Regional Wastewater Treatment Plant Alternative

Village of Sherman, Chautauqua County, New York

Preliminary Engineering Report

January 2019

Barton & Loguidice

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Executive Summary

The Village of Sherman retained Barton & Loguidice, D.P.C. (B&L) Consulting Engineers to prepare a Comprehensive Sewer Assessment Study report for assessing the condition of its public sanitary sewer collection system and wastewater treatment plant (WWTP). The study was completed and summarized in the August 2018 *Comprehensive Sewer Assessment Study Preliminary Engineering Report*. During the study, the Village was approached by the Chautauqua County Department of Health to discuss a "Regional" sewer project opportunity, which would include the extension of public sewer service to Findley Lake and the Route 430 corridor within the Towns of Sherman and Mina. This Preliminary Engineering Report supplements the August 2018 *Comprehensive Sewer Assessment Study Preliminary Engineering Report* for evaluating the feasibility and costs for expanding the Village of Sherman WWTP service area to serve as a Regional WWTP wherein the improved plant would accept and treat sewage from areas surrounding Findley Lake and the Route 430 corridor within the Towns of Sherman and Mina.

Based on 2008 NYSDEC/USEPA "Total Maximum Daily Load (TMDL) for Phosphorus in Findley Lake Report," implementing a public sewer system around Findley Lake is absolutely essential first step toward stopping the degradation of the lake's water quality and to lower the total phosphorus loading on the lake. The purpose of this PER is to reevaluate alternatives considered under the August 2018 PER for regional WWTP that would accept flows from the Findley Lake area of the Town of Mina. This report does not evaluate additional options for the Findley Lake area, such as constructing their own WWTP, or conveying their sewage to another nearby WWTP. Although conveyance of sanitary sewage from Findley Lake to the Sherman WWTP may be accompanied by a greater upfront capital investment, one larger regional WWTP would result in long term operational and maintenance cost savings.

Should it be determined and agreed upon by the County and involved municipalities that the Village of Sherman could effectively serve as a Regional WWTP, the recommended collection and conveyance system for Findley Lake would include a low-pressure sewer system around Findley Lake, three main sewage pump stations and associated force main from Findley Lake to the Village of Sherman, and various Sherman WWTP upgrades. Upgrades to the Sherman WWTP would generally include the installation of a new Sequencing Batch Reactor treatment process following a new headworks building equipped with automated screening and grit removal equipment; installation of disc filters for meeting lower seasonal BOD limits; replacement of the existing effluent chlorination/de-chlorination with ultraviolet (UV) light disinfection; and the installation of a new solids dewatering building and mechanical dewatering equipment to replace an inoperable sludge thickener and covered sludge drying

beds. The proposed infrastructure improvements would be constructed while existing unit processes remain in service to the extent practical, allowing the WWTP to remain fully operational at all times for achieving permit compliance.

The estimated probable project cost for the recommended alternative, which includes the construction of a low-pressure sewer system around Findley Lake, sewer conveyance to the Sherman WWTP across the 7.5-mile Route 430 corridor, and upgrades to the Sherman WWTP is $32,358,000. It is envisioned that the NYSEFCs CWSRF program would serve as the core funding program for the capital project, supplemented by grant funding that is available through EFC's Water Infrastructure Improvement Act (WIIA) grant program, USDA Rural Development, DOS Local Government Efficiency program, or HCRs Community Development Block Grant program. It should be noted that a plant upgrade for the Village of Sherman alone may not score enough points and the Town of Mina would not financially qualify for 0% financing. Therefore, working together on a joint sewer project is likely to have significant funding advantages under the NYSEFC CWSRF program.

To date, cost sharing discussions between the involved municipalities have not been finalized, and would ultimately be driven by the administrative structure under which the project advances. This structure may include formation of a single County Sewer District that includes portions of the two towns, or a joint municipal project between the two towns and Village under the auspices of an Intermunicipal Agreement. Based on discussions to date and our experience with structuring similar projects with available State and Federal funding programs, annual user costs for the different municipalities of the potential sewer district would likely be in the range of $700 - $900 per EDU for the Village of Sherman and $1,400 to $1,700 for the Towns of Mina and Sherman. These user costs are largely dependent on several unknown items including the final district boundary, final EDU schedule, final cost sharing method, and what funding package(s) is ultimately received.

Abbreviations

BOD_5	Biochemical Oxygen Demand (5-day)
C	Celsius
cfs	Cubic feet per second
CWSRF	Clean Water State Revolving Fund
DEC	New York State Department of Environmental Conservation
DMR	Discharge Monitoring Report
DO	Dissolved oxygen
EDU	Equivalent Dwelling Unit
EFC	New York State Environmental Facilities Corporation
EPA	United States Environmental Protection Agency
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
gpd	Gallons per day
gpm	Gallons per minute
MHI	Median Household Income
MGD	Million gallons per day
MLSS	Mixed liquor suspended solids
P	Phosphorus
PER	Preliminary Engineering Report
ppm	parts per million
psig	Pounds per square inch (gauge)
SBR	Sequencing Batch Reactor
scfm	Standard cubic feet per minute (68 degrees F and 1 atmosphere)
SEQR	State Environmental Quality Review

Abbreviations (Continued)

SPDES	State Pollutant Discharge Elimination System
SRT	Solids retention time
SVI	Sludge volume index
SWPPP	Storm Water Pollution Prevention Plan
TDH	Total dynamic head
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TSS	Total suspended solids
USFWS	United States Fish and Wildlife Service
WLA	Waste Load Allocation
WWTP	Wastewater treatment plant

1.0 Introduction

1.1 Authorization

The Village of Sherman retained the services of Barton & Loguidice, D.P.C. (B&L) on July 11, 2018 to prepare a Preliminary Engineering Report that will supplement the August 2018 *Comprehensive Sewer Assessment Study* Preliminary Engineering Report (PER) (referred to as the August 2018 PER) to evaluate the potential for the Village of Sherman to become a "Regional" wastewater treatment plant (WWTP). This report describes the required improvements to increase the capacity of the Village of Sherman WWTP to accept flows and loads from a potential County Sewer District that would provide public sewers to the Findley Lake community and the Route 430 corridor within the Towns of Mina and Sherman, respectively. Additionally, this report evaluates the required conveyance infrastructure across the Route 430 corridor (and alternative routes) to convey sewage from Findley Lake to the Village of Sherman WWTP. The Village of Sherman is being reimbursed by Chautauqua County for the engineering services associated with preparing this Preliminary Engineering Report.

1.2 Background

Findley Lake, located in the Town of Mina, is a manmade lake created in the early 1800s through the construction of a dam. Today, the lake has a densely developed lakeshore and is a popular recreational activity destination. According to a USEPA/NYSDEC Report on the Total Maximum Daily Load (TMDL) for Phosphorus in Findley Lake, the lake is considered an "impaired" waterbody and water quality has significantly degraded in Findley Lake largely as a result of inadequate onsite wastewater treatment systems that year-round and seasonal lakeside properties utilize for treatment of sanitary waste.

In 2017, the Town of Mina attempted to form a sewer district around Findley Lake and retained Greenman-Pedersen, Inc. to prepare the January 2017 *Findley Lake Sewerage Project Sewer District Formation Map, Plan and Report.* This Map, Plan and Report evaluated various sewage collection systems around Findley Lake and recommended that a low-pressure grinder pump collection system to be installed. The report provided a concept level evaluation of wastewater treatment needs and goals, and recommended that a new plant be constructed adjacent to French Creek just north of Interstate I-86. The estimated total project cost for the proposed project was $15,000,000, in addition to an annual operation, maintenance, and reserve

expense of $245,000 per year for the proposed Town sewer district. The Mina Town Board brought the proposed project plan to a mandatory referendum vote of the proposed sewer district, which failed by a slim margin.

Recognizing that the Town sewer district vote failed by a slim margin, and the long-term water quality improvements that could be achieved by implementing a public sewer system around Findley Lake, Chautauqua County officials began to meet with the Town of Mina to brainstorm potential solutions for public sewers at Findley Lake. In the spring of 2018, County representatives met with Village of Sherman and Town of Mina representatives to discuss, in concept, utilizing an expanded Village of Sherman Wastewater Treatment Plant, located approximately seven (7) miles from Findley Lake, for treatment of sanitary flows and loads from the Findley Lake area. This Preliminary Engineering Report provides an evaluation of public collection, conveyance, and treatment infrastructure necessary for conveying Findley Lake sewage to the existing Village of Sherman "regional" WWTP.

2.0 Project Background & History

2.1 Site Information

2.1.1 *Location*

The Village of Sherman is located in the southeast quadrant of Chautauqua County, New York. Nearby communities consist of the surrounding Town of Sherman, the Village of Sherman to the North, the Village of Panama to the South-east, and the Town of Mina and its Findley Lake community to the West. A project location map is include as Figure 1.

2.1.2 *Geographical Conditions*

The geographical conditions in the Village of Sherman are included in the August 2018 PER. Soil conditions around Findley Lake and along the route to Sherman were reviewed using the United States Department of Agriculture's (USDA) Web Soil Survey. Available information indicates that the site generally consists of a silty loam soil type with a water table depth varying between 0-feet to more than 6-feet across the potential project corridor. Results from this Web Soil Survey research are included as Appendix A.

2.1.3 *Environmental Resources*

The environmental resources in the Village of Sherman are included in the August 2018 PER. Preliminary screening through the United States Fish and Wildlife Services National Wetlands Inventory around Findley Lake and along the conveyance route to Sherman has identified wetlands within the project area. Freshwater wetlands are identified primarily near the northern and southern portions of Findley Lake and also along the conveyance route from Findley Lake to the Village of Sherman. Any impacts to wetlands would be mitigated and are expected to be minor. A copy of the National Wetlands Inventory mapping is included in Appendix B. Information of the Findley Lake watershed is also included in Appendix B.

2.1.4 *Floodplain Considerations*

Floodplain conditions in the Village of Sherman are included in the August 2018 PER. FEMA Flood Zone mapping around Findley Lake and along the conveyance route to Sherman is shown in Appendix C. Portions of the sewage collection and conveyance system are partially located in a designated FEMA 100 year flood zone. Publicly owned wastewater pumping stations located within a flood plain must be raised above the flood plain, fully accessible during flood events, and constructed to be water resistant/water tight. If a pump station is installed along the conveyance route within a floodplain, it will need to be raised to a minimum of 2-feet above the flood plain elevation.

2.2 Service Area

2.2.1 *Projected Population of Regional Sewer District*

Based on Census and American Community Survey data, the population of the potential sewer service area is estimated to be 2,795 people in the year 2038 as shown in the Table 2-1 below.

Table 2-1: Regional Sewer District Population Estimate

Municipality/Service Area	Est 2038 Population
(V) Sherman	735
Findley Sewer Ext. Estimate	2,060
Total	**2,795**

2.2.2 *Sanitary Sewer System – Equivalent Dwelling Units (EDUs)*

An equivalent dwelling unit, or EDU, is the unit of measure by which a user is typically charged for sewer service. Based on the potential service area of a regional sanitary sewer system, the EDU estimate for each potential participating municipality is summarized in Table 2-2. As the regional sewer district boundary is refined and an agreed upon EDU schedule is adopted, the estimated EDUs should be reviewed and updated as necessary.

