

Water Engineering Report
For
Town Center PDD

580 Columbia Turnpike
Town of
East Greenbush, New York

September 2020
Revised January 2021

Applicant: **580 Columbia Turnpike, LLC**
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INTRODUCTION

The purpose of this report is to describe the existing water system conditions and proposed methods, which will be utilized to provide adequate domestic and fire flow water service for the proposed development of a parcel of land situated in the Town of East Greenbush (EG) owned by 580 Columbia Turnpike, LLC, 1 Parkview Drive, Rensselaer, New York 12144. The "Town Center" project consists of a mixed-use development situated on 35+/- acres of land. The project will consist of approximately 22,000 square feet of commercial space and 275 residential apartments. The project will be serviced with municipal water and sewer. The 35-acre project area is comprised of various portions of 5 different tax map parcels

- a portion of tax map # 166.-7-3.4
- tax map # 166.-7-3.5 in its entirety
- tax map # 166.-7-5 in its entirety
- tax map # 166.-7-6.51 in its entirety, and
- a portion of tax map# 166.-7-6.111

As shown on the attached site location map Appendix "A", the parcel of land is situated on the southwest side of US Route 9 & 20 (Columbia Turnpike) and to the west and north of the intersection of US Route 9 & 20 (Columbia Turnpike) and US Route 4 (Troy Road).

EXISTING CONDITIONS

Currently the parcel of land is a mix of asphalt, gravel and woods. The front portion of the parcel was previously developed as the former site of the Weathervane Restaurant. The middle portion was a parking lot for the former Club East Health Club and historically developed as the Auto vision Drive in Theatre. The rear portion of the site is a mix of a gravel mine, firewood processing operation, equipment and trailer storage, and partially wooded. Most of the rear of the site has been disturbed over the last several decades.

The majority of the site has a gradual slope. The southerly portion of the project boundaries does have steeper slopes and is where most of the wooded area is located. The westerly boundary is also wooded and borders the Woodland Park neighborhood. See the attached aerial map Appendix B for added detail.

The site is served by Town of East Greenbush water and sewer. Extensions of the water and sewer mains into our site will be required. The site falls within an existing water and sewer district.

The site currently drains via surface runoff. The northerly (front) 1/3 of the site drains in a northerly direction towards Columbia Turnpike, and the southerly (back) 2/3 of the site drains in a southerly fashion to the rear of the site.

There is an existing 16-inch DIP water main along Columbia Turnpike in front of the site. The 16-inch main is owned by the Town of East Greenbush. It is the intention of the project design to use this existing 16-inch water main to provide water service to the project.

SITE TOPOGRAPHY, VEGETATION AND EXISTING SOILS

Vegetative Cover

Much of the site is open with some areas of heavily wooded vegetation. There is a strip of wooded vegetation about 200 feet deep along much of the southwest side of the site. There are some additional wooded sections on the south side of the site. There is an existing pond in the southeast corner of the site.

Topography

The topography of the parcel can generally be described as gently sloping. The project site generally changes in grade from a low elevation of approximately 240 feet in the southeast corner of the site to a high elevation of approximately 320 feet in the north central area of the site. North Country Ecological Services has delineated the wetlands on the site and are shown on the site plan set. No wetland disturbance is planned as part of this project.

Soils

According to the USDA Natural Resource Conservation Service (NRCS) Soil Report for Rensselaer County, the primary soils within the project site are defined as Riverhead fine sandy loams, Windsor loamy sand and Fluvaquent. The soils are classified as Hydrologic Soil Group A and are well drained. The typical soil profile consists of a 6-inch loamy topsoil layer, underlain with at least 50" of sand and gravelly loam. Depth to bedrock is greater than 80 inches. Based on actual drilled test borings as performed by Terracon, the soils denoted above are more typical of the southerly portion of the site. Borings done at the front northerly half of the site consist of granular overburden to a depth of 36" and then a silty sand and clay later to a depth of approximately 25'. The more sandy material becomes apparent closer to the rear of the future pad site and building C, at a depth of approximately 12'.

Refer to Appendix "C" for additional soils information.

LAND USE AND ZONING

The 35 acre parcel is situated within two different zoning districts as shown on the town of East Greenbush Zoning Map. Along the project frontage on

Columbia Turnpike is the B-1 General Business Mixed Use District. This district extends approximately 850 feet off of the highway. The back half of the parcel is in the R-B Residential-Buffer District. Lands contiguous to the proposed development parcel are zoned as follows:

B-1 General Business Mixed Use District – northerly, easterly and westerly along the highway

R-B southerly and in the rear of the project limits

R-2 In the rear portion of the site along our westerly boundary.

The proposed mixed use of commercial and residential uses is in conformance with the approved Planned Development District (PDD).

EXISTING UTILITIES

Water Supply: - The Town of East Greenbush currently uses about 500,000,000 million gallons of water per year. The average daily use from both residential and commercial users is about 1.37 million gallons per day. Peak daily use averages about 4.2 MGD. Water is provided to the Town from the City of Troy under a purchase agreement with available supply up to 8.0 million gallons per day. The available storage capacity is 10 million gallons utilizing two 5 mg above ground storage tanks. The tanks are located off Rt 4 in the Town.

