Sanitary Sewer Engineering Report

For

Town Center PDD

580 Columbia Turnpike
Town of
East Greenbush, New York

September 2020
Revised January 2021
Revised March 2021

Applicant: **580 Columbia Turnpike, LLC**
1 Parkview Drive
Rensselaer, New York 12144
Contact: Mr. Tyler Culberson
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Latham, New York 12110

Table of Contents

INTRODUCTION

The purpose of this report is to describe the existing sanitary sewer system conditions and proposed methods, which will be utilized to provide municipal Sanitary Sewer Service to the subdivision 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 20,000 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.

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 addition 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 they 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 the westerly boundary.

The proposed mixed-use development is in conformance with the approved Planned Development District. (PDD)

EXISTING UTILITIES

Water: - 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 approximately 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. This 16" main is runs along the entire frontage of the proposed development.

Sanitary Sewer: - A gravity sanitary manhole currently exists on the southwest 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).
The existing Sewer route from the Town Center Project to the town Waste Water Treatment Plant is shown in Appendix B. See Section "Impact on Downstream Sanitary Sewer Facilities" for added description on the existing sanitary sewer system.

Other Utilities: - 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 FunPlex 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 southwest 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.

See Section "Wastewater Collection and Treatment" for added description on the sanitary sewer system.

DESIGN STANDARDS ESTIMATED SANITARY FLOW

The proposed Sanitary Sewer System components consisting of 8" PVC SDR 26 gravity sewer mains are designed to receive and convey the peak sanitary flows at velocities sufficient to prevent deposition of solids. The estimated sanitary sewer flows for the project is as follows:

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 Sanitary Flow 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/home
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 Sewer Loading from above = 18,690 GPD = 13.0 gallons per minute (GPM) x 4 = 52.0 (GPM) peak

Phase II would include:
205 apartment units with a ratio of approximately (70% 2 BR and 30% 1 bedroom).
Phase II would flow southwest away from Columbia Turnpike and connect directly to the existing 18-inch gravity trunk sewer at the rear of the site.

Estimated Sanitary Flow Phase II:

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 Sewer 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

WASTEWATER COLLECTION AND TREATMENT

The proposed sanitary sewer system for the project site will consist of 6-inch PVC sanitary sewer laterals and an 8-inch PVC gravity sewer main with 4-foot diameter manholes. As previously mentioned, a gravity sanitary sewer manhole currently exists on the southwest 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. Approximately 2,700 LF of proposed 8" gravity sewer and 11 sanitary manholes will be installed as part of this project.

The proposed sewer main will be tested in accordance with ASTM Standards. The proposed work will be performed in accordance with the requirements and recommendations of the New York State Department of Environmental Conservation, Rensselaer County Health Department and the Town of East Greenbush.

Town Requirements

The Town of East Greenbush requirements with respect to construction of the proposed sewer mains are provided below.
a. Underground mains will be 8" PVC SDR 26 pipe and have at least 5 feet of cover.
b. The Town must be notified a minimum of two (2) days in advance of installation and testing of the sewer mains.
The proposed site development is shown on plans prepared by Hart Engineering and are included in Appendix "D".

Impact on Downstream Sanitary Sewer Facilities

The Sewer route from the Town Center Project to the town Waste Water Treatment Plant is shown in Appendix B. In general, the depicted route is as follows: As stated above a gravity sanitary manhole currently exists on the southwest 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 10-inch to 12-inch to 16-inch and then to 18-inch and connects to the 18-inch trunk sewer line that runs in a north westerly direction behind Hannaford Plaza and makes it way to the Corliss Avenue pump station. The Corliss Avenue pump station has two force mains (12" and 14") which flow towards Route 20 and connect to a gravity manhole at Barber Drive. From here the sewage flows westerly through 20" and 24" trunk lines to 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). The WWTP currently has a capacity of 4.4 MGD. The average daily flow is 1.7 MGD and the maximum daily flow is 3.4 MGD.
Our analysis of the downstream infrastructure is broken into 3 segments:

1. Flow from our site to Columbia Turnpike, along Columbia Turnpike to the 18-inch trunk sewer behind Hannaford Plaza. (Phase I = 52.0 GPM)
2. Flow from our site south westerly directly to the 18-inch trunk sewer behind Hannaford Plaza. (Phase II = 106.6 GPM)
3. Flow from Corliss Avenue pump station to the Waste Water Treatment Plant

Segment 1: Project Site to Columbia Turnpike, along Columbia Turnpike to the 18-inch trunk sewer behind Hannaford Plaza.

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 10-inch to 12-inch to 16-inch and then to 18-inch and

connects to the 18-inch trunk sewer line that runs in a north westerly direction behind Hannaford Plaza and makes it way to the Corliss Avenue pump station.

Pipe Capacities at minimum allowable slope are as follows:

8-inch = 0.76 CFS = 171 GPM (at -0.1% slope)
10-inch = 1.16 CFS = 521 GPM
12-inch = 1.67 CFS = 750 GPM
16-inch = 2.50 CFS = 1123 GPM
18-inch = 3.64 CFS = 1634 GPM

The 18" trunk sewer main behind Hannaford Plaza is further described in segment 2

Segment 2: Our site south westerly directly to the 18-inch trunk sewer behind Hannaford Plaza.

As the sewer continues to travel westerly towards the Corliss Ave pump station it increases in size to 18" main behind Hannaford Plaza. The 18" pipe has a pipe capacity of 1634 GPM at minimum slope of 0.12 %.

Previous studies for the balance of the sewer conveyance system from the 18" trunk line down to the WWTP have been conducted by Hank Labarba, PE. The study is titled, Engineering Report Town of East Greenbush Sanitary Sewer System Capacity Status Luther Road Pump Station to the Town's Waste Water Treatment Plant. This report is dated March 21, 2019 and last revised April 29, 2019.

As noted in Table 2 of the Report, attached herein appendix "E", the 18" Trunk Sewer to the Corliss Avenue Pump Station has available capacity of at least 1237 GPM.

Segment 3: Corliss Avenue Pumping Station to the Waste Water Treatment Plant

Based on an Engineering Report prepared by Boswell Engineering dated March 2017 and Revised October 2020, the Corliss Avenue pump station has 3 – 100 HP pumps. Pump capacities with one pump running is 1950 GPM and with two pumps running is 3300 GPM. Based on flow data gathered thru December of 2020 the maximum hourly average waste water inflow was recorded as 3.64 MGD or 2,527 GPM which occurred on August 4, 2020. Additional flows from the proposed Deer pond development will add 48 GPM for a total of 2,575 GPM. The peak flow from phase I and Phase II of the Town Center PDD will add 158.6 GPM. The total future flow will be 2,575 GPM + 158.6 GPM = 2,733.6 GPM which is well below the 3,300 GPM capacity of the Corliss Avenue Pump Station. The maximum wastewater flows were noted on rainy days which would indicate issues with inflow and infiltration. The

town is currently working on upgrades to the Corliss Ave pumping station including new pumps, controls, valves, and utilization of the equalization tank.

The discharge from the Corliss Avenue pump station then runs in a northerly direction to Routes 9 & 20 and then westerly along the highway to the WWTP. The capacities of the sewer lines from the pump station to gravity MH 50 near Barber Drive and then continuing down to the WWTP are noted in Table 1A of the Labarba Report and are attached herein. Capacity in the lines have a minimum *available* capacity of over 3,100 GPM.

The present Treatment Capacity of the treatment plant is 4.4 MGD (with SPDES Permit # NY – 0026034. According to the towns 2018 flow records, the average daily flow and maximum daily flow are 1.7MGD and 3.4 MGD respectively.

REGULATORY APPROVALS

The proposed project will require the following regulatory approvals prior to construction:

- Rensselaer County Health Department

  -Approvals of: Subdivision Plans

  Sanitary Sewer and Water Systems

- Town of East Greenbush

  -Site Plan Approval; Water & Sanitary Sewer Permits

FINANCING

Installation of the proposed sanitary sewer improvements in connection with "Town Center" project will be performed by the project developer/owners at their expense. Once the system is installed, tested and certified it will be turned over to the Town of East Greenbush for ownership, operation and maintenance.

SEWER DISTRICT EXTENSION

The Town Center project located at 580 Columbia Turnpike East Greenbush, New York is located within the boundaries of the East Greenbush General Sewer District and the provisions of sanitary sewer service to the project will not require a sewer district extension. The town of East Greenbush will own, operate and maintain the proposed wastewater facilities.

USER COSTS AND CONNECTION FEES

Appropriate user and Connection Fees will be calculated at time of Subdivision Approval and building permit for each phase as applicable.

CONCLUSION

It is our opinion, based on the enclosed analysis that the Town Center project can be connected to the existing gravity manhole on Columbia Turnpike in front of the project site owned by the Town of East Greenbush via the proposed on-site gravity sewer system described above. The proposed Town Center Project and associated gravity sewer collection system will not result in any adverse impacts to the existing downstream infrastructure.