Table 2-2: Regional Sewer District EDU Estimate

Municipality/Service Area	No. of EDU's
(V) Sherman	360
(T) Mina	668
(T) Sherman	16
Estimated Total EDUs	**1,044**

2.2.3 *Financial Status of Municipalities*

Table 2-3 below displays the 2010 Census Median Household Income, the 2015 American Community Survey Median Household, and the Low- to-Moderate income percentage (used for CDBG funding) for the municipalities that may be involved in a regional sewer district. As shown, the Village and the Town of Sherman are currently eligible for CDBG grant funding with an LMI% greater than 51%.

Table 2-3: Regional Sewer District Municipal Demographics

Place	No. of EDU's	2010 Census MHI	2014 ACS MHI	CDBG LMI %
(V) Sherman	360	$34,118	$35,238	54.86%
(T) Mina	668	$46,417	$50,598	32.76%
(T) Sherman	16	$34,674	$39,500	58.30%
Total/Weighted Average	**1,044**	**$41,996**	**$45,131**	**--**

2.2.4 *Anticipated Development*

The majority of the Village of Sherman and the area around Findley Lake is substantially "built out" with limited developable vacant land available for new residential or commercial development. To date, there are no major development projects underway or anticipated in the project area; however, the I-86 and Route 430 corridors are each bordered by substantial vacant agricultural land. Access to public sewers across the conveyance corridor may influence new development within/adjacent to agricultural districts. In an effort to comply with smart growth policy, the infrastructure detailed in the report does not account for any significant development along the Route 430 corridor or alternative route considered.

3.0 Existing Facilities

3.1 Description & History

3.1.1 *Village of Sherman*

A facilities assessment of the existing Village of Sherman infrastructure is included in the August 2018 PER.

3.1.2 *Findley Lake and Town of Sherman*

The Findley Lake area of the Town of Mina and the Route 430 corridor within the Town of Sherman do not have public water or sewer. Properties along Findley Lake utilize privately owned, on-site wastewater treatment systems (OWTS). The small lakeside lot sizes and soil conditions are not conducive to use of OWTS's, and have been identified as a major cause of the degradation of water quality in Findley Lake. The need for a municipal sewer project is further discussed in Section 3.2.

3.2 Definition of the Problem

3.2.1 *Environmental and Health Issues*

Implementing a public sewer system around Findley Lake is a high priority for the USEPA, NYSDEC, Chautauqua County, and the Findley Lake Watershed Foundation. Harmful algal blooms (HABs) regularly occur in Findley Lake, attributed in large part to failing on-site septic systems within the lake's watershed. When septic systems fail, they release bacteria and oxygen consuming nutrients which can degrade the quality of water, cause excessive algae growth, and render the water unsafe to drink or for recreational (contact) use. A municipal sewer system would reduce the nutrient loading to Findley Lake and is absolutely critical to begin improving the water quality of the lake.

According to the 2008 USEPA/NYSDEC Report on the Total Maximum Daily Load for Phosphorus in Findley Lake, "*Residential on-site septic systems contribute an estimated 425 lbs/yr of phosphorus to Findley Lake, which is about 45% of the total loading to the lake. Residential septic systems contribute dissolved phosphorus to nearby waterbodies due to system malfunctions … Due to the fact that septic systems are a major source of loading in the Findley Lake Watershed, restoration depends on elimination of*

that source. A systematic approach, such as the formation of a sanitary sewer district and discharge of treated wastewater outside of the watershed, is essential to achieving the load reductions."

The three (3) graphics pasted below (taken from the 2008 USEPA/NYSDES Report) clearly summarize the phosphorus loading problem and demonstrate how critical it is to eliminate failing septic systems around Findley Lake.

Figure 7. Estimated Sources of Annual Total Phosphorus Loading to Findley Lake

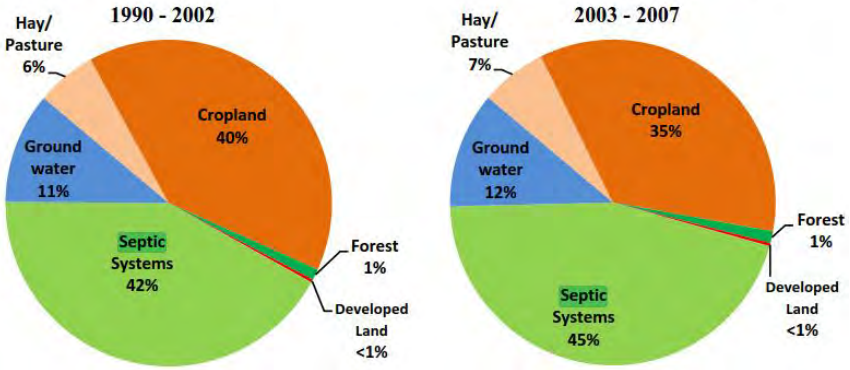
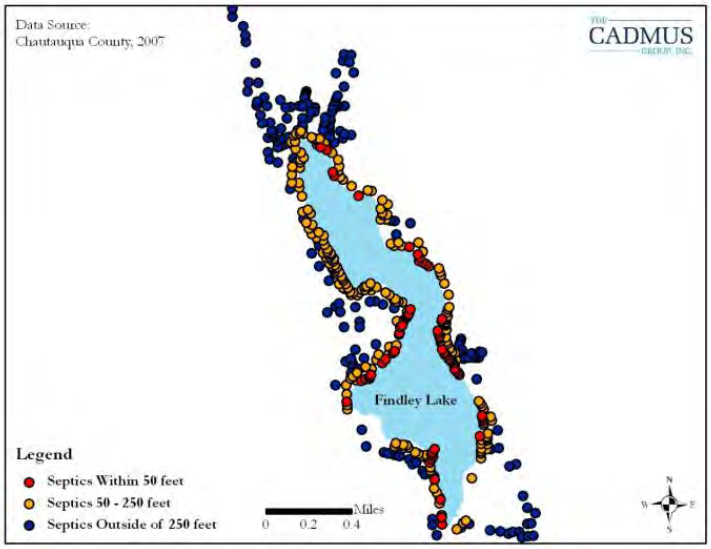


Figure 8. Findley Lake Septic Parcel Distribution



APPENDIX C. TOTAL EQUIVALENT DAILY PHOSPHORUS LOAD ALLOCATIONS

Source	Total Phosphorus Load (lbs/day)			% Reduction
	Current	Allocated	Reduction	
Agriculture*	1.073	0.312	0.761	71%
Developed Land*	0.127	0.077	0.05	39%
Septic Systems	1.162	0.0	1.162	100%
Forest, Wetland, Stream Bank, and Natural Background	0.209	0.209	0.0	0%
LOAD ALLOCATION	**2.571**	**0.598**	**1.973**	**77%**
Point Sources	0.0	0.0	0.0	0%
WASTELOAD ALLOCATION	**0.0**	**0.0**	**0.0**	**0%**
LA + WLA	**2.571**	**0.598**	**1.973**	**77%**
Margin of Safety	---	0.1	---	---
TOTAL	**2.571**	**0.698**	---	---

* Includes phosphorus transported through surface runoff and subsurface (groundwater)

3.3 Permit Conditions & Effluent Discharge Limits

The Village of Sherman WWTP operates under SPDES permit number NY0036315 with a single Outfall 001 to French Creek adjacent to the WWTP. The Village WWTP discharge permit limits are summarized in Table 3-1 for a current permitted flow of 0.14 MGD. As part of this study, the NYSDEC was contacted to identify future discharge permit limits should the Village accept sewage from a Findley Lake Sewer District, tabulated in Table 3-2 for a projected design flow of 0.217 MGD. A copy of the current SPDES permit and DEC projected future effluent limits are included in Appendix D.

Table 3-1: Current Village of Sherman WWTP SPDES Permit Summary

Parameter	Effluent Limit				
	Type	Limit	Units	Limit	Units
Flow	Monthly Avg.	**0.14**	MGD	--	--
Flow	Daily Max.	Monitor	MGD	--	--
Temperature	Daily Max.	Monitor	Deg C	--	--
pH	Range	6.5-8.5	SU	--	--
BOD_5 (June 1 – October 31)	Daily Maximum	5	mg/l	6	lbs/d
BOD_5 (Nov. 1 – May 31)	Monthly Avg.	30	mg/l	35	lbs/d
BOD_5 (Nov. 1 – May 31)	7-day Avg.	45	mg/l	53	lbs/d
TSS (June 1 – October 31)	Daily Maximum	10	mg/l	12	lbs/d
TSS (Nov. 1 – May 31)	Monthly Avg.	30	mg/l	35	lbs/d
TSS (Nov. 1 – May 31)	7-day Avg.	45	mg/l	53	lbs/d
Solids, Settleable	Daily Max.	0.1	ml/l	--	--
Dissolved Oxygen (June 1 – Oct. 31)	Daily Min.	7	mg/l	--	--
Nitrogen, Ammonia (as NH_3) (June 1 – Oct. 31)	Monthly Avg.	2	mg/l	--	--
Effluent Disinfection Required All Year Round					
Coliform, fecal	30 Day Geometric Mean	200	#/100 ml	--	--
Coliform, fecal	7 Day Geometric Mean	400	#/100 ml	--	--
Chlorine, total residual (June 1 – Oct. 31)	Daily Max.	0.02	mg/l	--	--
Chlorine, total residual (Nov. 1 – May 31)	Daily Max.	0.05	mg/l	--	--

* Effluent shall not Exceed 15% and 15% of influent concentration values of BOD_5 & TSS respectively.

Table 3-2: Potential Future WWTP Effluent Limits

Parameter	Effluent Limit				
	Type	Limit	Units	Limit	Units
Flow	Monthly Avg.	**0.217**	MGD	--	--
Flow	Daily Max.	Monitor	MGD	--	--
Temperature	Daily Max.	Monitor	Deg C	--	--
pH	Range	6.5-8.5	SU	--	--
BOD_5 (June 1 – October 31)	Daily Maximum	5	mg/l	9	lbs/d
BOD_5 (Nov. 1 – May 31)	Monthly Avg.	30	mg/l	54	lbs/d
BOD_5 (Nov. 1 – May 31)	7-day Avg.	45	mg/l	81	lbs/d
TSS (June 1 – October 31)	Daily Maximum	10	mg/l	18	lbs/d
TSS (Nov. 1 – May 31)	Monthly Avg.	30	mg/l	54	lbs/d
TSS (Nov. 1 – May 31)	7-day Avg.	45	mg/l	81	lbs/d
Solids, Settleable	Daily Max.	0.1	ml/l	--	--
Dissolved Oxygen (June 1 – Oct. 31)	Daily Min.	7	mg/l	--	--
Ammonia (as N) (June 1 – Oct. 31)	Monthly Avg.	1.6	mg/l	--	--
Ammonia (as N) (Nov. 1 – May 31)	Monthly Avg.	7.1	mg/l	--	--
Effluent Disinfection Required All Year Round					
Coliform, fecal	30 Day Geometric Mean	200	#/100 ml	--	--
Coliform, fecal	7 Day Geometric Mean	400	#/100 ml	--	--
Chlorine, total residual	Daily Max.	0.02	mg/l	--	--

3.4 Proposed Design Flows and Loads

Based on the existing WWTP influent data, population trends, and potential growth over the next 20 years, it is recommended that the Village of Sherman WWTP be designed to treat the flows and loads summarized in Table 3-3 and detailed in Appendix E should they accept flows from the Findley Lake Sewer District and Route 430 conveyance corridor. It should be noted that these flows assume some I/I reduction in the existing Village of Sherman sewer system from the flows and loads provided. Based on the current status of I/I investigations (detailed in the August 2018 PER), the Village has taken the initial steps for reducing I/I by removing a significant source of infiltration that accounted for approximately 7,500 gpd (equivalent to 45 EDUs). Prior to final design, flow and load data must be analyzed again to appropriately size the wastewater treatment plant.