The City of Rensselaer and the Town of East Greenbush jointly own and operate the Cross Street pump station, the 36 inch transmission main and two above ground storage facilities. Both municipalities under a joint agreement purchase water from Troy. Together they consume about 1,000,000,000 gallons per year. The current agreement is under a 20 year contract period.

Water is pumped to the Town from a pump station (Cross Street PS) located in the City of Troy. Two pumps have a pumping capacity of 5,000 GPM each and a third pump at 500 GPM. Pumping is maintained by the City of Troy to keep storage tank at static levels equal to the daily demand. There is also an emergency backup pump at Cross Street rated at 5,000 GPM with emergency power, in the event there is a power supply grid failure.

Water is conveyed to the Town through 9 miles of 36 inch ductile iron pipe from the City of Troy to the Town. At the Town the 36 inch main feeds the two storage tanks and water to a 36 and 30 inch main to the eastern part of Town along Rt 4 and via a 16 inch main on 3rd Ave. Pressure is reduced at 3rd Ave. to about 80 psi along 3rd Ave and to the west. The 16 inch main also provides water to the City of Rensselaer. From the intersection of Route 4 and 9 & 20 the 16" main continues westerly on 9 & 20 towards the City of Rensselaer.

The existing 16 inch diameter water main along Columbia Turnpike will be utilized to provide water service for the proposed project. This 16" main is runs along the entire frontage of the proposed development. Existing fire hydrants are adequately spaced along this corridor.

Hydrant flow tests were conducted on July 22, 2020 by RBM Guardian Fire Protection Inc. on hydrants fed by the existing 16-inch main along Columbia Turnpike. The flow test indicated the following:

Hydrant #1 – Columbia Turnpike:

Flow Rate = 910 GPM

Static Pressure = 103 pounds per square inch (PSI)

Hydrant #2 – Columbia Turnpike:

Residual Pressure = 90 PSI

Calculated extrapolated flow rate at 20 PSI residual = 2,476 GPM

The test results and hydrant location map are shown in Appendix "D"

Sanitary Sewer: - A gravity sanitary manhole currently exists on the south side of Columbia Turnpike at the intersection of the project entrance road. At this point the 8-inch gravity sewer crosses to the northeast side of Columbia Turnpike and then runs southeast along Columbia Turnpike approximately 1000 feet and then crosses back to the southwest side of the street and continues southeast increasing in size from 8-inch to 18-inch and connects to the 18-inch trunk sewer that runs towards the Corliss pumping station at the end of Corliss Avenue. After the Corliss Ave pumping Station force main, sewage is conveyed through a series of gravity sewers and ultimately discharges into the Town of East Greenbush Wastewater Treatment Plant (WWTP) for treatment prior to discharge into the Hudson River. The East Greenbush WWTP is located on Columbia Turnpike (Route 9 & 20).

Other Utilities: - The project owner is working with the utility companies to get required other utilities such as Electric, telephone, CATV and gas service to each building.

PROPOSED DEVELOPMENT

Roadway: A new road is being proposed that will start at Columbia Turnpike directly across from the current Fun Plex entrance. The road will terminate with a cul-de-sac. Accommodations will be made on the cul-de-sac to allow for future connections to the south and east. An "Emergency Access Only" connection will be made near the mid-point of this new road, with Jefferson Avenue. Parking for all proposed commercial and residential units will be provided with separate private lots. The new road will be designed and constructed to Town

standards and it is the intent to have this road dedicated to the Town following acceptance.

Proposed Utilities

Water Service: An existing 16" DIP water main exists along the southerly side of Columbia Turnpike. A new 8" PVC C900 water main is proposed to be connected to the existing 16" pipe, at the intersection of the proposed roadway and Columbia Turnpike. Approximately 2,500 linear feet of water main and related appurtenances will be required for this project. It is the intent to have the Water system designed and constructed to Town standards and to have the water system dedicated to the Town following acceptance.

Sanitary Sewer: As previously mentioned a gravity sanitary sewer manhole currently exists on the south side of Columbia Turnpike at the intersection of the project entrance road. It is the intention of the project design to connect the proposed site sewer to this gravity sanitary sewer manhole. All proposed new sewers will be gravity 8" PVC SDR 26 sewer. This project will require the installation of approximately 2700 lf of gravity sewer and 11 new sanitary manholes. The sanitary sewer system will be designed and constructed in accordance to Town standards and it is the intent to have the Sewer system dedicated to the Town following acceptance.

The proposed site development plan is shown on site plans prepared by Hart Engineering and are attached in Appendix "E"

DESIGN STANDARDS ESTIMATED FLOW

Proposed Water Usage:

The hydraulic loading is computed as follows:

Hydraulic Loading - Water Use - Domestic Flow

Design Average Daily Flow:

Phase I would include:

19,000 SF commercial – which includes a 3,500 sf restaurant, plus 78 residential apartment units with a ratio of approximately (60% 2 BR and 40% 1 bedroom).

Phase 1 will flow out to the existing manhole on Columbia Turnpike.