Respectfully submitted:
Advance Engineering & Surveying PLLC

Nicholas Costa, PE

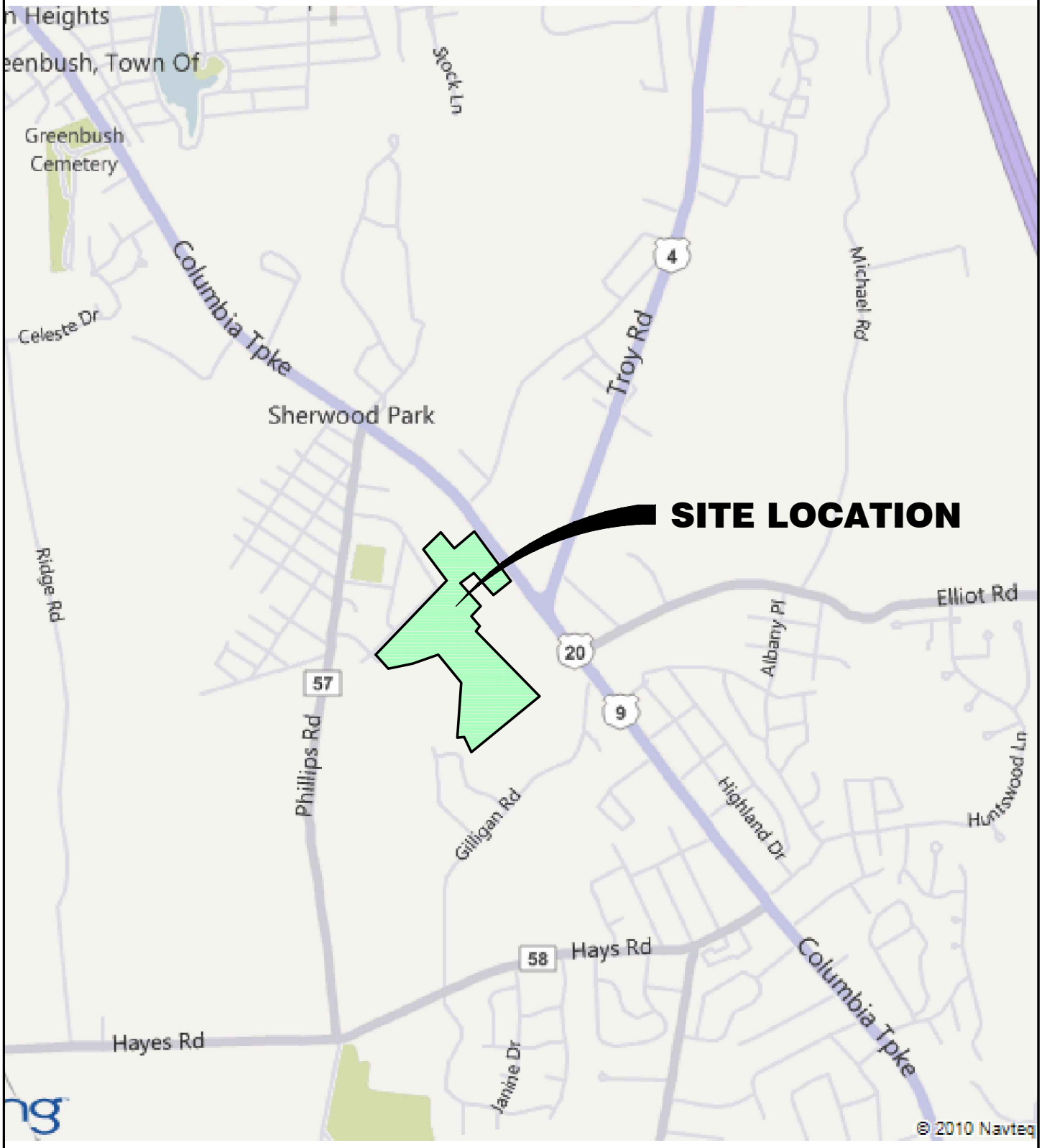
Appendix A

Project Location Map

D:\Auto Cad Standards\Borders\Brdr\Hart.jpg

Drawn By:	Checked By:	Date Issued:	SCALE:	Drawing Number:
CHRIS BERTRAM PE	STEVE HART PE	MAY 25, 2018	1"= 1700'	2

Project Name:	Drawing Title:	File Name:
TOWN CENTER PDD	SITE LOCATION MAP	SITE LOCATION MAP.DWG



1969 Ferndale Road // Castleton, New York 12033 // office: 518.479.4014

Appendix B

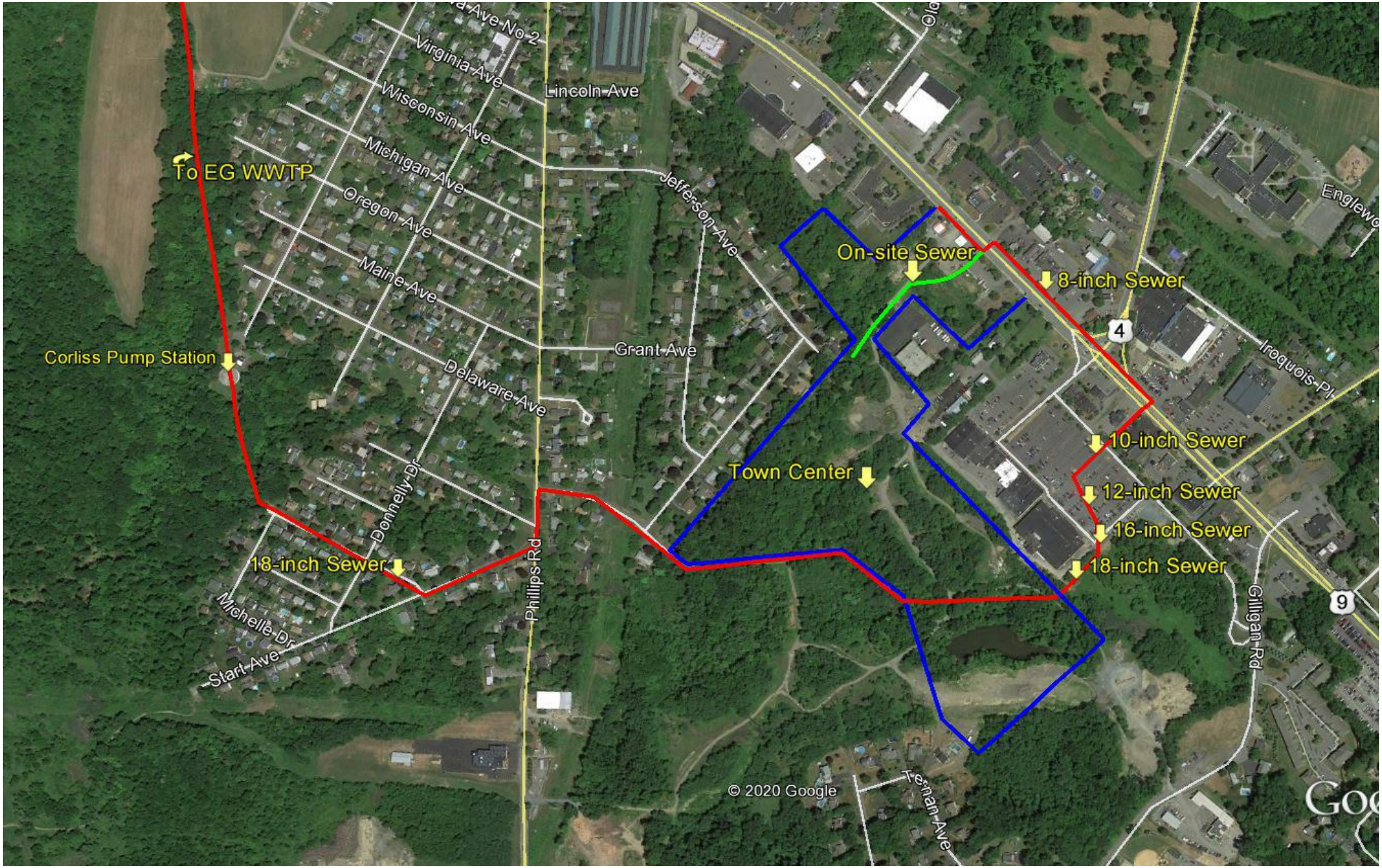
Aerial Map
And
Route of Sanitary Sewer Map