Table 3-3: Projected Village of Sherman Design Flows and Loads

Average Daily Flow (gpd)	217,000
Maximum Daily Flow (gpd)	477,000
Peak Hourly Flow Rate (gpm)	617
BOD_5 (lbs/day)	583
TSS (lbs/day)	645
Nitrogen as Ammonia (lbs/day)	50
Phosphorus (Total) (lbs/day)	17

4.0 Alternative Analysis

The purpose of this report is to reevaluate alternatives considered under the August 2018 PER for a potential Regional Sherman WWTP that would accept flows from the Findley Lake area of the Town of Mina. The WWTP alternatives were evaluated to consistently meet SPDES permit limits for a Regional WWTP over a 20-year planning period. Appendix D contains the potential future effluent limits provided by the NYSDEC, previously summarized in Table 3-2. In addition to the required improvements for a regional WWTP, this section evaluates the required improvements to collect and convey sewage from a Findley Lake Sewer District to the Village of Sherman WWTP. This section details the following items:

- Collection and Conveyance of Sewage from Findley Lake to Village of Sherman
- Alternative No 2 – Expand Existing WWTP with Contact Stabilization/Single Stage Nitrification or Contract Stabilization/Extended Aeration
- Alternative No 3 – Construct a New SBR WWTP

4.1 Collection and Conveyance of Sewage to Village of Sherman

4.1.1 *Potential Sewer Service Area*

The main objective of a new sewer district in the vicinity of Findley Lake is to improve Findley Lake water quality by removing nutrient loading (i.e., nitrogen and phosphorus) from failing septic systems. Based on this objective, a modified version of the 2017 Findley Lake Sewer District Map, Plan, and Report (2017 MPR) sewer district boundary was assumed to be the "target" sewer service area. Parcels located away from the Lake that could not be conveniently and cost effectively served by sewer were eliminated from the service area. All properties north of Interstate 86 on Route 426, including the Holiday Inn Express, have been eliminated from the sewer service area with the intent to directly address the water quality issue of the "impaired" water body with the project.

Several parcels in the Town of Mina and the Town of Sherman, outside of the "target" service area, located along the proposed sewage conveyance system alignment may be relatively inexpensively serviced by sewer should the project move forward. It is recommended, although not required to meet the main project objective, that the parcels fronting the conveyance system be included in a sewer district and serviced by the potential project. Adding additional users not only presents environmental benefits, but will also help reduce overall capital, operation, and maintenance costs to the average user.

Figure 2a includes a map of the "target" sewer service area parcels. Figure 2b displays additional parcels along Route 430 that front the proposed main and could therefore be serviced by a sanitary sewer system should Findley Lake send sewage to a "Regional" Sherman WWTP.

4.1.2 *Low Pressure Sewer System Preliminary Design*

The 2017 MPR recommended that "target" service area parcels utilize a low-pressure grinder pump sewage collection system to collect and convey sanitary sewage around Findley Lake. Based on the Findley Lake area layout, topography, and previous engineering evaluations, a low-pressure sewage collection system is recommended as the most cost effective sewage collection system. As part of this study, a preliminary layout of a low-pressure sewer system around Findley Lake was completed for the modified (reduced) sewer district boundary around the lake. Figure 3 displays the low-pressure sewer system layout and required low-pressure sewer piping sizes. Pipe sizes are based on an Environment One Corporation (E-One) grinder pump system and the Preliminary Design Analysis included as Appendix F.

4.1.3 *Sewage Conveyance to the Village of Sherman WWTP*

The peak hourly flow rate from a new sewer district around Findley Lake is estimated to be approximately 384 gallons per minute. This is inclusive of approximately 50 additional outside users fronting the 7-mile conveyance system between Findley Lake and the Village of Sherman. For purposes of this study and the preliminary design of conveyance system pump stations, it will be assumed that each pump station must be capable of 400 gpm. Further, it is assumed that each pump station will consist of a self-priming, above grade packaged pump station equipped with a liquid petroleum gas (propane) auto start back-up engine for emergency pumping during a power outage. The above grade pump station configuration allows the pumps, motors, valves, and controls to be located above grade, outside of the sewage wet well within an unclassified space. The above grade configuration is generally preferred by operators due to the ease of accessibility and maintenance, the enhanced safety with no confined entry or classified space, and will typically have a longer life expectancy than a standard submersible station.

Conveyance of sewage from Findley Lake would be designed to utilize the proposed low pressure collection system to the greatest extent practical to convey, or pump the sewage as far-east along the Route 430 corridor towards the Village of Sherman as possible before a second pump station is needed. For purposes of this study, four (4) potential alignments were reviewed:

- Alignment No. 1 – State Route 430 Corridor

- Pros
  - Shortest Route (approximately 7.5 miles)
  - Three-phase power along entire route
  - May promote development along State Route
- Cons
  - Long I-86 Interstate Crossing
  - More expensive to install utilities in State Highway R.O.W.

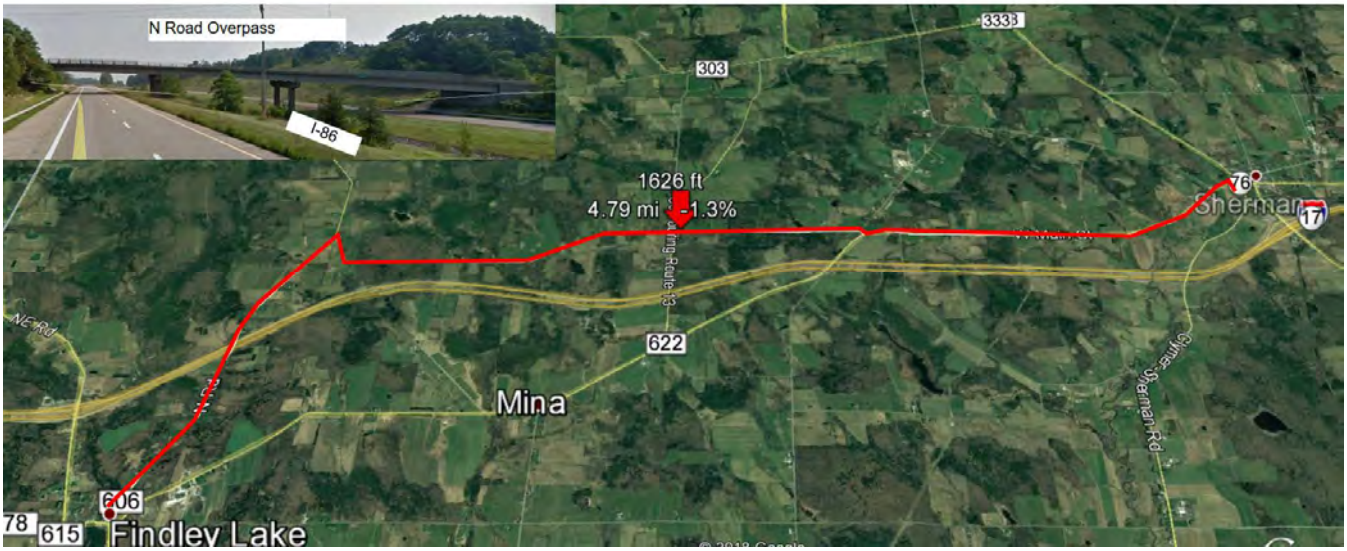
- Alignment No. 2 – State Route 430 to Co. Touring Route 13 to Hazen Road to State Route 430

  - Pros
    - Shorter Route (approximately 8.2 miles)
    - Easiest Interstate Crossing through County Road
    - May promote development along State Route
    - Less Expensive installation off of State Route
  - Cons
    - No three phase power off of State Route 430
    - More expensive to install utilities in State R.O.W.

- Alignment No. 3 – Bailey Hill Road to Clymer-Sherman Road

- Pro
  - Cheaper Linear Foot Install of pipe outside of State Route
- Cons
  - Long Route (approximately 9 miles)
  - Long I-86 Interstate Crossing
  - Adequate power not available along entire Route

· Alignment No. 4– North Road to Hazen Road to Route 430



- Pros
  - Cheaper Linear Foot Install of pipe outside of State Route
  - Lowest Peak Elevation of all alignments
- Cons
  - Long Route (approximately 9 miles)
  - Long I-86 Interstate Crossing
  - Adequate power not available along entire Route

Based on the pros and cons listed above that could impact constructability and capital costs, and information currently available, Alignment No. 1 will provide the most direct, easiest to construct alignment at the lowest estimated capital cost. If issues arise with permitting the Interstate I-86 crossing, Alignment No. 2 would be the second most favorable option. The following infrastructure will be required for Alignment No. 1.

4.1.3.1 Pump Stations and Force Main

Three (3) sewage pump stations will be required to convey sewage from Findley Lake to the Village of Sherman. Each pump station force main will be constructed of 8-inch DR18 C900 PVC pressure pipe. Air release and air-vacuum release valves must be strategically located at high points along the conveyance force main to prevent additional head loss due to trapped air. Refer to Appendix G for preliminary concept plan/profile of the infrastructure required to convey sewage to the Village WWTP and pump station design calculations.

- *Bailey Hill and Main Street Pump Station* – The first major pump station will be located on the northeast corner of Findley Lake near the intersection of Main Street and Bailey Hill Road. Preliminary calculations are summarized in Table 4-1 below:

Table 4-1: Bailey Hill and Main Street Pump Station Design Data

Design Flow (gpm)	400
Design Total Dynamic Head (feet)	155
Force main Diam. (in)	8
Force main Material	DR18 C900 PVC
Force main Approx. Length (feet)	4,120

- *Route 430 Pump Station No. 1* – The second major pump station will be located approximately 0.85 miles from the Bailey Hill and Main Street Pump Station along Route 430 toward Sherman. There is a substantial elevation increase between the first and second pump stations. Preliminary calculations are summarized in Table 4-2 below:

Table 4-2: Route 430 Pump Station No. 1 Design Data

Design Flow (gpm)	400
Design TDH (feet)	155
Force main Diam. (in)	8
Force main Material	DR18 C900 PVC
Force main Approx. Length (feet)	12,890

- *Route 430 Pump Station No. 2* – The third major pump station will be located approximately 2.4 miles from Route 430 Pump Station No. 1 along Route 430 near its intersection with County Route 13. Preliminary design data are summarized in Table 4-3:

Table 4-3: Route 430 Pump Station No. 2 Design Data

Design Flow (gpm)	400
Design TDH (feet)	123
Force main Diam. (in)	8
Force main Material	DR18 C900 PVC
Force main Approx. Length (feet)	23,350

The proposed 4.4-mile force main has a net elevation drop of 80 feet between Pump Station No. 2 and the Sherman WWTP discharge manhole.