Estimated Hydraulic Loading Phase I:

Apartment units to be connected to system:

2 bedroom apartments = 46

110 GPD/bedroom x 2 bedrooms per unit = 220 GPD/unit

220 GPD/unit x 46 = 10,120 gallons per day (GPD).

1 bedroom apartments = 32

110 GPD/bedroom x 1 bedrooms per unit = 110 GPD/unit

110 GPD/home x 32 = 3,520 gallons per day (GPD)

**Based on actual flow data from a nearby apartment facility the average daily flow was calculated to be 45 GPD/unit.

Commercial space = 3,500 Sq. Ft. restaurant plus 15,500 Sq. Ft. general space.

3,500 SF Restaurant with 100 seats.

100 seats x 35 GPD/seat = 3,500 GPD.

15,500 SF general commercial =

0.10 GPD/Sq. Ft. x 15,500 Sq. Ft. = 1,550 GPD

Design Average Daily Flow Total Phase I:

10,120 GPD + 3,520 GPD + 3,500 GPD + 1,550 GPD = 18,690 GPD

Design Peak hourly Flow Phase I:

Peak daily flows are estimated at approximately 4.0 times the average daily flow.

Average Daily Hydraulic Loading from above = 18,690 GPD = 13.0 gallons per minute (GPM) x 4 = 52.0 (GPM) peak

Estimated Hydraulic Loading Phase II:

Phase II would include:

205 apartment units with ratio of approximately (70% 2 BR and 30% 1 bedroom).

Apartment units to be connected to system:

2 bedroom apartments = 144

110 GPD/bedroom x 2 bedrooms per unit = 220 GPD/unit

220 GPD/unit x 144 = 31,680 gallons per day (GPD).

1 bedroom apartments = 61

110 GPD/bedroom x 1 bedrooms per unit = 110 GPD/home

110 GPD/home x 61 = 6,710 gallons per day (GPD)

Design Average Daily Flow Total:

31,680 GPD + 6,710 GPD = 38,390 GPD/1,440 min. /day = 26.66 gallons per minute (GPM) average.

Design Peak hourly Flow:

Peak daily flows are estimated at approximately 4.0 times the average daily flow.

Average Daily Hydraulic Loading from above = 38,390 GPD = 26.66 gallons per minute (GPM) x 4 = 106.6 (GPM) peak

Total Project Peak flow = phase I 52.0 GPM + Phase II 106.6 GPM =158.6 GPM

Total Estimated Average Yearly Flows = 57,080 gallons per day (GPD) x 365 days per year = 20.83 Million gallons per year.

In full build out of the Town Center the estimated average daily flow is 0.057 MGD, which represents 0.57% of the storage capacity in the storage tanks which holds 10 million gallons total. The town average daily flow is 1.37 MGD. The Town Center Subdivision represents 4.4% of the current flow from this tank. It is not anticipated that any improvements will be required on the existing water system to provide the water to the Project.

Static Pressure for Proposed Development:

The static pressure at the first floor elevation of the highest building is calculated as follows:

322 feet (Highest Building First Floor Elevation) – 257 feet (Elevation at hydrant used for static pressure reading, hydrant #1) = 65 feet x .433 psi/ft. = 28.1 psi.

103 PSI static at the hydrant #1 – 28.1 psi = 74.9 PSI static at highest building first floor.

Building Water Service lateral size:

The buildings currently being proposed will be served by individual water services laterals connected to the proposed street mains. Each water service will be sized for domestic and fire flow needs of the individual buildings.

The pressure at the first floor of the proposed buildings will be a minimum of 74.9 PSI. If required, pressure reducing valves will be installed at each building to keep the static pressure below 90 PSI.

The plumbing within the building shall be designed so that the minimum flow rate and flow pressure provided to fixtures and appliances are in accordance with Table 604.3 of the 2015 International Plumbing Code.

Fire Protection:

Fire protection will be provided by proposed fire hydrants that are shown on the project drawings. Calculations showing extrapolation of available flows at 20 psi result in 2,476 GPM (See "Existing Utilities – Water Supply" section of this report).

FINANCING

Installation of the proposed water service improvements in connection with the proposed development will be performed by the project developer/owner at their expense.

WATER SERVICE PERMITS

The applicant/Developer and the project contractor will be responsible for completing the required applications for the new water service permits. The water system extension and improvements proposed for this project, as they relate to the Town's water system, will require approval by the Rensselaer County Health Department.

USER COSTS:

Appropriate user and connection fees will be calculated at time of building permit for each phase.

CONCLUSION

It is our opinion, based on the enclosed analysis, that the Town Center Development can be connected to the 16-inch DIP water main along Columbia Turnpike. The existing water main and water system have sufficient capacity and pressure to service the proposed project's domestic water demands.

The system will also have enough capacity to service the proposed project's fire flow water demands.

Respectfully submitted:

Advance Engineering & Surveying PLLC

Nicholas Costa, PE

Appendix A

Location Map

Appendix B

Aerial Map

Appendix C

Soils Data

Appendix D

Hydrant Flow Test Results and Hydrant Location Map

Appendix E

Project Drawings