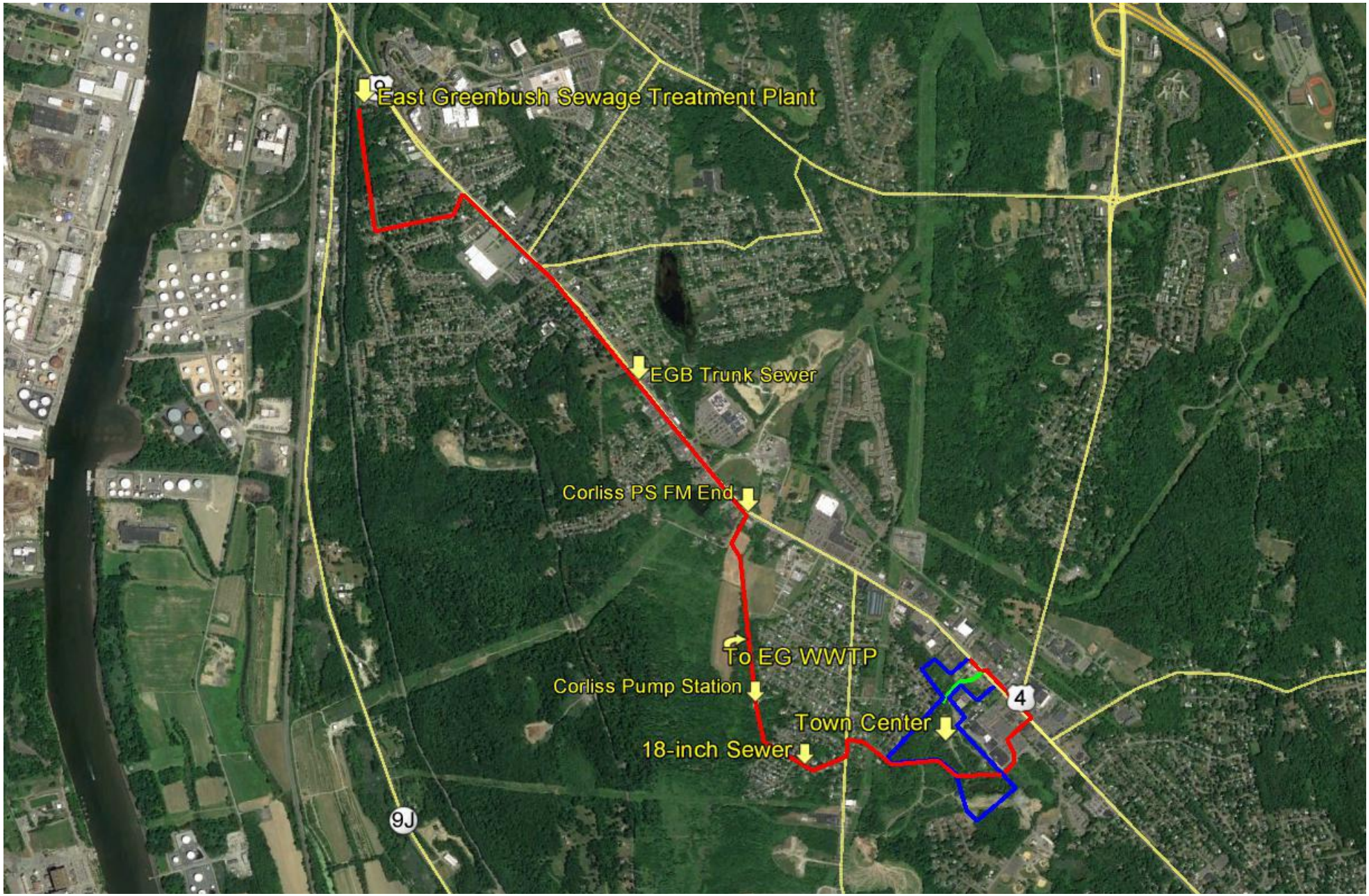
D:\Auto Cad Standards\Borders\Brdr\Hart.jpg

Drawn By:	Checked By:	Date Issued:	SCALE:	Drawing Number:
CHRIS BERTRAM PE	STEVE HART PE	MAY 25, 2018	1"= 400'	1

Project Name:	Drawing Title:	File Name:
TOWN CENTER PDD	AERIAL MAPPING	AERIAL MAP.DWG

1969 Ferndale Road // Castleton, New York 12033 // office: 518.479.4014


To EG WWTP
Corliss Pump Station
18-inch Sewer
On-site Sewer
8-inch Sewer
10-inch Sewer
12-inch Sewer
16-inch Sewer
18-inch Sewer
Town Center
Virginia Ave
Wisconsin Ave
Michigan Ave
Oregon Ave
Maine Ave
Delaware Ave
Lincoln Ave
Jefferson Ave
Grant Ave
Donnelly Dr
Phillips Rd
Michelle Dr
Start Ave
Iroquois Pl
Gilligan Rd
Fenan Ave
4
9
© 2020 Google


East Greenbush Sewage Treatment Plant
EGB Trunk Sewer
Corliss PS FM End
To EG WWTP
Corliss Pump Station
Town Center
18-inch Sewer
9J
4

Appendix C

NRCS SOILS REPORT

Custom Soil Resource Report
Soil Map

Map Scale: 1:4,450 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rensselaer County, New York
Survey Area Data: Version 14, Oct 8, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 10, 2015—Mar 29, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CaA	Catden muck, 0 to 2 percent slopes	0.0	0.0%
FlA	Fluvaquents-Udifluvents complex, 0 to 3 percent slopes	10.0	17.3%
Pg	Pits, gravel	0.2	0.4%
RkB	Riverhead fine sandy loam, 3 to 8 percent slopes	21.7	37.5%
RkC	Riverhead fine sandy loam, rolling	8.5	14.7%
W	Water	1.3	2.3%
WnE	Windsor loamy sand, 25 to 35 percent slopes	16.1	27.9%
Totals for Area of Interest		**57.9**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor

components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Rensselaer County, New York

CaA—Catden muck, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2t2qk
Elevation: 0 to 1,430 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Catden and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Catden

Setting

Landform: Kettles, marshes, swamps, bogs, depressions, depressions, depressions, fens
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Highly decomposed herbaceous organic material and/or highly decomposed woody organic material

Typical profile

Oa1 - 0 to 2 inches: muck
Oa2 - 2 to 79 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 26.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Timakwa

Percent of map unit: 5 percent

Landform: Swamps
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

Natchaug

Percent of map unit: 5 percent
Landform: Depressions, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Canandaigua

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Alden

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

FlA—Fluvaquents-Udifluvents complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9v1t
Elevation: 100 to 3,000 feet
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquents and similar soils: 45 percent
Udifluvents and similar soils: 35 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquents

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Alluvium with highly variable texture

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 60 inches: gravelly silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Hydric soil rating: Yes

Description of Udifluvents

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium with a wide range of texture

Typical profile

H1 - 0 to 9 inches: gravelly fine sandy loam
H2 - 9 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.06 to 19.98 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Saprists

Percent of map unit: 5 percent
Landform: Marshes, swamps
Hydric soil rating: Yes

Limerick

Percent of map unit: 5 percent
Landform: Flood plains
Hydric soil rating: Yes

Teel

Percent of map unit: 5 percent
Hydric soil rating: No

Fredon

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed soils, moderately deep

Percent of map unit: 2 percent
Hydric soil rating: Unranked

Pg—Pits, gravel

Map Unit Setting

National map unit symbol: 9v2r
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, gravel: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Gravel

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Udorthents, loamy and clayey
Percent of map unit: 10 percent
Hydric soil rating: No

RkB—Riverhead fine sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9v30
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 115 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Riverhead and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverhead

Setting
Landform: Deltas, terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits overlying stratified sand and gravel

Typical profile
H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 35 inches: sandy loam
H3 - 35 to 50 inches: gravelly loamy sand

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Riverhead, shallow substratum
Percent of map unit: 5 percent
Hydric soil rating: No

Haven
Percent of map unit: 5 percent
Hydric soil rating: No

Chenango
Percent of map unit: 5 percent
Hydric soil rating: No

Hoosic
Percent of map unit: 5 percent
Hydric soil rating: No

RkC—Riverhead fine sandy loam, rolling

Map Unit Setting
National map unit symbol: 9v31
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Riverhead and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Riverhead

Setting
Landform: Terraces, deltas
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits overlying stratified sand and gravel

Typical profile
H1 - 0 to 6 inches: fine sandy loam
H2 - 6 to 35 inches: sandy loam
H3 - 35 to 50 inches: gravelly loamy sand

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Haven

Percent of map unit: 5 percent
Hydric soil rating: No

Chenango

Percent of map unit: 5 percent
Hydric soil rating: No

Hoosic

Percent of map unit: 5 percent
Hydric soil rating: No

Windsor

Percent of map unit: 5 percent
Hydric soil rating: No

Riverhead, shallow substratum

Percent of map unit: 5 percent
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: 9v3k
Mean annual precipitation: 36 to 44 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 115 to 195 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

WnE—Windsor loamy sand, 25 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2svl7
Elevation: 10 to 1,110 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Windsor and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: Dunes, outwash plains, outwash terraces, deltas
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Hinckley

Percent of map unit: 10 percent
Landform: Outwash plains, deltas, eskers, kames
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, rise
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Appendix D

Subdivision Plans

Appendix E

Existing Sewers Capacity Report by Hank Labarba, PE

Engineering Report

Town of East Greenbush
Sanitary Sewer System Capacity Status
Luther Road Pump Station
to the Town's Wastewater Treatment Plant

Prepared For:
Departments of Public Works
and Planning and Zoning Departments

March 21, 2019
Rev April 29, 2019

Table of Contents

Attachments

Engineering Report
March 21, 2019

Town of East Greenbush
Sanitary Sewer System Capacity Status
Luther Road Pump Station
to the Town's Wastewater Treatment Plant

Purpose

This report evaluates sewer and pump station capacities within the Couse and General Sewer District in order to provide guidance and information on existing conditions and recommendations for future improvements. The information can be used by Town and regulatory officials in their decision making process, and by developers proposing residential and commercial projects requiring new sanitary sewer service.

I. Project Area Description

The sewer service area under review consists of all properties serviced by Town sewers from approximately the Couse Corners round a about on Rt 4 to the Town wastewater treatment plant (WWTP). The project area is within both the General and Couse sewer districts. This area of sewer service consists of about 28,000 feet of gravity sewers and force main, and four, in series, sewage pumping stations.

In general, the area of study commences at the high school continues down Rt 151 to Rt 4 then to the vicinity of Mill Creek. Throughout this route the collected sewage is pumped three times. Gravity sewers then recommence at the middle school, across Rt 20 through Witbeck property and Sherwood Park, to the Corliss Ave pump station. From Corliss wastewater is again

pumped out to Rt 20 near Barber Drive then travels by gravity to the treatment plant. This review did not include portions of the General Sewer District east of the intersection of Rts 20 and 4, and the Town of Schodack. That area is entirely serviced by gravity sewers.

Attachment 1. is a map showing the areas under review, and the various connecting sewers and pump stations. The entire route was divided into five (5) sections, each section located between sequential pump stations.

Information presented in this report emphasizes existing capacity in the gravity sewers and at each pump station. This can be used to plan for future improvements that will serve future potential users and as budget tool for recommended system improvements and possible upgrading.