4.1.3.2 Odor Control

Long residence times and anaerobic conditions in low-pressure sewer collection/conveyance systems can cause the creation of hydrogen sulfide gas. In addition to omitting a foul odor, hydrogen sulfide gas is toxic and highly corrosive to concrete and ferrous metal equipment and infrastructure. Both the low-pressure sewer collection system and the 7.5-mile conveyance force main to the Village of Sherman provide conditions that will cause the production of hydrogen sulfide gas. It is therefore recommended that odor control provisions be implemented in both the low-pressure sewage collection system and within the sewage conveyance system to Sherman. It should be noted that no odor control provisions were recommended in the 2017 Map, Plan, and Report for the low-pressure collection system around Findley Lake and north to the proposed WWTP site.

Based on the preliminary low-pressure layout, it recommended that two (2) liquid Bioxide® odor control stations be installed in the low-pressure sewer system, one on Shady Side Road and the second on Sunny Side Road. A Bioxide® odor control station typically consists of a chemical storage tank and dosing pumps that dose sewage with Bioxide®, a chemical that reacts with and eliminates hydrogen sulfide.

In addition to the Bioxide® odor control stations, it is recommended that each main sewage pump station be equipped with a wet well mixer to prevent anaerobic conditions and ensure the sewage is continuously exposed to oxygen on its way east. This will help to mitigate hydrogen sulfide in the sewage. Finally, it is recommended that the last 750 feet of transmission main prior to the Sherman WWTP be constructed as a traditional gravity sewer, which will further introduce oxygen into the wastewater prior to the WWTP. Manholes should be coated with a hydrogen sulfide resistant epoxy-based protective coating, or similar.

4.1.4 *Capital Cost*

The estimated probable project capital cost for the proposed Findley Lake and Route 430 collection and conveyance infrastructure described above is summarized in Table 4-4. A full itemized cost estimate is included in Appendix N at the conclusion of this report.

Table 4-4: Estimate of Probable Project Cost – Findley Lake/Route 430 Collection and Conveyance System

Description	Estimated Project Cost
Low Pressure Sewage Collection System *(inclusive of Contractor General Conditions and Inflation to 2022)*	$10,445,000
Conveyance of Sewage to Sherman WWTP *(inclusive of Contractor General Conditions and Inflation to 2022)*	$6,090,000
Subtotal	*$16,535,000*
Construction Contingency (20%)	$3,307,000
Estimated Engineering, Survey, Soils, District Formation, Legal, Administration, Misc. (20%)	$3,307,000
Total Estimated Probable Project Cost	**$23,149,000**

4.1.5 *Anticipated Annual O&M and Short Lived Asset Costs*

Projected O&M costs for sewage collection and conveyance to Sherman are summarized in Table 4-5 and detailed in Appendix O.

Table 4-5: Annual Operation and Maintenance Cost Estimate – Collection and Conveyance Systems

Item	Total
General Sewer Expenses	$20,000
Administration Salaries and Benefits	$22,000
Administration Expenses	$13,000
Employee Salaries and Benefits	$111,800
Infrastructure O&M	$26,500
Total Annual O&M (without SLA Reserves)	*$150,800*
Short Lived Asset Reserve Funding	$38,000
Total Estimate O&M Cost (Including SLA Reserves)	**$188,800.00**

4.2 Alternative No. 2 – Expand Existing WWTP with Contact Stabilization/Single Stage Nitrification or Contact Stabilization/Extended Aeration

A preliminary Site Plan illustrating Alternative No. 2 for a Regional WWTP is attached as Figure 4 and described below. A preliminary Hydraulic Profile and Control Building Plans are contained in Appendix H.

4.2.1 *WWTP Influent Pump Station*

As described in the August 2018, the influent duplex submersible pump station was recently upgraded. Based on the pump curves, each influent pump will not be able to pump the estimated 617 GPM peak hourly flow rate from the Village and Route 430 conveyance system. Therefore, the pump station would require capacity upgrades that would generally include replacing the existing 15 hp motors with 20 hp motors, replacing the existing pump impellers, and replacing the variable frequency drives (VFDs) with larger drives. The upgraded pump station would be capable of running "low" and "high" flows, and would have two primary design points at 150 GPM @ 45.2 feet of TDH (for ADF) and 650 GPM @ 48.7 feet of TDH (for PHF). Design calculations are included in Appendix I.

4.2.2 *Headworks and Grit Removal*

As discussed in the August 2018 PER, the headworks and grit removal facilities have been extremely critical to WWTP's in the last 10 years. Disposable hygienic wipes, often marketed as "flushable wipes", have caused WWTPs across the country considerable issues. Due the increased flows, the manual grit channels proposed in the August 2018 PER recommendation for the Village of Sherman only would not be adequate for a Regional WWTP as influent velocities would be too high.

It is recommend that a new 35'x 16' Headworks Building be constructed to house an automatic, 1/4-inch "fine" screen and an accompanying grit removal system. The building would include all necessary control systems for monitoring and control of the new unit process equipment. The building will not be heated and will be a Class 1, Division 1 classified space; therefore, all electrical, HVAC, and control equipment will be designed to operate under these conditions. Prior to entering the Headworks Building, the influent wastewater will be measured in a new magnetic flow meter manhole, equipped with a local transmitter and new circular chart and/or PLC controls in the existing Control Building.

The Headworks Building is proposed to be constructed offline, above the existing headworks structure such that the hydraulic profile may be raised above the current profile. After the facility is completely operational, the new screen and grit removal system would be placed into service and the existing headworks structure and flow meter would be demolished. A preliminary concept sketch of the proposed headworks facility is included as Figure 5.

4.2.3 *Secondary Treatment Process*

4.2.3.1 Renovation of Existing Treatment Process

The current treatment tanks and clarifiers would be undersized for a Regional WWTP. It is not feasible to modify nor utilize the existing treatment tanks for the secondary treatment process; however, the existing treatment tanks could be refurbished and retrofitted to serve as aerobic sludge digesters. For a Regional WWTP, Alternative No. 2 proposes to construct two (2) rectangular aeration tanks separated by a common wall and two (2) center feed circular clarifier's "offline" from the existing treatment process. It would be intended to construct the new aeration tanks with the flexibility of operation in contact stabilization, single-state nitrification, or extended aeration modes. Based on calculations, attached as Appendix J, the aeration tanks would each be approximately 66' long x 22' wide and have a minimum side water depth of 15 feet. The clarifiers would be 25 feet in diameter and have a minimum side water depth of 12 feet. Table 4-6 provides a summary of the required secondary treatment sizing.

Table 4-6: Sizing of Alternative No. 2 Secondary Treatment Unit Processes

Zone Description	Min. Sidewater Depth	Volume, ft^3	Surface Area, ft^2
Contact	15 ft	7,260	--
Reaeration	15 ft	14,520	--
Secondary Clarifier	12 ft	--	490

A new full floor-fine bubble diffuser system would be installed throughout the aerated zones, likely utilizing ceramic disc diffusers for the aeration zones. Each treatment tank will have a dedicated 25 HP blower for its aeration zones. A common 25 HP standby aeration blower would serve as a spare for both aeration tanks. The aerobic digesters, because they will operate at variable depths with intermittent air shut-off, will be equipped with membrane disc diffusers and three 25 HP positive displacement type blowers equipped with variable speed drives. Each blower will be equipped with a premium efficiency motor, controlled with a VFD and modulated in response to dissolved oxygen levels within the individual aeration and digester zones.

4.2.3.2 Effluent Filtration

Similar to the Alternatives discussed in the August 2018 PER, secondary effluent from the clarifiers would gravity flow to the existing flow splitter structure located adjacent to the Control Building garage north wall, and from there enter two (2) new interior disc filtration units. Due to the size of a regional treatment plant, redundant filtration units would be installed.

4.2.4 *Effluent Disinfection and Post Aeration*

Similar to the August 2018 PER, in an effort to determine the most cost effective method for disinfection at the WWTP, two (2) alternatives were evaluated; liquid chlorine vs. Ultraviolet light (UV) disinfection.

4.2.4.1 Liquid Chlorine Disinfection and De-Chlorination

For a Regional WWTP, utilizing liquid chlorine (sodium hypochlorite) is one alternative to disinfect the plant's effluent. As stated in the August 2018 PER, this would require a sodium hypochlorite solution to be pumped via a flow-paced chemical dosing pump to reach the desired level of disinfection. TR-16 is more stringent than 10 States Standards and requires a minimum contact period

at peak flow rate of 30 minutes. To accommodate the proposed peak hourly flow rate of 617 gpm, an 18,510 gallon contact volume would need to be constructed as a liquid chlorine contact basin.

In order to meet the strict residual chlorine limit of 0.02 mg/l for French Creek, de-chlorination would also be required. This process requires an additional chemical feed system, an additional bulk chemical storage vessel, and additional chemical feed pumps. De-chlorination, similar to disinfection, typically takes place in a concrete basin or channel, but at a much faster rate. Ten States Standards requires 30-seconds of contact time at peak hourly flow rate, whereas TR-16 requires a two (2) minute detention time at average daily flow. The required channel/basin volume would be approximately 310 and approximately 305 gallons in accordance with Ten States and TR-16, respectively; therefore, a volume of 310 gallons would be required. It is proposed to utilize the required post aeration tank for de-chlorination contact time.

The estimated capital cost for liquid chlorination disinfection, is summarized in Table 4-7. The estimated chemical usage and associated O&M costs for the proposed WWTP average daily design flow of 0.217 mgd is summarized in Table 4-8.

Table 4-7: Liquid Chlorination/De-Chlorination Estimated Capital Costs

Description	**Cost**
Concrete Contact Tank	$55,000
Replacement of Chemical Feed Pumps	$10,000
Replacement of Chemical Storage Tanks and Containment	$15,000
Replacement of Chemical Feed Piping	$5,000
Electrical Allowance	$10,000
Total Estimated Probable Construction Cost	$95,000

Table 4-8: Liquid Chlorination/De-Chlorination Estimated O&M Costs

	12.5% Sodium Hypochlorite	**38% Sodium Bisulfite**
Estimated Usage (gal/day)	5.3	2.3
Cost ($/gal)	$2.02	$2.46
Annual Cost	$3,908	$2,065
Annual Power/Misc. Costs	**$1,000**	
Total O&M Cost	**$6,973**	

4.2.4.2 Ultra-Violet Light (UV) Disinfection

A UV disinfection system for a regional plant would be very similar to a Sherman only WWTP. As stated in the August 2018 PER, UV disinfection typically takes place within a concrete channel that houses banks of UV bulbs and associated equipment. UV systems do not require any bulk chemical storage or chemical feed equipment; however, these systems are more energy intensive than liquid chlorination/de-chlorination and require regular cleaning and periodic replacement of the bulbs. The estimated capital cost for implementing UV disinfection within a new concrete channel located adjacent to the existing chlorine contact tank is summarized in Table 4-9. The estimated O&M costs for an open channel UV system are summarized in Table 4-10.

