Recommended Standards for Wastewater Facilities.

Peak Hourly Domestic Flow

16,940 gpd ÷ (24 hr/day) ÷ (60 min/hr) = 11.8 gallons per minute (gpm)

Peak Hourly Flow = 11.8 gpm x 4 = 47 gpm

Although the anticipated flows (average daily design flow) for the project is significantly lower than the design maximum daily flows, the Peak Hourly Flow based on the design maximum daily flows are used for the design of the system. This provides a factor of safety in the proposed design.

3.0 PROPOSED COLLECTION SYSTEM COMPONENTS AND CONNECTION TO WESTCHESTER COUNTY DEPARTMENT OF ENVIRONMETAL FACILITIES SYSTEM

A gravity sewage collection and conveyance system consisting of 8-inch diameter PVC SDR 35 sewer mains and precast concrete manholes will be installed onsite and will connect the building to the proposed pump station. The sewage collection and conveyance system will flow by gravity to an onsite pump station. A duplex pump station is proposed to be installed and will connect to the 8-inch forcemain with a proposed connection manhole. A backup generator will be provided to power the pumps in the event of power failure.

All PVC SDR 35 pipe will contain rubber push on gaskets at pipe connections. Sewer manholes will be installed at all bends for access and maintenance. The proposed sewer forcemain will consist of PVC SDR 21 pipe. All sewer manholes will have exterior asphalt coating and contain watertight connections at all pipe connections. Cleanouts will be provided on each sewer service connection just outside of the townhomes. All sewer mains will be pressure tested, and all manholes vacuum tested in accordance with the *Recommended Standards for Wastewater Treatment Works*.

4.0 PUMP STATION DESIGN

The pump station will be sized to convey at a minimum the peak hourly flow from the subject project. The pumps will need to achieve this flow rate while pumping against the static and friction heads in the system. A simultaneous use analysis will be performed to ensure the proposed pump station will not be affected by or affect the other pumps in the system.

4.1 Pumps and Pump Controls

Duplex submersible grinder pumps have been designed to convey the sewage flow contributing to each pump station generated from the proposed development. The pumps will be housed in a six-foot diameter wet well. The submersible pumps will be controlled via a liquid level probe in the wet well that will turn the pumps on or off depending on the water level within the wet well. The pump controller will also alternate the lead/lag designation of the pumps. Additionally, a backup float system will be provided to operate the pumps independent of the probe controls in the event of a probe control system failure.

4.2 Pump Design Criteria

As discussed above, the pump design is based on the average design flow reaching the pump station and a peaking factor of 4.0. The static head and losses associated with bends, entrance and exit losses and valves to calculate a total dynamic head (TDH) at the peak flow using a Hazen-Williams “C “value of 120. The specific flows and TDHs for the pump station will be designed as the overall project design advances.

4.3 Pump Controls

A submersible level control system is proposed for the pump station. This system is composed of a submersible level transducer to control and monitor the operation of the duplex pump station and provide lead-lag automatic alternation, high and low level alarms (Visual and Audible). Elevations for low level alarm, both pumps off, lead pump on, lag pump on, and high level alarm will be established as the project design advances.

In the event that the primary control system fails to operate the pumps, and the wet well level rises above the high-level alarm set point, a back-up float pump control system will override the primary pump controller and take over control of the pumps. Upon the liquid level reaching 6 inches above the “high level alarm”, the back-up float will turn on both the lead and lag (after 45

second delay for lag) pumps. Upon the liquid level reaching 6 inches below the low alarm," a backup float will simultaneously turn both pumps off. The station will continue to operate in this mode until the alarm condition is corrected and the primary pump control system has been placed back into operation.

4.4 Wet Well

The pump station wet well has been designed based on the average daily flow reaching the pump station. The pump dose volume for each pump station is set to provide less than 30-minute detention time, at the average daily flow as recommended by *Recommended Standards for Wastewater Facilities*. The maximum pump dose volume will be determined by multiplying the average daily flow by 30 minutes.

4.5 Valve Pit

A precast concrete valve pit will be provided for the pump station to house gate valves, check valves, plug valves and a bypass piping system. The valve pit will also house discharge pressure gauges on the forcemain. The valve pit will be provided with a floor drain to the wet well for removal of accumulated water. A gate valve will be provided on the drain line.

4.6 Check Valves

Check valves will be provided on both pump discharge headers. The proposed check valves will be swing type with a weight and lever. The check valves will have a pressure rating of 150 psi.

4.7 Control Panel

The controls for the pump station will be post mounted inside the pump station fence. Controls will include power panels, a transfer switch for auxiliary power, pump control panel, and an autodialer. The controls will be housed in a weather proof NEMA enclosure. Access to the pump pit area will be provided via a 10-foot wide gate.

4.8 Auto-dialer and Alarm Communication

In order to transmit pump station alarm conditions, an autodialer with telephone will be provided. Alarm conditions will include pump station "Wet Well High Level" alarm, "Wet Well Low Level" alarm, "Power Failure" alarm and "Pump Failure" alarm. The auto-dialer will be capable of transmitting the four alarms separately. The power and pump failure systems will also have contacts connected to the autodialer. The autodialer shall call a designated representative of the owner. Dial out numbers will be coordinated at startup.

4.9 Forcemains

The proposed sewer forcemain will be used to convey raw sewage from the sewer pump station to the existing forcemains and will consist of PVC SDR 21 pipe. The PVC SDR 21 will have bell and spigot joints and factory installed gaskets. The fittings and elbows will be glued SCH 80 fittings. Any horizontal or vertical bends will be provided with concrete thrust blocks. The forcemain shall be provided with 3'-6" minimum cover. The final size of the forcemain shall be determined as the project design advances.

4.10 Emergency Backup Power

The controls, autodialer and telephone modem will be connected to an uninterrupted power supply (UPS) to maintain control and communications while the backup generator starts.

A generator will supply backup power. The generator will be able to run both the lead and lag pump, controls and communications. An automatic transfer switch will provide automatic startup of the backup generator and automatic transfer between primary and backup power as required.

APPENDICES

Appendix A Sewer Collection System Mapping

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Sewer Collection System Mapping

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SOURCE:
Map represents GIS mapping of the sewer collection system provided by Village of Croton-on-Hudson Engineer.