II. Wastewater Conveyance (Sewers) Capacities

Gravity Sewers – Existing gravity sewers were reviewed commencing at the Luther Road station located near the high school. The entire route ended at the Town's wastewater treatment plant. The sewer route can be seen on the attached sewer system map (Attachment 1.).

All sections of sewers were evaluated based on record drawing information. Their physical parameters and capacities are presented in the tables found in Attachment 2. Five tables were prepared, one for each section between each of the pump stations. The map found in Attachment 1. shows the sections of the sewer route between the four existing pump stations and treatment plant. Each section is labeled (from 1 – 5) and the number corresponds to Tables (1- 5) in Attachment 2. Table 1 and 1A start at the treatment plant and Table 5 ends at the last pump station (Luther Road). There are two tables labeled as Table 1. and Table 1.A. which contain the sewer capacities using the current peak flow (964 gpm)from Corliss station whereas Table 1 A. shows sewer capacities using the available peak flow capability (1,950 gpm) assuming one pump at design capacity is running.

The tables were developed using Manning's Equation for flow in gravity sewers and pipes. The formula requires knowing the slope or grade of the sewer, a pipe wall roughness coefficient, and pipe diameter. This information was obtained using Town maps and records. Existing flows were added using the number of connections. Pump station flow rates were also considered. The formula calculates the capacity of the pipe when flowing full which is given in the table as the "design capacity". Since each sewer section has a pump station, the pump station pumping rate for one pump was added to downstream flow contributed by sewer user

connections. This was done for each of the five sections. The estimated peak flows were subtracted from the design capacity to determine the available flow capacity in the sewers.

Summary - Essentially all of the sanitary sewers reviewed consist of older clay tile pipe. The age is estimated to be between 40 and 70 years old. The force mains (pressure sections) are ductile iron pipe. For five sections of sewers evaluated, (Results found in Tables 1 -5) all the sewers sections were found to have adequate existing capacity. 90% of the 100 sections reviewed have ample capacity (50% + capacity remaining). 10% of the sewers were at 50% capacity or less. Refer to the tables in the attachments for specific data.

The gravity sewer system which conveys sewage described above does not have a recent history of overflows. Due to the age of the sewer system there is probably an inherent problem of inflow/infiltration that is ongoing due to the condition and materials of the system. In other part of Town sewers have been rehabilitated by cured in place lining methods with over 6.3 miles of sewer repaired. However, in the sewer systems described above (from Luther to Hideaway) no in-situ sewer rehabilitation has been initiated to date. The system should be evaluated in more detail to determine condition and needed rehabilitation. Lining of the sewers will result in a reduction in infiltration and with it some additional capacity for future connections.

III. Pump Station Descriptions

The capacity and existing flow conditions were evaluated for each of the four pump stations in the system. That information is found later in this report. The following is a description of each station and its type and extent of service area. The stations from the upstream point commencing with Luther Road station are as follows:

Luther Road PS, located on Rt 151 generally services Luther Road and Michaels Road. It is in the Couse district and flows through the roundabout down Rt 4 to the Commons pump station. Luther Road PS was installed in 2008 when it replaced an existing submersible station in its entirety. At that time and to date the major sources of wastewater are the high school, library and YMCA. The station is an aboveground facility with two positive suction head pumps. It is equipped with emergency backup power.

Commons PS is located on Rt 4 across from Commons Drive and services the vicinity including Rt 4, several apartment complexes and multi-family developments and commercial users. This station discharges to a gravity sewer on Rt 4 which is then tributary to the Hideaway pump

station. It was constructed circa 1979. It is a submersible type station and has new emergency backup power. The station is older and has reached its life expectancy.

Hideaway pump station is located on the banks of Mill Creek adjacent to the Rt 4 bridge crossing. This station services the upstream residential area on either side of Rt 4 plus the discharge from the Commons PS. From this point the sewage is pumped about 1,110 feet through a 6 inch force main to a gravity sewer near the middle school and then travels by gravity through the Town system across Rt 20 to the Corliss pump station. In 2010 this above ground station replaced an older submersible type station that had a history of overflows.

Corliss pump station is the last station in line for the above system. In addition to receiving sewage from the Hideaway station, there is more contribution from the General District to the east along Rt 20 and the Town of Schodack. The station was rebuilt in 1990, refurbished with mechanical bar screens in 2014, and repaired and maintained since. The Town has current and ongoing plans in replace major pumping components in 2019 which is described further below.

IV. Pump Station Capacities and Flows

The following information provides flow data and pump station capacities based on recent data. Attachment 3. is a summary (Table No. 6) listing each station's design capacity, current flows, peak flows and available capacity. This information is also given below.

Luther Road - The station has two pumps designed to pump at a rate of 240 gpm each. Presently the station pumps, on the average, about 29,000 gpd. The high school, YMCA and library account for about 18,000 gpd. It is projected that the facility receives sewage at peak times in the order of 81 gpm (4,860 gph). This was based on peak factor of 4 applied to the estimated average daily flow of known contributors. As this rate, compared to the design pump rate for one pump (240 gpm) there is available pumping capacity. It should be noted that this facility's operational scenario is the same as for all pump stations. Pumps should be designed to handle estimated peak flow situations with one pump in operation, and the second pump as a backup. It may sometimes be the case where two pumps will run simultaneously if the station experiences wet weather (storm) conditions.

Overall this station has some available capacity and is in good condition to handle some additional future connections, provided the pump capacity is addressed. Historically, the Town has been cited by NYS DEC for overflows at this station that were the result of commercial users in this system. At this time, the Town has established operating procedures; including cycling of pumps at the YMCA to prevent an overflow, but the station will require pump modifications to

handle peak flows from existing users as well as additional connections. This station's pumps should be upgraded to handle flow above the existing flow capacity.

Commons Drive – The station was installed in 1979 and has two pumps that have been refurbished several times since installation. In the past, the station has had several overflow events due to pump malfunction. Maintenance and repairs occur frequently. One common problem is clogging due to cloths and heavy debris. Data logging is available at this station that records pump running times. Recently, pump down and flow measurements were taken to confirm existing pumping rates. It was determined that each pump can deliver about 300 gpm. Influent flows over the past six (6) months have averaged about 88,000 gpd. Using a peak factor of 2.5, knowing the composition of residents and other users in the collection area, the existing peak is projected to be about 244 gpm (14,640 gph). This is in line with pump station flow measurements. It has little to no additional safe capacity.

Hideaway - The station was totally replaced in 2013. It replaced an in ground station that frequently overflowed. The facility has two 330 gpm pumps. It is also similar to the Luther Road station, in that it is an aboveground facilities of the same manufacturer. Recent data shows that the average daily flow is about 220,000 gpd. This equates to about 153 gpm and assuming a peak of 2, which equals about 300 gpm, (7,200 gph) therefore the station is essentially at capacity.

Corliss Pump Station – This station was reconstructed in 1991 and contains three 100 hp pumps. It services the Couse and General Sewer districts including the above described service areas. It is an above ground station with emergency power and preliminary treatment equipment to remove rags and large debris. There are three pumps of which two are run simultaneously at a variable speed range. Each pump has a rated duty of about 1,900 gpm. The third pump is a backup and is alternated with the other two. Accurate flow data has been collected and evaluated over the past four months. Instantaneous readings can be taken (gpm) and there is a flow totalizer that records daily and monthly totals. Recent data shows that the station is pumping at average of about 910,000 gallons per day with peaks at 948 gpm. The peak hourly flow is about 56,880 gph.

Recorded peak flows are in the range of about 964 gpm which below the pumping capacity of 1,900 gpm per pump. Ttherefore there is an estimated reserve station pumping capacity of about 51%. Details and further description of operating conditions and equipment for the Corliss Station are found in a separate recently prepared engineering report for the Town.

V. Summary and Recommendations for Sanitary Sewer and Pumping Station Improvements

Based on the evaluation of flow data for each of the four pump station described in this report, a summary of flow conditions and capacities was prepared. The attached Table lists and summarizes the findings.

1. Summary of Pump Station Capacities

Pump Station	Design Flow gals/min	Existing gals/day	Peak Capacity gals/min	Existing Peak gals/min	Available Capacity gals/min & %
Luther Road	240	29,000	240	81	159/66%
Commons Dr	300	88,000	300	244	56/19%
Hideaway	330	213,000	330	296	34/10%
Corliss	1950/2200	910,000	1950/2200	964	986/51%

Luther Road - This station has some available capacity and is in good condition to handle some additional future connections. The station can also be upgraded with pump modifications to handle flow above existing flow capacity.

Commons - The Commons Road station is older (circa 1979) and has limited capacity for any additional flow contribution. It is recommended that the facility be considered for replacement in the near term. An above ground station in similarity to most existing Town pump stations is preferred. The station can be upgraded to handle 50 – 100% more flow or about 450 – 550 gallons per minute.

Hideaway - This station was installed in 2010 and manages to handle current flow conditions. There is little capacity for future flows. Due to the station design, the existing pumps can be replaced with higher capacity equipment to accommodate increased flows up to about 475 gallons per minute. Pump modifications, with an increase in pump horsepower would result in a 45% increase in capacity.

Corliss – The station does not require upgrading of its pumping capacity but some improvements to flow equalization and flow control are now underway. As shown in the proceeding table the station now has available capacity of about 51%. Costs associated with these improvements have been authorized to proceed by the Town. The budget amount is about $255,000. This cost is not included in the cost summary below.