Table 4-9: UV Disinfection Estimated Capital Costs

Description	Cost
Concrete Channel	$75,000
Disinfection Equipment and Controls	$175,000
Effluent Piping and Connection to Outfall	$10,000
Metal Furnishings (Stairs, Handrails, Channel Covers, Gates, etc.)	$25,000
Electrical Allowance	$25,000
Total Capital Cost	$335,000

Table 4-10: UV Disinfection Estimated O&M Costs

Total Number of Lamps	72	Number of Lamps Operating Simultaneously	48
Avg. Power Draw, kWh	4.2	Lamp Replacement per Year	48
Cost per kWh	$0.07	Price per Lamp	$60
Annual Power Cost	$2,576	Annual Lamp Replacement Cost	$2,880
Total Annual O&M		**$5,456**	

4.2.4.3 Recommended Disinfection Method

A net present value (NPV) analysis was performed for both liquid chlorine and UV disinfection, incorporating both capital and 30-year operating costs. These estimated costs are summarized in Table 4-11.

Table 4-11: Effluent Disinfection – Net Present Value Analysis

Net Present Value (NPV) Analysis	Chlor./Dechlor.	UV
Capital Cost	$ 95,000	$ 310,000
30-Year O&M	$ 209,190	$ 163,800
Total NPV	$ 304,190	$ 498,800
Delta	$ -	*$ 169,610*

Based on the net present value analysis included above, a chlorination/ de-chlorination would be more cost effective over a 30 year period. However, a net present value analysis does not take into account non-monetary considerations such as:

- UV disinfection eliminates the need to receive, store, handle and dose hazardous chemicals;
- UV disinfection would be a more reliable process in meeting effluent limits, effectively removing the chlorine residual limit from the SPDES permit (the operators would not have to worry about total chlorine residual limits);
- Currently, the DEC does not enforce a limit on sodium bisulfite in the WWTP effluent, but UV disinfection would eliminate this chemical from the effluent wastewater; and
- UV disinfection is more environmentally friendly and a proven technology that is routinely funded by the DEC, EFC, etc.

As discussed in the August 2018 PER, the Village took a pledge to become a Climate Smart Community and believes the environmental benefits of UV disinfection are worthy of additional investment. Based on this preference and the environmental benefits of UV disinfection, it proposed for UV disinfection to be installed for the Regional WWTP.

4.2.4.4 Post Aeration

The Village of Sherman will be required to aerate the treated effluent to increase dissolved oxygen levels in summer months to the SPDES permit minimum. For a regional treatment plant, it is recommended that a new, larger post aeration basin be installed with fine bubble disc diffusers with a dedicated aeration blower such that it can be turned off when post-air is not required. As

an alternative, a lower cost option could be to construct a gravity cascade aeration structure if the effluent pipe invert and existing topography permit sufficient elevation drop for the required number of cascade "steps".

4.2.5 *Solids Handling*

4.2.5.1 Aerobic Sludge Digestion

For a Regional WWTP, each of the existing donut treatment tanks' internals would be completely removed, the concrete surfaces would be rehabilitated, and each tank repurposed solely as aerobic digesters. Two (2) new 25 HP positive displacement type blowers would be installed, one for each digester tank. The digesters would share a single standby digester blower. Each aerobic digester would be equipped with a pipe decanter that would be manually lowered into the supernatant using a davit crane following air shut-off and sludge settling. The supernatant would be piped to the influent manhole at the head of the plant for mixing with the influent raw sewage. Digested, thickened (i.e., 1- to 2-percent solids) sludge would be drawn off the bottom of the digesters and piped by gravity to the sludge dewatering facilities. Supporting calculations for the aerobic digesters are included in Appendix K.

4.2.5.2 Sludge Dewatering

As discussed in the August 2018 PER, the existing solids handling process is extremely labor intensive - expanding the WWTP would further increase the need for sludge dewatering. Typical sludge dewatering technologies occur with a belt filer press, screw press, or similar piece of equipment that produce cake solids ranging from 15% to 25% solids. The sludge dewatering equipment would be housed inside a heated timber framed, pre-engineered metal building, or similar, and would convey the dewatered sludge outside through the use of a conveyor onto to an adjacent covered sludge drying bed for further dewatering. Sludge from the drying bed would be transported to a landfill for disposal. A preliminary concept layout, similar to the layout provided in the August 2018 PER, for this dewatering process is depicted on Figure 6.

It should be noted that as a Climate Smart Community, the Village of Sherman would strongly prefer to compost their dewatered sludge in an effort to reduce landfill waste. Should the overall project cost come in less than

anticipated, the Village of Sherman would like to explore the feasibility and costs of implementing composting in greater detail under the holistic WWTP Improvements project recommended herein. The domestic nature of the sludge, absent from any significant commercial or industrial waste solids, makes it an ideal candidate for beneficial reuse.

4.2.5.3 WAS/RAS/and Filtrate Pump Station

Under this alternative, the plant's existing sludge pump station would be required to be replaced with a WAS/RAS/filtrate pump station. Since the plant would no longer operate within a "donut" style treatment tank, air lifts would not be able to be utilized for WAS/RAS and therefore a separate pump station would be required. The WAS/RAS/filtrate pump station would consist of a duplex submersible pumping station equipped with non-clog impellers for passing 3-inch solids. It would be designed to continuously pump RAS back to the head of the treatment tanks in addition to intermittent wasting of WAS to the digesters. The pumps would operate on VFDs and the flow rates to the digesters/aeration tanks would be controlled by PLC logic which would utilize flow meter data to open/close control valves and increase/decrease the output of the pumps. To avoid operational issues during construction, it is proposed that the required WAS/RAS/Filtrate sludge pump station wet well be constructed adjacent to the existing wet well. Once the new treatment system is operational, the existing sludge pump station can be decommissioned.

4.2.6 *Control Building Modifications*

Similar Control Building modifications to what was recommended in the August 2018 PER will be required. The replacement of the building's original vintage windows and doors, any dated lighting, mechanical/HVAC, and ventilation equipment, as well as minor floor plan modifications necessitated by construction sequencing and a more energy efficient layout, are also proposed under this alternative. A proposed concept Control Building Floor Plan is included in Appendix H.

4.2.7 *Electrical Equipment and Controls*

Similar to what was recommended in the August 2018 PER, it is recommended that the main power feed/service breaker, MCC, wiring and control systems for unit process equipment to be demolished in the Control Building, and be removed and

replaced with modern, PLC-based controls and variable frequency drives where applicable. It is further recommended for a SCADA system to be installed for a Regional WWTP. The SCADA system would increase ease of operator control and provide remote notification of equipment alarm conditions such as power loss, low building temperature, motor over-heat, motor over-torque, high/low liquid level, etc.

4.2.8 *WWTP Emergency Power Improvements*

Similar to what was recommended in the August 2018 PER, a new emergency diesel or natural gas generator with a new automatic transfer switch are recommended for replacing the nearly 40-year old generator.

4.2.9 *WWTP Site/Civil Improvements*

A Regional WWTP would require more land and site/civil improvements as compared to the August 2018 PER for a Sherman only WWTP Improvements project. In addition to the installation of nearly all brand new site piping, a large section of site perimeter fencing would require replacement/installation around the expanded WWTP site, the driveway and parking area would have to be extended and existing areas will likely require paving improvements after construction. Further, significant site grading can be expected to facilitate the installation of new tankage, and stormwater collection/ management enhancements for improving runoff water quality to French Creek would be installed.

4.2.10 *Impact on Existing Facility*

The proposed project would essentially upgrade and replace the majority of the WWTP unit processes. Construction of new and replacement assets would be sequenced to reduce impacts to current plant operations and SPDES compliance, but with any major asset renewal projects, some minor impacts to the facility and operations are expected to occur.

The addition of new unit process equipment and technologies prompted completion of the NYSDECs *WWTP Rating Worksheet for Wastewater Treatment Plant Certification* form under Part 650.3 and 650.6. The rating form was completed for the existing plant in its current state and mode of operation, as well as for Alternative Nos. 2 and 3 for a Regional WWTP. Copies of the completed forms are included in Appendix L; preliminary scores and operator requirements are summarized in Table 4-12.

Table 4-12: Summary of WWTP Rating for WWTP Operator Certification

Alternative Description	Total Score	Operator Certification Required
Existing WWTP (1)	55	2A
Alternative No. 2 – Refurbish Existing	58	3A
Alternative No. 3 – New SBRs	58	3A
Alternative No. 2 or No. 3 w/Composting	63	3A

Based on the above, it appears that the current operator (Grade 2A) would not be qualified to operate the Regional WWTP, which would require a Grade 3A Operator. A Grade 2A operator can operate a Grade 3A plant with supervision by a Grade 3A operator, including by a contract operator, provided they spend sufficient time at the treatment plant.

4.2.11 *Land Requirements*

This alternative would require expanding the current WWTP site to the northwest as shown on the proposed concept plan in Figure 4.

4.2.12 *Environmental Impacts & Mitigation Measures*

It is anticipated that this alternative will have minimal to no environmental impacts. Impacts, if any, to wetlands or cultural resources would be mitigated as required. Minimal construction may occur within a flood plain, but this would be minimized to the furthest extent possible by locating new unit processes at a higher elevation adjacent to existing treatment tanks.

4.2.13 *Discharge Permit Requirements*

The proposed project will create an increase in the permitted effluent flows/loads and require a SPDES permit modification. The project will be subject to DEC review.

4.2.14 *Water & Energy Efficiency Measures*

It is proposed that all pump motors, aeration blowers, etc. that are needed under this alternative be installed with PLC-based VFD control loops and premium efficiency motors where practical. Additionally, all new lighting installed under this alternative is proposed to be LED. Table 4-13 below includes a NYSERDA Summary of Baseline Standard Practices & Energy Efficient Designs for wastewater project that would be followed where practical.

