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WATER & WASTEWATER ENGINEERING REPORT

For

West End Lofts
City of Beacon, New York

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1.0 INTRODUCTION

The West End Lofts project is located on a parcel between Beekman Street and Wolcott Avenue, immediately south of the Beacon City Hall property. The subject property is located in the City's Linkage District and is identified as Tax Map No. 5954-26-688931. The applicant, Kearney Realty & Development Group wishes to construct three buildings containing 98 apartments. The project will also require subdivision approval to arrange the final property lines with the City, and place Buildings 1 and 2 on one lot, and Building 3 on a second lot. All buildings are proposed to be three (3) stories from the front and four (4) stories from the rear.

The building breakdown of the proposed development of the site consists of the following:

1. Building #1, 28 Total Units, (14, 1-bedroom / 14, 2-bedroom).

2. Building #2, 45 Total Units, (31, 1-bedroom / 14, 2-bedroom).

3. Building #3, 25 Total Units, (11, 1-bedroom / 14, 2-bedroom).

The project is located in the City of Beacon Water and Sewer area. Water will be provided by a proposed 8" water main connected to the existing 12" water main in Wolcott Avenue. Sewer will be provided with 6" service connections to the existing 8" sewer in Beekman Street.

2.0 PROJECT DESIGN FLOWS AND ANTICIPATED FLOWS

Design maximum daily wastewater flows for the proposed project, West End Lofts, 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 following table calculates the hydraulic loading rates and the design flow rates (gallons per day or gpd) for the proposed project.

Table 1: West End Lofts Project Design Maximum Daily Flow Rate

Proposed Use	Hydraulic Loading Rate	Design Maximum Daily Flow (gpd)
56 – One Bedroom Apartments	110 gpd/dwelling	6,160
42 –Two Bedroom Apartments	220 gpd/dwelling	9,240
Total		**15,400**

The anticipated design average daily flows for the project are expected to be significantly less than the design maximum daily design flow. The design maximum daily flows represent conservative flows to ensure that the proposed sewer infrastructure is designed with an ample factor of safety. The anticipated average daily flows are based on 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) shows that the average in home water use is 69 gpd per person. This number is reduced to 45 gpd per person when water saving fixtures are used, which is the case for this project.

Table 2: Design Average Daily Flow

Proposed Use	Occupancy Rate	Total Anticipated Residents	Water Use Per Resident (gpd)	Water Use (gpd)
56 – One Bedroom Apartments	1.6 people/unit	90	45	4,050
42 –Two Bedroom Apartments	2.3 people/unit	97	45	4,365
Total Anticipated Water Use (gpd)				**8,415**

As demonstrated above, through the use of water saving fixtures as required by current building code, a design maximum flow of 15,400 gpd is proposed for the project, while the design average daily flows are anticipated to be substantially less 8,415 gpd.

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

Peak Hourly Flow

15,400 gpd ÷ (24 hr/day) ÷ (60 min/hr) = 10.7 gallons per minute (gpm)

Peak Hourly Flow = 10.7 gpm x 4 = 42.8 gpm

Although the anticipated flows (design average daily flow) for the project are lower than the design maximum daily flows, the design maximum daily flows are used for the design of the system. This provides an additional factor of safety in the proposed design.

The requirements for fire sprinkler systems were preliminarily established for the project. The three residential buildings are required to have fire sprinklers. The fire sprinkler designer has provided that the sprinkler demand for the residential buildings is 250 gpm with a 100 gpm hose stream for a total fire sprinkler flow of 350 gpm. This results in a peak fire sprinkler and domestic combined flow of;

Peak Fire Sprinkler and Domestic Combined Flow

42.8 gpm + 350 gpm = **392.8 gpm**

3.0 PROPOSED CONNECTION TO THE CITY OF BEACON WATER DISTRICT

Based on discussions with the City Water and Sewer Department there is adequate pressure in the system in the vicinity of the project, with approximately 60-80 psi. Prior to the completion of the final design of the onsite water system and its connection to the city main, a flow test will be scheduled with the Water and Sewer Department to determine the flows and pressures in the existing system in the vicinity of the proposed development.

An 8” ductile iron pipe (DIP) water main will connect to the existing 12” water main in Wolcott Ave (NYS Route 9D). The 8” water main will extend into the site to provide water to the three (3) proposed buildings. A 6” DIP service line will be provided for each building. This service line will be a combined fire and domestic service line for each of the residential buildings. As shown on the project plans it is proposed to provide the City of Beacon with an easement over the portion of the 8” water main extending into the site to the tee. The intent is that the City will own the water main extension into the project site within the easement area from which the private service lines will connect to each of the proposed buildings.

Two (2) centrally located fire hydrants are proposed throughout the proposed development. All hydrants will be manufactured by Mueller as required by the City.

Restrained joint connections will be provided at all pipe bends. Upon completion of the water service installation pressure testing, disinfection, and flushing will be performed in accordance with AWWA standards.

4.0 PROPOSED CONNECTION TO THE CITY OF BEACON SEWER DISTRICT

Centralized sanitary sewer service for the West End Lofts will be provided via connection to the gravity sewer system located west of the project site adjacent to Beekman Street.

Onsite sewer service lines will collect wastewater flows from all three (3) buildings and connect to an existing sewer manhole on the east side of Beekman Street. Wastewater flow from each building will be conveyed by 6" PVC SDR 35 sewer service lines. The service connections will be installed with a minimum slope of ¼" per foot slope meeting the requirements of DEC14. All PVC pipe will contain rubber push on gaskets at pipe connections. Cleanouts will be provided on each sewer service connection just outside of each building. Upon installation of the sewer mains will be tested with low pressure air tests in conformance with ASTM F1417-92 and the sewer manholes shall be vacuum tested in conformance with ASTM 1244-02, per the notes on the project plans.

The site plan depicts the sanitary sewer system connections for the subject project including the locations of the existing sewer mains, manholes, and sewer services from a survey prepared at the time of the construction of Beacon City Hall. The elevations associated with the existing system will be verified prior to the final design of the connection to the existing sewer. The onsite sanitary sewer system will be designed in accordance with City of Beacon and Dutchess County Department of Health (DCDOH) requirements and is subject to their respective approvals.

It is understood that the City Sewer collection system down gradient of the proposed project flows to an existing pump station at the end of West Main Street, near the Metro North Train Station. In conversations with the Planning Board Engineer it is understood that the City will require their independent consulting engineer to assess the proposed flows from the subject project and the impact on the existing pump station with respect to capacity to the overall City system.