2. Sanitary Sewer Rehabilitation

Within the Couse Sewer District and the above study area there are sections of existing sanitary sewers that are candidates for rehabilitation. The sewers are older dating back over 50 years and consist of clay tile pipe (vitrified clay) with numerous joints. The sections of sewers

reviewed for this report are between the Commons Drive and Hideaway pump station along the neighborhoods on either side of Rt. 4. In Attachment 4, there are two maps showing the location of the sewers in this system. The total length of the sewers is about 6,200 linear feet, including 39 manholes. The majority of the aforementioned sewer system is a candidate for

Luther Road Station	Upgrade Pumps	$49,500	$35,000	$25,000	$119,500
Commons Drive Station	New Station	$75,000	$50,000	$45,000	$170,000
Hideaway Station	Upgrade Pumps/Elec	$45,000	$35,000	$50,000	$130,000
Sewer Lining Rehabilitation	Clean and TV Line Sewers	6,200 feet	$2.50 /ft $35 / ft	$10,000	$242,500

further evaluation and possible rehabilitation. The basis for this is that during evaluation of pump stations flows the difference in flows from the Commons to the Hideaway station was about found to be about 120,000 gallons per day. This seems high compared to the number of homes located on the sewer route. 80 homes generating an estimated average of about 250 gpd yields about 20,000 gpd. Conservatively there may 100,000 gallons per day (70 gpm) of extraneous flow, which could impact sewer and pump station capacities.

3. Summary of Costs of Sewer and Pump Station Improvement Recommendations

Presented here are estimated costs for implementing the above findings and recommendations. They include both pump station and sewer improvements.

Estimates of Pump Station and Sewer Improvement Costs

Project Location	Task Item	Estimated Costs Material	Labor	Misc.	Totals

4. Implementation Schedule

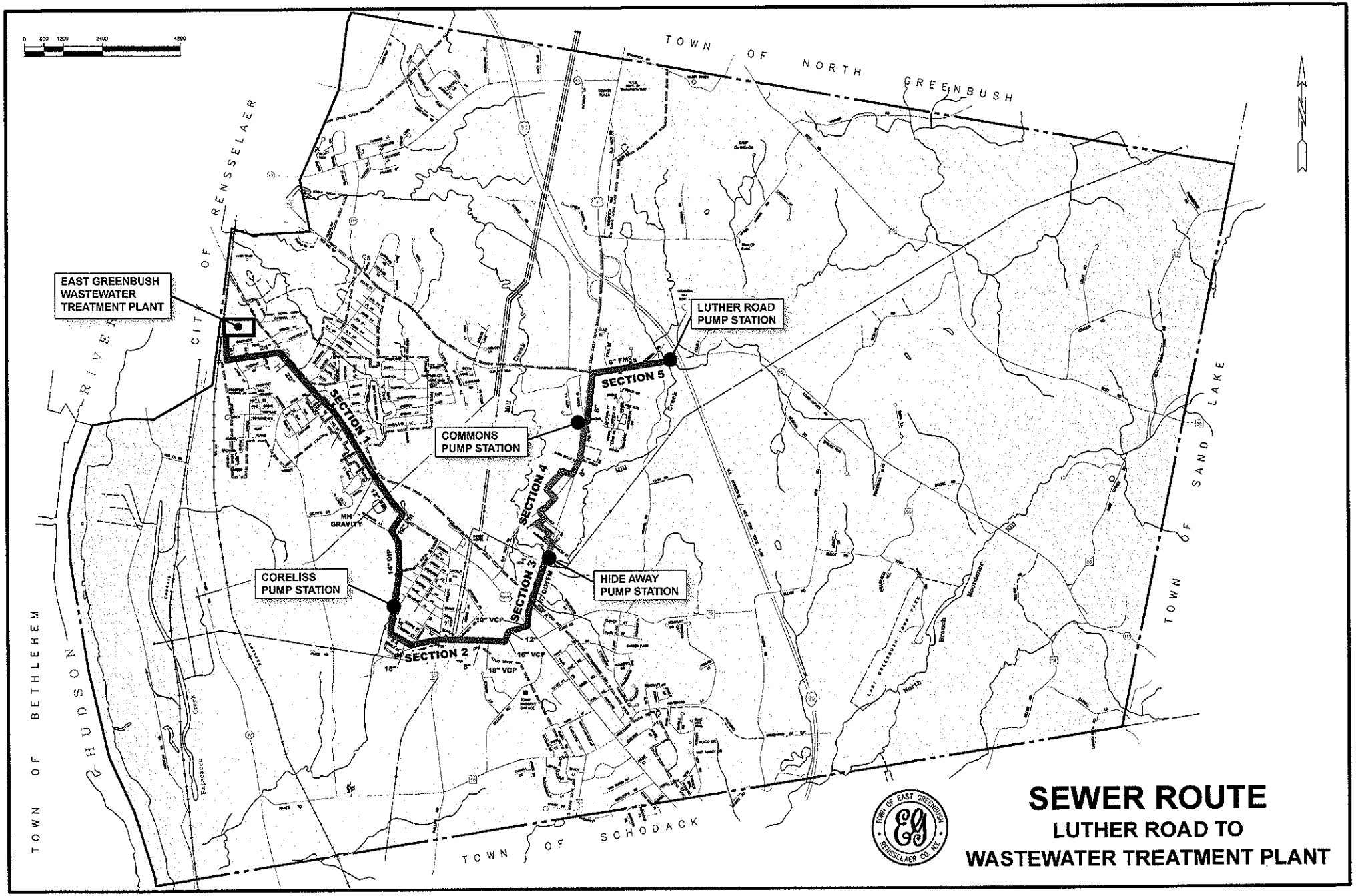
Pump Stations - All of the above improvements can be initiated at the same time. Modifications to Luther Road and Hideaway can probably be completed within a 6-8 month time frame. The replacement of the Commons pump station may take at least twelve months including design and construction.

Sewer rehabilitation should be approached by initially, internally televising all of the sewers in question. The cost given includes cleaning and then producing an in situ video report showing conditions and problematic sections. Based on an evaluation of the report, determination and project limits would be defined, identifying those sections of sewers as candidates for internal lining. The total length would probably be less than the existing 6,200 feet given above.

Prepared For: Town of East Greenbush Depts. of Public Works
and Planning and Zoning Department

By: _____
Henry V. LaBarba, PE

March 29, 2019
Rev: April 29, 2019


0 600 1200 2400 4800
TOWN OF NORTH GREENBUSH
CITY OF RENSSELAER
EAST GREENBUSH WASTEWATER TREATMENT PLANT
LUTHER ROAD PUMP STATION
COMMONS PUMP STATION
CORELISS PUMP STATION
HIDE AWAY PUMP STATION
SECTION 1
SECTION 2
SECTION 3
SECTION 4
SECTION 5
MH GRAVITY
6" FM
8" DUCTILE
10" VCP
12"
16" VCP
18" VCP
15"
HUDSON RIVER
TOWN OF BETHLEHEM
TOWN OF SCHODACK
TOWN OF SAND LAKE
East Greenbush Town Park
Poestenkill
North Branch Moordener
N
TOWN OF EAST GREENBUSH RENSSELAER CO., N.Y.
SEWER ROUTE
LUTHER ROAD TO
WASTEWATER TREATMENT PLANT

Attachments

1. Sewer System Study Area Map

2. Sewer Capacity Tables

3. Table 6 – Pump Station Capacities

4. Map of Sewers to be Evaluated for Rehabilitation

ATTACHMENT 2.

SEWER SYSTEM CAPACITY ANALYSIS

Worksheet Tables 1 - 5

TABLE 1

Existing Sewer System Hydraulic Capacity Analysis Corliss PS to WWTP

Section 1 ^^^^^^^ March

LOCATION Manhole Run	UPSTREAM INVERT	DOWNSTREAM INVERT	LENGTH (FT)	SLOPE	MATERIAL	n COEFFICIENT	PIPE DIAMETER (FT)	MANNINGS CAPACITY (gph)	DESIGN CAPACITY (gpd)	Design Capacity (gpm)	PEAK EXISTING FLOW (gpm)[1]	Existing Development to System (gpm)2	AVAILABLE CAPACITY (gpm)[3]
PS to MH5(	. 258	279.5	1110	-0.0194	dip		1.00	force main			Out PS	530 homes Tot	
MH# 50 to	253.89	251.98	401	0.0048	VCP	0.013	1.67	260,552	6,253,255	5,485	964	50	4,471
MH# 49 -4{	251.98	250.36	308	0.0053	dip	0.013	1.67	273,799	6,571,186	5,764	964	75	4,725
MH# 48-46	250.36	248.8	309	0.0050	dip	0.013	1.67	268,246	6,437,907	5,647	964	90	4,593
MH# 46-45	248.8	246.8	399	0.0050	dip	0.013	1.67	267,288	6,414,904	5,627	964	100	4,563
MH# 45-44	246.8	245.77	200	0.0052	dip	0.013	1.67	270,928	6,502,273	5,704	964	120	4,620
MH# 44-43	245.77	243.75	400	0.0051	dip	0.013	1.67	268,285	6,438,835	5,648	964	130	4,554
MH# 43a-4	243.75	243.06	123	0.0056	dip	0.013	1.67	282,763	6,786,309	5,953	964	140	4,849
MH# 41a-4	243.07	240.94	426	0.0050	dip	0.013	1.67	266,953	6,406,880	5,620	964	150	4,506
MH# 41-40	240.94	238.6	441	0.0053	dip	0.013	1.67	275,004	6,600,096	5,790	964	160	4,666
MH# 40a-3	238.6	223.49	243	0.0622	dip	0.013	1.67	941,411	22,593,874	19,819	964	170	18,685
MH# 39-37	223.49	201.05	205	0.1095	dip	0.013	1.67	1,249,065	29,977,548	26,296	964	180	25,152
MH# 37a-3	201.05	192.51	445	0.0192	dip	0.013	1.67	522,997	12,551,931	11,010	964	190	9,856
MH# 37-36	192.51	189.18	480	0.0069	dip	0.013	1.67	314,450	7,546,805	6,620	964	210	5,446
MH# 36-35	189.18	187.95	181	0.0068	dip	0.013	1.67	311,217	7,469,214	6,552	964	230	5,358
MH# 35-3:	189.18	185.5	415	0.0089	dip	0.013	1.67	355,509	8,532,209	7,484	964	240	6,280
MH# 33b-3	185.5	184.48	117	0.0087	dip	0.013	1.67	352,499	8,459,969	7,421	964	260	6,197
MH#33a-3:	184.48	182.65	276	0.0066	dip	0.013	1.67	307,412	7,377,898	6,472	964	300	5,208
MH# 31-30	182.65	180.57	317	0.0066	dip	0.013	1.67	305,811	7,339,452	6,438	964	330	5,144
MH# 30-29	180.57	178.08	320	0.0078	dip	0.013	1.67	333,024	7,992,567	7,011	964	370	5,677
MH# 29-28	178.08	144.92	424	0.0782	dip	0.013	1.67	1,055,783	25,338,794	22,227	964	390	20,873
MH# 28- 1!	144.92	126.27	258	0.0723	dip	0.013	1.67	1,015,032	24,360,780	21,369	964	411	19,994
MH# 15b-:	126.27	123.01	324	0.0101	dip	0.013	2.00	612,560	14,701,447	12,896	964	411	11,521
MH# 17-16	123.01	122.58	142	0.0030	dip	0.013	2.00	336,049	8,065,176	7,075	964	411	5,700
MH#16-15	122.58	121.58	330	0.0030	dip	0.013	2.00	336,167	8,068,017	7,077	964	411	5,702
MH# 15-13	121.58	119.21	757	0.0031	dip	0.013	2.00	341,695	8,200,683	7,194	964	411	5,819
MH# 13-w\	119.21	118	398	0.0030	dip	0.013	2.00	336,716	8,081,183	7,089	964	411	5,714