Table 4-13: Energy Efficiency Measures

Table 1: NYSERDA Summary of Baseline Standard Practices & Energy Efficient Designs Wastewater Sector

Operation Process	Standard Practice	Typical Energy Efficiency Measures*
Influent Pumping	On/Off Level Control and EPAct Motors	VFD with Control Loop; Premium Efficiency Motors
Primary Treatment	EPAct Motors; Timers on Sludge Draw-off	Premium Efficiency Motors; VFDs on Sludge Draw-off
Secondary Treatment	EPAct Motors	Premium Efficiency Motors
Fixed Film	EPAct Motors	Premium Efficiency Motors; Flow Control/VFDs on Recycle
Mechanical Aeration	EPAct Motors	Premium Efficiency Motors; Level Control on Effluent Weir
Diffuser System	Coarse or Medium Bubble Aeration	Fine Bubble Diffusers; Fine Bubble Diffusers with Mixers
Aeration Blowers	Multi-Stage Centrifugal Blowers with EPAct Motors	Premium Efficiency Motors; Inlet Flow Control
Aeration Blowers	Positive Displacement Blowers with EPAct Motors	Premium Efficiency Motors; VFDs
DO Control	Manual handheld DO Monitoring with Manual Adjustment	VFD with DO Control Loop; Start/ Stop Blowers; Control Air Output
WAS/RAS Pumps	Timed Operation and EPAct Motors	VFD with Control Loop; Premium Efficiency Motors
Tertiary Treatment	Flow Control Valves and EPAct Motors	VFD with Control Loop; Premium Efficiency Motors
Sludge Processing	EPAct Motors and case-by-case VFD designs	Premium Efficiency Motors
UV Disinfection	Medium Pressure UV Lamps	Low Pressure High Output Lamp Technology
Effluent Pumping	Flow Control Valves and EPAct Motors	VFD with Control Loop; Premium Efficiency Motors
Plant Water System	Constant Speed Pumps; System wide Pressure	VFD with Pressure Control; Booster Pumps at Specific Processes
Building Systems	Building Energy Code Compliant	Lighting, HVAC, etc. More Efficient than Building Energy Code

*Typical Energy Efficiency Measures were developed for standard conditions and run times. Actual recommendations are evaluated on a case by case basis.

4.2.15 *Storm & Flood Resiliency*

This alternative may involve minimal construction within a flood plain, likely limited to modifications to the existing influent pump station. Any mechanical or electrical equipment located within the 100-year flood plain will be protected from and accessible during flood conditions.

4.2.16 *Schedule & Constructability*

The majority of the required improvements can be installed offline of the existing WWTP and proven operational before the existing process equipment is decommissioned. The WWTP may be required to liquid haul their sludge to another plant during upgrades to their sludge handling processes.

4.2.17 *Opportunities for Green Infrastructure*

Opportunities to incorporate green infrastructure will continue to be evaluated as the recommended improvements are developed, and may include:

- Replacement/Expansion of Solar Panels on the roofs of the WWTP buildings
- Bioswales for treatment of stormwater runoff prior to entering French Creek
- Use of porous asphalt for expanded paved driveways

4.2.18 *Project Capital Cost*

The estimated probable project capital cost for the proposed Alternative No. 2 improvements is summarized in Table 4-14. A full itemized cost estimate is included in Appendix N at the conclusion of this report.

Table 4-14: Estimate of Probable Project Cost

Description	Estimated Project Cost
Alternative 2 – Construction Cost Estimate (inclusive of Contractor General Conditions and Inflation to 2022)	$7,769,000
Construction Contingency (20%)	$1,554,000
Estimated Engineering, Survey, Soils, Legal, Administration, Misc. (20%)	$1,554,000
Total Estimated Probable Project Capital Cost	**$10,877,000**

4.2.19 *Anticipated O&M Cost(s) and Short Lived Assets*

Projected O&M and short lived asset costs for Alternative No. 2 are summarized in Table 4-15 and detailed in Appendix O.

Table 4-15: Annual Operation and Maintenance Cost Estimate*

Item	Total
General Sewer Expenses	$10,000
Administration Salaries and Benefits	$5,000
Administration Expense	$2,500
Employee Salaries and Benefits	$180,000
Treatment O&M (Chemicals, Utilities, Disposal, Lab, Repairs)	$130,000
Total Annual O&M (without SLA Reserves)	*$327,500*
Short Lived Asset Reserve Funding	$36,010
Total Estimate O&M Cost (Including SLA Reserves)	**$363,510**

** Annual O&M Costs do not include Village of Sherman Collection System or Billing*

4.3 Alternative No. 3 – Construct a New SBR WWTP

A preliminary layout of Alternative No. 3 is attached as Figure 7 and described below. A preliminary Hydraulic Profile and Control Building Plans are included in Appendix H.

4.3.1 *Influent Pump Station*

Improvements under this alternative would be identical to the Influent Pump Station improvements for Alternative No. 2, detailed in Section 4.2.1.

4.3.2 *Headworks and Grit Removal*

Improvements under this alternative would be identical to the Headworks and Grit Removal improvements for Alternative No. 2, detailed in Section 4.2.2.

4.3.3 *Treatment Process*

4.3.3.1 SBR Treatment Process

The SBR alternative will be similar to the SBR alternative discussed in the August 2018 PER, except on a larger scale. The larger tanks and unit process equipment for a Regional treatment plant will result in site plan changes compared to a Sherman only SBR plant. The proposed SBR tankage will be a common walled unit containing two (2) 73'(L) x 24'(W) x 17'(H) SBR tanks and one (1) 10'(L) x 52'(W) x 17'(H) equalization basin at the effluent end of the SBRs. The SBRs will be an intermittent cycle extended aeration system, which allows continuous inflow of wastewater to the SBR basins and is a variant of the traditional fill and draw, or "batch" SBR system.

Influent is received continuously during all phases of the cycle, including settle and decant, which allows the process to be controlled on a time, rather than flow basis, and ensures equal loading and flow to the two (2) SBR basins. The PER planning level design and equipment basis is based on the ICEAS Advanced SBR as manufactured by Sanitaire, Brown Deere, WI. Sanitaire (acquired SBR from ABJ) has over 20 years of experience in the design and supply of SBR systems, and has over 750 systems worldwide with 80+ operating and permitted systems in New York State with flow ranges of 0.01 MGD to 3.0 MGD. There are currently over 50 systems in New York State performing biological nutrient removal (BNR). Preliminary manufacturer design of the SBR is included in Appendix M.

Preliminary effluent from the Headworks Building will gravity flow to an influent distribution splitter box located in the center of the two (2) basin SBR tank. Two (2) weir gates, or inlet valves will be provided to control the influent flow to the tank. The weir gates or valves can be raised/closed to isolate and remove a tank from service. Each SBR basin will be divided into two (2) zones, the pre-react zone and the main react zone, using an intermediate baffle wall with openings. The influent will flow continuously into the pre-react zone and will be

directed down through orifice openings at the bottom of the baffle wall into the main react zone. The baffle wall will "condition" the incoming flow and prevent short circuiting.

The proposed SBR diffuser system will utilize full floor membrane disc diffusers utilizing EPDM rubber membranes. An aeration blower will be provided and dedicated to each SBR basin with a common standby blower. Each blower will be 20 HP premium efficiency, controlled with a VFD and modulated by a PLC in response to dissolved oxygen levels.

Following treatment in the SBRs, secondary effluent will be decanted to a single equalization basin located at the outlet end of the SBRs. Each SBR basin will have a plunging weir style decanter that utilizes a VFD to maintain a constant decant rate over the entire decant cycle. The decanter will include a scum exclusion float to prevent carryover of floating material with the treated effluent. At the end of a decant cycle, the decanter will "park" just above the top water level to serve as an emergency overflow device during peak wet weather conditions or power failure.

4.3.3.2 Effluent Filtration

Similar to the Alternatives discussed in the August 2018 PER, decanted effluent from the SBRs would be pumped out of the equalization basin at an operator adjustable flow rate, regardless of depth of water in the tank, to one of two (2) new effluent disc filtration units. Due to the size of a Regional treatment plant, redundant filtration units would be installed.

4.3.4 *Effluent Disinfection and Post Aeration*

Improvements under this alternative would be identical to the effluent disinfection and post aeration improvements for Alternative No. 2 detailed in Section 4.2.4.

4.3.5 *Solids Handling*

4.3.5.1 Sludge Digestion

Waste sludge will be pumped from the bottom of each SBR tank at the end of each treatment cycle using submersible pumps. Sludge pump run time would be automated and operator adjustable via the SBR PLC. Similar to

Alternative No. 2 (described in Section 4.2.5.1), the internals of each existing donut treatment tank would be removed, each tanks' concrete walls/floor would be rehabilitated as necessary, and each tank repurposed solely as an aerobic digester. Two (2) new 25 HP positive displacement type blowers would be installed, one for each digester tank. The digesters would share a single standby blower with the SBRs. Each aerobic digester would be equipped with a pipe decanter that would be manually lowered into the supernatant using a davit crane following air shut-off and sludge settling. The supernatant would be piped to the influent manhole at the head of the plant. Digested sludge would be drawn off the bottom of the digesters and piped by gravity to the sludge dewatering facilities. Supporting calculations for the aerobic digesters under Alternative No. 3 are included in Appendix K, noting that more waste solids are produced per pound of influent BOD than with the Alternative No. 2 biological treatment process due to shorter residence time in the aeration tanks.

4.3.5.2 Sludge Dewatering

Improvements under this alternative would be identical to the Sludge Dewatering improvements for Alternative No. 2 detailed in Section 4.2.5.2.

4.3.5.3 Sludge Pump Station

The sludge transfer pump station located adjacent to the existing drying beds would be used to transport sludge dewatering filtrate back to the aeration tanks, or to transfer WAS between aerobic digesters. This pump station would be similar to that proposed under the August 2018 PER Alternative No. 3, and much smaller than what is detailed in this report under Alternative No. 2 (Section 4.2.5.3).

4.3.6 *Control Building Modifications*

The proposed Control Building modifications are identical to those recommended for Alternative No. 2 and summarized in Section 4.2.6. Minor changes would be required to accommodate the hydraulic profile from the SBR to the effluent filter, as well as the SBR blowers and SBR control panel. A proposed concept floor plan is included in Appendix H.

4.3.7 *Electrical Equipment and Controls*

Improvements under this alternative would be identical to the Electrical Equipment and Controls improvements for Alternative No. 2, detailed in Section 4.2.7.

4.3.8 *WWTP Emergency Power*

Improvements under this alternative would be identical to the Emergency Power improvements for Alternative No. 2, detailed in Section 4.2.8.

4.3.9 *WWTP Site/Civil Improvements*

Improvements under this alternative would be similar to Alternative No. 2 (detailed in section 4.3.9), which would generally include the replacement/installation of various site piping, replacement of large sections of site perimeter fencing, the extension of the driveway and parking area, site grading work, and improvements to the stormwater collection and management systems.

4.3.10 *Impact on Existing Facility*

This alternative would effectively change the secondary treatment process from contact stabilization/extended aeration to an activated sludge process using the continuous flow Sequencing Batch Reactor treatment process. This would not constitute a significant change to the current process and process control requirements since each process is a form of activated sludge. The site layout will be altered and expanded to the north to accommodate the new SBR/equalization tank and headworks building at a higher elevation. Construction will be sequenced to reduce operating impacts, but with any major asset renewal projects, some minor impacts to the facility and operations are expected to occur.

The addition of new unit process equipment and technologies prompted completion of the NYSDECs *WWTP Rating Worksheet for Wastewater Treatment Plant Certification* form under Part 650.3 and 650.6. The rating form was completed for the existing plant in its current state and mode of operation, as well as for Alternative Nos. 2 and 3. Copies of the completed forms are included in Appendix L; preliminary scores and operator requirements are summarizes in Table 4-16.

Table 4-16: Summary of WWTP Rating for WWTP Operator Certification

Alternative Description	Total Score	Operator Certification Required
Existing WWTP (1)	55	2A
Alternative No. 2 – Refurbish Existing	58	3A
Alternative No. 3 – New SBRs	58	3A
Alternative No. 2 or No. 3 w/Composting	63	3A

Based on the above, it appears that the current operator (Grade 2A) would not be qualified to operate the Regional SBR WWTP (Grade 3A). A Grade 2A operator can operate a Grade 3A plant with supervision by a Grade 3A operator, including by a contract operator, provided they spend sufficient time at the treatment plant.

4.3.11 *Land Requirements*

This alternative would require expanding the current WWTP site to the northwest as shown on the proposed concept plan in Figure 7.

4.3.12 *Environmental Impacts & Mitigation Measures*

It is anticipated that this alternative will have minimal to no environmental impacts. Impacts, if any, to wetlands or cultural resources would be mitigated as required. Minimal construction may occur within a flood plain, but this would be minimized to the furthest extent possible.

4.3.13 *Discharge Permit Requirements*

The proposed project will create an increase in the permitted effluent flows/loads and require a SPDES permit modification. The project will be subject to DEC review.

4.3.14 *Water & Energy Efficiency Measures*

It is proposed that all pump motors, aeration blowers, etc. that are needed under this alternative be installed with PLC-based VFD control loops and premium efficiency motors where practical. Additionally, all new lighting installed under this alternative is proposed to be LED. Table 4-13 in Section 4.2.14 includes a NYSERDA Summary of Baseline Standard Practices & Energy Efficient Designs for wastewater project that would be followed where practical.

4.3.15 *Storm & Flood Resiliency*

This alternative may involve minimal construction within the 100-year flood plain. Any mechanical or electrical equipment located within a flood plain will be protected and accessible during flood conditions.

4.3.16 *Schedule & Constructability*

The majority of the required improvements can be installed offline of the existing WWTP and proven operational before the existing unit process equipment is decommissioned. The WWTP may; however, be required to liquid haul their sludge to another plant during upgrades to their sludge handling processes.

4.3.17 *Opportunities for Green Infrastructure*

Opportunities to incorporate green infrastructure will continue to be evaluated as the recommended improvements are developed, and may include:

- Replacement/Expansion of Solar Panels on the roofs of the WWTP buildings
- Bioswales for treatment of stormwater runoff prior to entering French Creek
- Use of porous pavements within expanded driveway areas

4.3.18 *Project Capital Cost*

The estimated probable project capital cost for the proposed Alternative No. 3 improvements is summarized in Table 4-17 below. A full itemized cost estimate is included in Appendix N at the conclusion of this report.

Table 4-17: Alt. No. 3 Estimate of Probable Project Cost

Description	Estimated Project Cost
Alternative 3 – Construction Cost Estimate (inclusive of Contractor General Conditions and Inflation to 2022)	$6,577,000
Construction Contingency (20%)	$1,316,000
Estimated Engineering, Survey, Soils, Legal, Administration, Misc. (20%)	$1,316,000
Total Estimated Probable Project Cost	**$9,209,000**

4.3.19 *Anticipated O&M Cost(s) and Short-Lived Assets*

Projected O&M and short lived asset costs for Alternative No. 3 are summarized in Table 4-18 and detailed in Appendix O.

Table 4-18: Alt. No. 3 Annual Operation and Maintenance Cost Estimate*

Item	Total
General Sewer Expenses	$10,000
Administration Salaries and Benefits	$5,000
Administration Expense	$2,500
Employee Salaries and Benefits	$180,000
Treatment O&M (Chemicals, Utilities, Disposal, Lab, Repairs)	$130,000
Total Annual O&M (without SLA Reserves)	*$327,500*
Short Lived Asset Reserve Funding	$37,385
Total Estimated O&M Cost (Including SLA Reserves)	**$364,885**

** Annual O&M Costs do not include Village of Sherman Collection System or Billing*

5.0 Summary & Alternative Comparison

5.1 Feasible Alternatives Summary

5.1.1 *Alternative No. 1: No Action or Sewage Treatment by Others*

The purpose of this report was to evaluate the Village of Sherman as a Regional WWTP. A No Action alternative is not recommend as onsite septic system will continue to degrade Findley Lake. According to NYSDEC/USEPA study, the only way the water quality of Findley Lake will get better is to completely eliminate the pollution caused by septic systems and a municipal sewer system is essentially required to do this. An alternative (not evaluated in this report) would be to not use the Village of Sherman for sewage treatment. The Town of Mina could construct its own WWTP, or partner with a different nearby plant such as the Peak N Peak WWTP, located approximately 4-miles south of Findley Lake. This could be further evaluated in the future and compared to the conveyance to and treatment by the Village of Sherman. Utilizing an expanded Village of Sherman WWTP may not be the most cost effective alternative due to the shear distance of relatively vacant land between Findley Lake and the Village. In concept, pursuit of a Regional WWTP offers an opportunity to reduce and stabilize near- and long-term capital, operation and maintenance costs for treating sanitary sewage.

5.1.2 *Alternative No. 2: Expand Existing WWTP with Contact Stabilization/Single Stage Nitrification or Contact Stabilization/Extended Aeration*

This alternative focuses on maintaining the Village's existing WWTP's biological and secondary treatment unit processes. However, due to essentially tripling the design flow/loads for the WWTP, very little existing equipment could be utilized under this alternative. The majority of the unit processes would require replacement and could be constructed and tested offline prior to being placed into service. This alternative does repurpose existing concrete tankage for the aerobic digesters to save construction cost. This is a feasible alternative for a 20-year planning period.

5.1.3 *Alternative No. 3: SBR WWTP*

This alternative involves the construction of a new SBR treatment system and equalization tank housed within a new concrete tank adjacent to the existing treatment tanks. This system will be completely automated with PLC controls and logic, and will simplify daily operations and process control requirements, particularly for waste solids

management when compared to the current extended aeration process. This is a feasible and cost effective alternative for a 20-year planning period, and offers a reduction in unit process tankage on the site over Alternative No. 2.

5.2 Non-Monetary Factors

5.2.1 *Compliance with Standards*

Alternative Nos. 2 and 3 were designed and evaluated in accordance with 10 States Standards and TR-16 Design Standards for WWTP design. Each WWTP configuration could be designed and constructed to ensure the WWTP will remain in consistent compliance with current and anticipated future SPDES effluent limits.

5.2.2 *WWTP Capacity*

Alternative Nos. 2 and 3 were each evaluated to treat projected flows and loads of a regional service area for the 20-year planning period, or for year 2038.

5.2.3 *Recreational Impact*

None of the project alternatives will have an adverse impact on recreational use in the project area. In fact, a regional sewer system that includes the area around Findley Lake will significantly enhance and benefit the recreational activities that take place on Findley Lake. Also, both WWTP alternatives were chosen to provide more effective waste treatment to help protect the water quality of French Creek.

5.2.4 *Employment Factors*

Both regional WWTP alternatives are anticipated to change current Village WWTP staffing requirements and Operator licensing requirements as shown in Appendix L. The current WWTP operator (Grade 2A) would not be qualified to operate the Regional WWTP (Grade 3A). A Grade 2A operator can operate a Grade 3A plant with supervision by a Grade 3A operator, including by a contract operator, provided they spend sufficient time at the treatment plant under the guidance and direction of the 3A operator.

5.2.5 *Aesthetics*

Each of the alternative WWTP improvement projects considered would be located within or immediately adjacent to the existing fenced-in, Village-owned WWTP parcel of land. Additional infrastructure that may have aesthetics impacts are the four main sewage pump stations and odor control stations slated for the north end of Findley

Lake and across the Route 430 corridor. An attempt will be made during design to mitigate any potential aesthetic impacts through the use of vegetative screening, natural colors, etc.

5.2.6 *Existing Habitat Impacts*

Neither Alternative No. 2 nor No. 3 are anticipated to impact any existing critical plant or wildlife habitats.

5.2.7 *Permit Issues*

Both WWTP improvement alternatives will require a SPDES Permit modification and will be subject to NYSDEC review/approval. The construction of both alternatives would require temporary SWPPP permits during construction to mitigate any potential for surface water contamination due to storm water runoff. Other permits that may be required include the necessary local building permits.

5.2.8 *Community Objections*

This project will be subject to the NYS SEQR/SERP process and municipal bonding under NYS Village/Town Law. As a result, all interested and involved parties will have an opportunity to make public comments on potential environmental impacts and mitigation measures prior to design, construction, and funding of the recommended capital improvement project.

5.2.9 *Wetlands*

There are mapped wetlands in the project area. Until wetland delineations are completed, the exact extent of impacts will be unknown. Wetland impacts will be mitigated to the furthest extent possible. Construction activities will be executed in accordance with a site specific SWPPP to protect the water quality within French Creek, including use of horizontal directional drilling (HDD) for installing new low-pressure mains beneath delineated wetlands.

5.3 Life-Cycle Cost Analysis

Life-cycle costs inclusive of the estimated project capital costs, the estimated annual O&M costs, and the short-lived asset costs as discussed in Section 4.2.19 and 4.3.19 have been extrapolated to cover an estimated 30-year operational life of the WWTP. Life-cycle costs are summarized in Table 5-1.

Table 5-1: Summary of Alternative Capital and Net Present Value Costs

Net Present Value (NPV) Analysis	Alternative 2 – EAASS / CSAS/ SSN WWTP	Alternative 3 - SBR WWTP
Estimated Project Cost	$10,877,000	$9,209,000
30-Year O&M and SLA NPV	$10,905,300	$10,946,550
Total NPV	**$21,782,300**	**$20,155,550**
Delta	***$1,626,750***	***$-***

6.0 Recommended Alternative

6.1 Basis of Selection

As discussed in Section 5.0, WWTP improvement Alternative Nos. 2 and 3 were each evaluated on their ability to provide efficient and reliable wastewater treatment in accordance with recognized design standards for a 20-year planning period. A summary of the pros and cons of the alternatives evaluated, including non-monetary factors, is provided in Table 6-1.

Table 6-1: Comparison of Alternatives Table

Alternative	Pros	Cons
Alternative No. 2 - New EAAS/ CSAS/SSN WWTP	· Operator familiarity of treatment process	· Higher capital cost · More tankage required · Less automated operation and process control compared to SBR system
Alternative No. 3 - New SBR WWTP	· New tankage · Lowest estimated capital cost · Automated process control/operation à highly flexible	· New Treatment Process for plant operators
No Action or Sewage Treatment by Others	A No Action alternative is not recommend as onsite septic systems will continue to degrade Findley Lake water quality. An alternative (not evaluated in this report) would be to convey Findley Lake sewage to a new WWTP located in closer proximity to the lake. This could be evaluated in the future and compared to the treatment by Sherman alternatives.	

Should it be determined that the Village of Sherman will serve as a Regional WWTP, it is recommended that the Village proceed with Alternative No. 3 New SBR WWTP. This configuration has the lowest estimated probable project capital cost and 30 year life cycle cost. Table 6-2 summarizes the recommended WWTP improvements under Alternative No 3.