total	9749

[1] Existing Corliss Peak Flow

[2] Projected peak from homes/commercial in existing collections system

[3] Available capacity is mannings capacity minus existing peak flows

TABLE 1A

Existing Sewer System Hydraulic Capacity Analysis Corliss PS to WWTP

Assuming Peak Flow based on Maximum Pumping Capacity for one pump

Feb 2(

LOCATION Manhole Run	UPSTREAM INVERT	DOWNSTREAM INVERT	LENGTH (FT)	SLOPE	MATERIAL	n COEFFICIENT	PIPE DIAMETER (FT)	MANNINGS CAPACITY (gph)	DESIGN CAPACITY (gpd)	Design Capacity (gpm)	PEAK PUMP FLOW (gpm)[1,4]	Existing Development to System (gpm)2	AVAILABLE CAPACITY (gpm)[3]
PS to MH50	205.6	254.8	1110	-0.0443	dip		1.00	force main			Out PS	551 homes Tot	3,172
MH# 50 to 4	253.89	251.98	401	0.0048	VCP	0.013	1.67	260,552	6,253,255	5,485	1,950	50	3,485
MH# 49 -48	251.98	250.36	308	0.0053	dip	0.013	1.67	273,799	6,571,186	5,764	1,950	75	3,739
MH# 48-46	250.36	248.8	309	0.0050	dip	0.013	1.67	268,246	6,437,907	5,647	1,950	90	3,607
MH# 46-45	248.8	246.8	399	0.0050	dip	0.013	1.67	267,288	6,414,904	5,627	1,950	100	3,577
MH# 45-44	246.8	245.77	200	0.0052	dip	0.013	1.67	270,928	6,502,273	5,704	1,950	120	3,634
MH# 44-43a	245.77	243.75	400	0.0051	dip	0.013	1.67	268,285	6,438,835	5,648	1,950	130	3,568
MH# 43a-41	243.75	243.06	123	0.0056	dip	0.013	1.67	282,763	6,786,309	5,953	1,950	140	3,863
MH# 41a-41	243.07	240.94	426	0.0050	dip	0.013	1.67	266,953	6,406,880	5,620	1,950	150	3,520
MH# 41-40a	240.94	238.6	441	0.0053	dip	0.013	1.67	275,004	6,600,096	5,790	1,950	160	3,680
MH# 40a-39	238.6	223.49	243	0.0622	dip	0.013	1.67	941,411	22,593,874	19,819	1,950	170	17,699
MH# 39-37a	223.49	201.05	205	0.1095	dip	0.013	1.67	1,249,065	29,977,548	26,296	1,950	180	24,166
MH# 37a-37	201.05	192.51	445	0.0192	dip	0.013	1.67	522,997	12,551,931	11,010	1,950	190	8,870
MH# 37-36	192.51	189.18	480	0.0069	dip	0.013	1.67	314,450	7,546,805	6,620	1,950	210	4,460
MH# 36-35	189.18	187.95	181	0.0068	dip	0.013	1.67	311,217	7,469,214	6,552	1,950	230	4,372
MH# 35-33l	189.18	185.5	415	0.0089	dip	0.013	1.67	355,509	8,532,209	7,484	1,950	240	5,294
MH# 33b-33	185.5	184.48	117	0.0087	dip	0.013	1.67	352,499	8,459,969	7,421	1,950	260	5,211
MH#33a-31	184.48	182.65	276	0.0066	dip	0.013	1.67	307,412	7,377,898	6,472	1,950	300	4,222
MH# 31-30	182.65	180.57	317	0.0066	dip	0.013	1.67	305,811	7,339,452	6,438	1,950	330	4,158
MH# 30-29	180.57	178.08	320	0.0078	dip	0.013	1.67	333,024	7,992,567	7,011	1,950	370	4,691
MH# 29-28	178.08	144.92	424	0.0782	dip	0.013	1.67	1,055,783	25,338,794	22,227	1,950	390	19,887
MH# 28- 15l	144.92	126.27	258	0.0723	dip	0.013	1.67	1,015,032	24,360,780	21,369	1,950	411	19,008
MH# 15b-1	126.27	123.01	324	0.0101	dip	0.013	2.00	612,560	14,701,447	12,896	1,950	411	10,535
MH# 17-16	123.01	122.58	142	0.0030	dip	0.013	2.00	336,049	8,065,176	7,075	1,950	411	4,714
MH#16-15	122.58	121.58	330	0.0030	dip	0.013	2.00	336,167	8,068,017	7,077	1,950	411	4,716
MH# 15-13	121.58	119.21	757	0.0031	dip	0.013	2.00	341,695	8,200,683	7,194	1,950	411	4,833
MH# 13-ww	119.21	118	398	0.0030	dip	0.013	2.00	336,716	8,081,183	7,089	1,950	411	4,728

TABLE 2

Existing Sewer System Hydraulic Capacity Analysis - 18" Trunk Sewer to Corliss PS

Section 2

LOCATION Manhole Run	UPSTREAM INVERT	DOWNSTREAM INVERT	LENGTH (FT)	SLOPE	MATERIAL	n COEFFICIENT	PIPE DIAMETER (FT)	MANNINGS CAPACITY (gph)	DESIGN CAPACITY (gpd)	Design Capacity (gpm)	PEAK EXISTING FLOW (gpm)^1	Existing Development to System (peak gpm)^2	AVAILABLE CAPACITY (gpm)
											Hideaway+General		
MH72-71	235.47	233.05	288	0.0084	VCP	0.013	1.50	259,904	6,237,688	5,472	732	0	4,740
MH 71-70	233.05	231.08	228	0.0086	VCP	0.013	1.50	263,552	6,325,252	5,548	732	0	4,816
MH70-69	231.08	226	380	0.0134	VCP	0.013	1.50	327,824	7,867,780	6,902	732	0	6,170
Mh69-68	226	223.71	269	0.0085	VCP	0.013	1.50	261,603	6,278,469	5,507	732	0	4,775
Mh68-67	223.71	221.34	270	0.0088	VCP	0.013	1.50	265,640	6,375,356	5,592	732	0	4,860
Mh67-66	221.34	218.74	208	0.0125	VCP	0.013	1.50	316,998	7,607,942	6,674	732	58	5,884
Mh66-65	218.74	215.92	355	0.0079	VCP	0.013	1.50	252,704	6,064,885	5,320	732	58	4,530
MH65-64	215.95	213.31	302	0.0087	VCP	0.013	1.50	265,094	6,362,249	5,581	732	58	4,791
MH64-63b	213.31	211.91	230	0.0061	VCP	0.013	1.50	221,208	5,308,994	4,657	732	125	3,800
Mh63b-63	211.9	210.14	225	0.0078	VCP	0.013	1.50	250,764	6,018,347	5,279	732	150	4,397
Mh63-61	210.14	209.86	152	0.0018	VCP	0.013	2.00	262,102	6,290,440	5,518	732	150	4,636
Mh61-60	209.84	209.2	405	0.0016	VCP	0.013	2.00	242,759	5,826,212	5,111	732	200	4,179
MH60-59	209.2	208.55	316	0.0021	VCP	0.013	1.50	128,592	3,086,209	2,707	732	215	1,760
MH59-58	208.55	208.09	342	0.0013	VCP	0.013	1.50	103,984	2,495,618	2,189	732	220	1,237
Mh58-57	208.09	207.55	363	0.0015	VCP	0.013	1.50	109,356	2,624,555	2,302	732	220	1,350
MH57-56	207.55	207.2	237	0.0015	VCP	0.013	1.50	108,958	2,615,002	2,294	732	232	1,330
MH56-55	207.2	206.94	172	0.0015	VCP	0.013	1.50	110,236	2,645,664	2,321	732	232	1,357
Mh55-54	206.95	206.37	383	0.0015	VCP	0.013	1.50	110,336	2,648,054	2,323	732	232	1,359
MH54-53	206.37	205.7	388	0.0017	VCP	0.013	1.50	117,821	2,827,702	2,480	732	232	1,516
Total			5513										-

Note ^1 Includes: Hideaway Pump and General Sewer District contribution

Note ^2 Includes: Witbeck, Sherwood Park

TABLE 3

Existing Sewer System Hydraulic Capacity Analysis Hideaway PS to 18 " Trunk Sewer

Section 3

5-I

LOCATION Manhole Run	UPSTREAM INVERT	DOWNSTREAM INVERT	LENGTH (FT)	SLOPE	MATERIAL	n COEFFICIENT	PIPE DIAMETER (FT)	MANNINGS CAPACITY (gph)	DESIGN CAPACITY (gpd)	Design Capacity (gpm)	PEAK EXISTING FLOW (gpm)	Existing Development to System (gpm)^1	AVAILABLE CAPACITY (gpm)
PS to MHA3	258	266.2	1110	-0.0074	dip		0.50	force main			PS Disch		
MHA3-A2	255.2	254.6	130	0.0046	VCP	0.013	0.83	39,742	953,810	837	330	10	497
MHA2-A1	254.5	253	400	0.0038	VCP	0.013	0.83	35,823	859,753	754	330	15	409
MHA1-76C	253	250.74	380	0.0059	VCP	0.013	0.83	45,114	1,082,731	950	330	25	595
Mh76c-76B	250.7	249.2	310	0.0048	VCP	0.013	0.83	40,692	976,614	857	330	30	497
Mh76B-A	265.63	264.48	229	0.0050	VCP	0.013	0.83	41,455	994,922	873	330	35	508
Mh76-75	264.48	264.16	65	0.0049	VCP	0.013	0.83	41,045	985,091	864	330	55	479
Mh75-74	264.16	251	300	0.0439	VCP	0.013	0.83	122,522	2,940,528	2,579	330	60	2,189
MH74-74A	251	244.6	224	0.0286	VCP	0.013	0.83	98,881	2,373,144	2,082	330	70	1,682
MH74A-77A	244.6	244.2	210	0.0019	VCP	0.013	1.00	41,965	1,007,157	883	330	70	483
MH-77A-72	244.2	235.47	180	0.0485	VCP	0.013	1.33	453,053	10,873,265	9,538	330	386	8,822
total			3538										

To Begin of 18 in Trunk Sewer

Note^1 Includes General Sewer Sewer Rt 20 East

Sudden increase due to General sewer add in from East

TABLE 4

Existing Sewer System Hydraulic Capacity Analysis Commons PS to Hideaway PS

Section 4

Feb 19

LOCATION Manhole Run	UPSTREAM INVERT	DOWNSTREAM INVERT	LENGTH (FT)	SLOPE	MATERIAL	n COEFFICIENT	PIPE DIAMETER (FT)	MANNINGS CAPACITY (gph)	DESIGN CAPACITY (gpd)	Design Capacity (gpm)	PEAK EXISTING FLOW (gpm)[1,4]	Existing Development to System (gpm)[2]	AVAILABLE CAPACITY (gpm)[3]
PS to MHb2	258	279.5	1110	-0.0194	dip		0.50	force main			Out PS	75 homes Tot	
B22-B21	279	277.3	230	0.0074	VCP	0.013	0.67	28,410	681,834	598	200	10	388
B21-B20	277.3	275.6	400	0.0042	VCP	0.013	0.67	21,543	517,026	454	200	15	239
B20-B19	275.6	267.3	352	0.0236	VCP	0.013	0.67	50,743	1,217,828	1,068	200	20	848
B19-B18	267.3	265.63	390	0.0043	VCP	0.013	0.67	21,624	518,972	455	200	20	235
B18-B17	265.63	264.45	365	0.0032	VCP	0.013	0.83	33,261	798,275	700	200	30	470
B17-B16	264.45	263.3	345	0.0033	VCP	0.013	0.83	33,774	810,583	711	200	30	481
B16-B15	263.3	262.4	300	0.0030	VCP	0.013	0.83	32,041	768,986	675	200	40	435
B15-B14	262.4	261.8	150	0.0040	VCP	0.013	0.83	36,998	887,949	779	200	60	519
B14-B13	261.8	261.43	38	0.0097	VCP	0.013	0.83	57,724	1,385,374	1,215	200	70	945
B13-B12	261.43	260.47	238	0.0040	VCP	0.013	0.83	37,153	891,672	782	200	80	502
B12-B11	260.47	260.21	94	0.0028	VCP	0.013	0.83	30,766	738,382	648	200	90	358
B11-B10	260.21	259.37	264	0.0032	VCP	0.013	0.83	32,998	791,946	695	200	100	395
B10-B9	259.37	258.7	240	0.0028	VCP	0.013	0.83	30,909	741,805	651	200	110	341
B9-B8	258.7	257.67	295	0.0035	VCP	0.013	0.83	34,566	829,594	728	200	130	398
B8-B7	257.67	257.1	185	0.0031	VCP	0.013	0.83	32,471	779,309	684	200	160	324
B7-B6	257.67	255	148	0.0180	VCP	0.013	0.83	78,573	1,885,744	1,654	200	170	1,284
B6-B5	255	240	200	0.0750	VCP	0.013	0.83	160,206	3,844,932	3,373	200	170	3,003
B5-B3	240	233	185	0.0378	VCP	0.013	0.83	113,792	2,730,997	2,396	200	170	2,026
B3-PS	233	213	100	0.2000	VCP	0.013	0.67	147,782	3,546,772	3,111	200	170	2,741
total			5629										

[1] Existing Commons PS Peak Flow based on one pump on

[2] Projected peak from homes in system

[3] Available capacity is mannings capacity minus existing peak flows

[4] Rate can go to about 375 gpm in event 2 pumps turn on, existing peaks flow do not exceed pumping capacity at Hideaway

TABLE 5

Existing Sewer Hydraulic Capacity Analysis Luther PS to Commons PS

Section 5

LOCATION Manhole Run	UPSTREAM INVERT	DOWNSTREAM INVERT	LENGTH (FT)	SLOPE	MATERIAL	n COEFFICIENT	PIPE DIAMETER (FT)	MANNINGS CAPACITY (gph)	DESIGN CAPACITY (gpd)	Design Capacity (gpm)	PEAK EXISTING FLOW (gpm)[1]	Existing Development to System (gpm)2	AVAILABLE CAPACITY (gpm)[3]
												120 homes(Tot)	
CE1 - ce2	335	327	150	0.0533	VCP	0.013	0.67	76,314	1,831,545	1,607	240	5	1,362
CE2-CE3	327	310.14	375	0.0450	VCP	0.013	0.67	70,068	1,681,634	1,475	240	15	1,220
CE3- CE10	310.14	308.14	400	0.0050	VCP	0.013	0.67	23,366	560,794	492	240	15	237
CE10-CA9	308.14	307.04	245	0.0045	VCP	0.013	0.67	22,142	531,412	466	240	20	206
CA9-CA8	307.04	303.58	280	0.0124	VCP	0.013	0.67	36,734	881,612	773	240	25	508
CA8-CA7	303.58	303	120	0.0048	VCP	0.013	1.00	66,848	1,604,354	1,407	240	25	1,142
CA7-CA6	303	302.4	120	0.0050	VCP	0.013	0.67	23,366	560,794	492	240	25	227
CA6-CA5	302.4	301.24	260	0.0045	VCP	0.013	0.67	22,072	529,737	465	240	45	180
CA5-CA4	301.24	300.2	260	0.0040	VCP	0.013	0.67	20,900	501,589	440	240	45	155
CA4-CA3	300.2	299.56	110	0.0058	VCP	0.013	0.67	25,206	604,939	531	240	45	246
CA3-CA2a	299.56	298	120	0.0130	VCP	0.013	0.67	37,677	904,253	793	240	66	487
CA2a-CA2	298	283.3	270	0.0544	VCP	0.013	0.67	77,105	1,850,525	1,623	240	70	1,313
CA2-CA1	283.3	272.8	277	0.0379	VCP	0.013	0.67	64,337	1,544,092	1,354	240	70	1,044
CA1-H1	272.8	268.1	60	0.0783	VCP	0.013	0.67	92,487	2,219,686	1,947	240	75	1,632
H1-F2	268.1	258.43	210	0.0460	VCP	0.013	0.67	70,911	1,701,852	1,493	240	75	1,178
F2-F1	258.43	258.06	68	0.0054	VCP	0.013	0.67	24,375	585,012	513	240	75	198
B6-B5	255	240	200	0.0750	VCP	0.013	0.83	160,206	3,844,932	3,373	240	135	2,998
B5-B3	240	233	185	0.0378	VCP	0.013	0.83	113,792	2,730,997	2,396	240	135	2,021
B3-PS	233	213	100	0.2000	VCP	0.013	0.67	147,782	3,546,772	3,111	240	135	2,736
total			3810										

[1] Existing Luther PS Peak Flow 1 pump on > 240 gpm

[1] flows from Proposed new projects Heritage Hills and Covered Bridge included in 240 gpm

[2] Projected peak from EDU's in system Flows increase as sewer picks up homes

[3] Available capacity is mannings capacity minus existing peak flows

Attachment 3.

Table 6

Town of East Greenbush 6-Mar-19

Pump Station Capacities from Luther to Corliss PS

Pump Station	Design Q Flow - Q gal/min	Year Built	Current Cond. Ave Daily Q Gals/day	Peak *1 gal/min	Est Exist Peak gal/min	Peak Available Capacity gal/min
Luther Road ^2	240	2008	29000	240	81	159
Commons Dr^3	300	1979	88000	300	244	6
Hideaway^4	330	2009	213000	330	296	34
Corliss^5	1950/2200	1990	910000	1950	964	984

Ex Peak Factors applied above

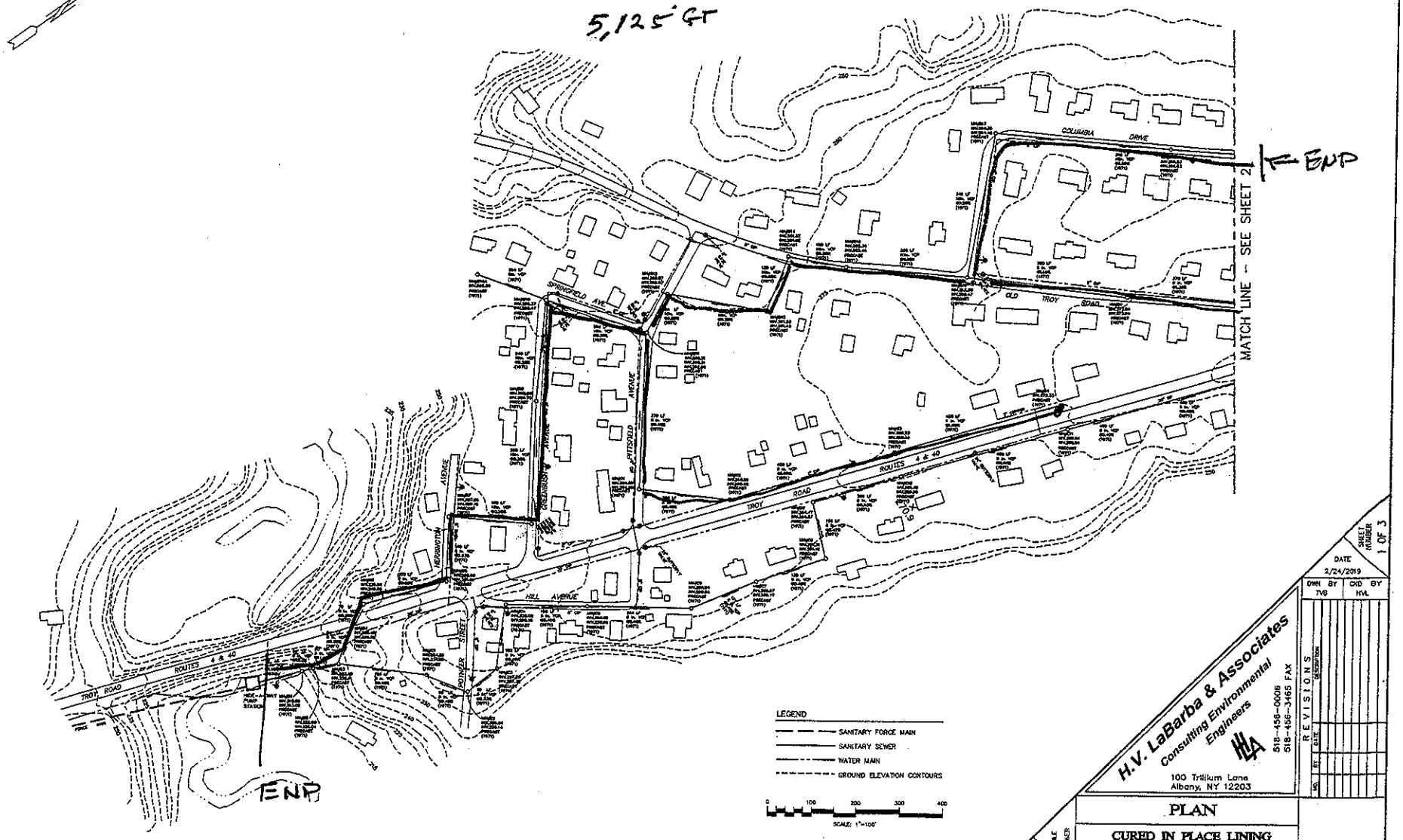
* 1	Based on Pump Station Capacity one pump running
^2	Based on Peak factor of 4 with one pump running
^3	Based on Peak Factor of 2.5 (using ps influent data)
^4	Based on Peak Factor of 2 (using ps influent data)
^5	I pump/ 2 pumps on actual peak Q data
	Some capacity exists up to 56 gpm.
	Some capacity exists up to 34 gpm.

ATTACHMENT 4.

Sanitary Sewers in Study Area

Candidates for Evaluation and Rehabilitation

TOTAL LENGTH
SEWERS (8" Ø)
5,125' GT



H.V. LaBarba & Associates
Consulting Environmental Engineers
100 Trillium Lane
Albany, NY 12203
518-456-0006
518-456-3465 FAX

REVISIONS
NO. | BY | DATE | DESCRIPTION

DATE 2/24/2019
DWN BY TVB | CKD BY HVL
SHEET NUMBER 1 OF 3

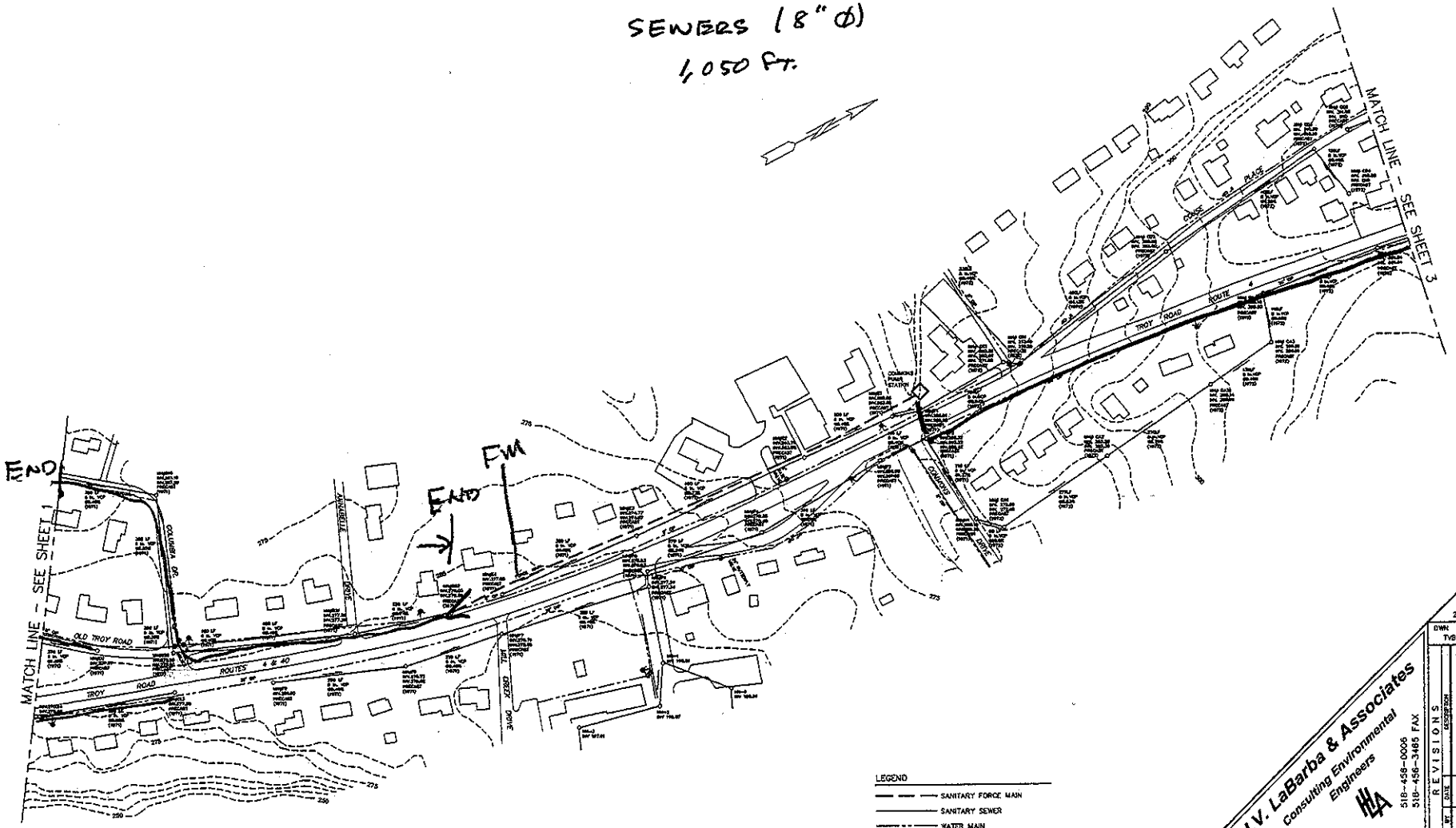
PLAN

CURED IN PLACE LINING
SANITARY SEWER

TOWN OF EAST GREENBUSH RENSSELAER COUNTY, N.Y.

SCALE AS SHOWN
FILE SEWER

TOTAL LENGTH
SEWERS (8" Ø)
1,050 Ft.



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REVISIONS

NO.	BY	DATE	DESCRIPTION

DWN BY TVB | CKD BY KVL

DATE 2/24/2018

SHEET NUMBER 2 OF 3

PLAN

CURED IN PLACE LINING
SANITARY SEWER

TOWN OF EAST GREENBUSH RENSSELAER COUNTY, N.Y.

SCALE AS SHOWN

FILE SEWER