Table 6-2: Recommended WWTP Improvements – Alternative No. 3

Process	Recommended Improvement
Influent Pumping and Headworks	Upgrade influent pump station for increased flows
	Demolish existing comminutor and flow meter
	Construct new Headworks facility offline
	New automated mechanical screening and grit removal
Biological Treatment (SBR Plant with tertiary filters)	Install new SBR treatment tanks offline. New controls, fine bubble diffusers, and premium efficiency blowers.
	Disc filters to replace existing gutted inoperable sand filter boxes
Effluent Disinfection	New Open Channel UV Disinfection and Post Aeration
Solids Handling	Repurpose existing treatment tanks as aerobic digesters. Install new blowers and diffusers
	Demolish Gravity Thickener tank and cover
	New Dewatering facility with mechanical dewatering and sludge conveyor to transport sludge to a covered drying bed
	Upgrade existing sludge pump station to a filtrate pump station
Control Building	Remove obsolete process, electrical, I&C, HVAC and plumbing equipment assets
	Upgrade various mechanical systems that have reached the end of their useful lives (i.e., doors, windows, HVAC, etc.
	Minor modifications to floor plan
WWTP Site/Civil/Utilities	Various site piping, fencing, grading, and paving improvements
WWTP Electrical/I&C/SCADA	Replace emergency power generator and ATS
	New SCADA and WWTP control systems

6.2 Cost Estimate

The estimated probable project cost for a low pressure sewer system around Findley Lake, conveyance of sewage from Findley Lake to Sherman across the 7.5-mile Route 430 corridor, and the WWTP upgrades recommended in Alternative No. 3 is $32,358,000. The costs summarized below in Table 6-3 are detailed in Appendix N.

Table 6-3: Summary of Recommended Project Costs

Line Item	Associated Cost
Low Pressure Sewage Collection System	$9,242,000
Conveyance to the Village of Sherman WWTP	$5,388,000
Alternative 3 – SBR WWTP Upgrades	$5,820,000
Mobilization/Demobilization/General Conditions (5%)	*$1,024,000*
Inflation to 2022 Dollars (2% per year)	*$1,638,000*
Subtotal of Construction Costs	**$23,112,000**
Construction Contingency (20%)	*$4,623,000*
Estimated Engineering, Legal, Administration (20%)	*$4,623,000*
Total Estimated Probable Project Cost	**$32,358,000**

6.2.1 *Payback Period*

Should it be decided that the Village of Sherman will be utilized as a Regional WWTP, Alternative No. 3 is estimated to have a lower initial capital cost and similar operation and maintenance cost. As displayed in Table 5-1, it will be most cost effective over a 30-year life cycle to select Alternative No. 3.

6.2.2 *Preliminary Plan to Finance*

There are various funding options for municipal WWTP upgrades. Typically, core funding is provided by State and Federal government programs such as the NYS Environmental Facilities Program (EFC) Clean Water State Revolving Fund (CWSRF) or USDA Rural Development (RD), respectively. Both funding programs provide interest subsidies and grant funding to make municipal sewer improvement projects more affordable for the average user. To further reduce the cost of a capital project, additional grants can be applied for through agencies such as the Office of Housing and Community Renewal's (HCR) Community Development Block Grant Program, EFC's Water Infrastructure Improvement Act (WIIA) Grant Program, New York State Energy Research & Development Authority (NYSERDA), Department of State Local Government Efficiency Grants (DOS LGE) or EFC's Green Innovation Grant Program (GIGP).

NYSEFC Clean Water State Revolving Fund (CWSRF) Program

Using a weighted demographic data for the potential project service area, the Village of Sherman, Town of Mina, and Town of Sherman collectively qualify for hardship financing (0% interest over 30 years) and the lesser of $3,500,000 or a 25% project grant based on the 2018 Draft IUP. Grant eligibility for the Village is determined below based on 2018 NYSEFC IUP Affordability Score and Award Criteria for projects qualifying for hardship financing. The tables below show the Affordability Score achieved by the Village and associated maximum grant awards.

Table 6-4: Affordability Score & Award Criteria

Operator 1	Limit 1	Operator 2	Limit 2	Score	Comment
2015 Weighted Median Household Income = $45,131					
Greater Than	$35,561	Less Than	$47,415	7	
2016 % County Unemployment = 5.1%					
Greater than	4.6%	Less than or equal to	5.5%	1	
Weighted Population Change (2000-2010) = Negative Trend					
Negative Trend				1	
2015 Weighted Families Below Poverty = 10.16%					
Less Than or equal to	12.0%			0	
			Total Affordability Score	9	

Table 6-5: Maximum Grant Awards

Total Affordability Score	Maximum Grant
0-8 points	$2,000,000
9-12 points	**$3,500,000**
13 points or greater	$5,000,000

In order to qualify for a subsidized interest rate loan, or a 0-percent interest hardship loan under EFCs CWSRF program, the project must score above the Funding Subsidy Line by demonstrating significant environmental or public health benefits. Based on the environmental benefits of sewering Findley Lake, a NYSDEC "impaired" waterbody, the Regional project is likely to score above the Hardship Funding subsidy line. It should be noted that a plant upgrade for the Village of Sherman alone as listed in the Final 2018/2019 CWSRF IUP did not score enough points to be listed above the subsidy line.

The Town of Mina, on its own, would not financially qualify for 0% financing due to its higher MHI. Therefore, working together on a joint or Regional sewer project is likely to have significant funding advantages under the NYSEFC CWSRF program.

USDA Rural Development Water and Environmental Program (WEP)

Rural Development (RD) has funding available for municipal projects for municipalities with a population of 10,000 or less. Using a weighted 2010 MHI, it is believe the project would qualify for poverty interest rate (estimated at 2.375%) loan financing for a 38 year term and also RD grant funding. Grant determinations are based on similar system costs and what USDA deems is an "affordable" rate for utility service. Generally speaking, an affordable rate for sewer service is approximately 1.5% to 2.0% of the area's 2010 MHI, which equates to $628 to $838 per year for the service area. USDA RD will provide a maximum of 75% grant and only provide grant to reduce the service area's utility rates to an affordable level. It should be noted that the Town of Mina would not qualify for the poverty interest rate without the Village of Sherman.

Community Development Block Grant (CDBG) Public Infrastructure

The Community Development Block Grant (CDBG) Program is a federally funded program administrated through the NYS Office of Community Renewal and applied to under the CFA process. This program provides grant funding up to $750,000 or $1,000,000 (with co-funding) to public utility projects if at least 51% of the project beneficiaries are low and moderate income individuals. Based on the data taken off the NYSOCR website, the Village of Sherman and the Town of Sherman have a low to moderate income percentages of over 51%; however, the Town of Mina does not. An income survey of the proposed Findley Lake Sewer District area would be needed to determine if the Town's service area would qualify for CDBG grant funding.

NYSEFC Water Infrastructure Improvement Act (WIIA Grant Program)

The NYSEFC administers the WIIA Grant Program which can provide up to 25% grants for Clean Water projects with a maximum annual grant of $5,000,000. The Village of Sherman, Town of Sherman, and Town of Mina are all eligible to apply for this grant program. The higher project cost would also allow multiple WIIA grants up to $5.0 million in successive years, but totaling no more than 25% of the total net project cost (i.e., after other grants are subtracted from the total project cost).

DOS Local Government Efficiency Program (LGE Grant Program)

The DOS administers the LGE Grant Program which can provide up to 90% grants for implementation projects with a maximum grant of $600,000. A joint sewer project with the Village of Sherman, Town of Sherman, and Town of Mina would be a solid candidate to jointly apply for this grant program.

6.2.3 *Summary of Preliminary Plan of Finance*

Based on an estimated probable project cost of $32,358,000, a sizeable grant funding package with reduced interest rates is absolutely critical for the service area rate payers to be able to afford this project. The annual debt service cost for this capital improvement project would be dependent on how the involved parties (Town of Mina, Town of Sherman, Village of Sherman, and Chautauqua County) decided to share the project costs. Based on meetings with the involved parties and for purposes of this report, we have assumed the following potential cost sharing method could be used.

Project Area	Cost Type	Responsibility
Low Pressure Collection and Conveyance to Sherman	Capital Debt and O&M	(T) Mina and (T) Sherman proportionately share based on EDU's
Sherman Wastewater Treatment Plant Upgrade	Capital Debt	(V) Sherman pays 70% of upgrades; (T) Mina and (T) Sherman pay 30% of upgrades
Upgraded Sherman Wastewater Treatment Plant	O&M	(V) Sherman, (T) Mina, and (T) Sherman proportionately share based on EDU's

It should be noted that the cost sharing method displayed has not been agreed upon and is shown for informational purposes only and as starting point for future discussions. One of the first steps to move forward with the project would be to draft a Memorandum of Understanding (MOU) indicating the intent of the three (3) municipalities, and potentially the County, to move forward with the next steps in project development. Should the municipal stakeholders determine that the Regional WWTP

project is feasible and affordable, then an Intermunicipal Agreement (IMA) outlining the project infrastructure, proposed cost sharing, method of financing, operation and maintenance, etc. would be drafted and accepted by each municipal board.

Based on the size and financial needs of the project, it is recommended that each of the funding sources described above, including the EFC CWSRF program, USDA RD WEP program, CDBG grant program, EFC's WIIA grant program, and DOS LGE grant program are explored and applied to. The project will likely need to obtain grant co-funding from more than one agency to ensure annual sewer user rates would be at an affordable level. Generally speaking the first step in searching for funding for a project of this nature would be to submit this PER to NYSEFC in the next couple months for review prior to issuing the Draft 2020 IUP. NYSEFC will score the proposed project and list it on the Annual List of their Draft 2020 Intended Use Plan, which generally is released in late July or early August. This would help solidify the assumption that this project would receive 0% hardship financing through NYSEFC CWSRF program which is anticipated would serve as the Regional project's "core funding."

Table 6-6 summarizes estimated annual capital debt and O&M costs of a joint sewer system under a variety of grant funding scenarios. This funding table assumes that the project could be split up to receive 0% financing for the entire estimated project cost. **It is recommended that the County and stakeholder municipalities hold a project development meeting involving potential funding agencies, including NYSEFC and USDA Rural Development, to validate the reality of all funding scenarios. After such a meeting, this table could be updated to serve as the preliminary plan of finance and basis for an MOU; it would be further refined and finalized in the requisite Map, Plan, and Report that would be required for County sewer district formation.** Preliminary financing calculations in support of this table are included in Appendix P.

Table 6-6: Estimated Annual Project Costs for Recommended Regional Alternative

Scenario No.	Description of Work	Interest Rate and Loan Term	% Grant	Annualized Project Cost	Annualized O&M and SLA Costs
1	Low Pressure Collection System	0% Interest, 30 year Loan	35%	$316,832	$124,000
	Conveyance to Sherman			$184,730	$64,800
	WWTP Upgrades			$199,528	$364,885
2	Low Pressure Collection System	0% Interest, 30 year Loan	25%	$365,575	$124,000
	Conveyance to Sherman			$213,150	$64,800
	WWTP Upgrades			$230,225	$364,885
3	Low Pressure Collection System	0% Interest, 30 year Loan	15%	$414,318	$124,000
	Conveyance to Sherman			$241,570	$64,800
	WWTP Upgrades			$260,922	$364,885

Table 6-7 summarizes estimated annual user costs based on an assumed EDU schedule and cost sharing method under a variety of potential grant funding scenarios. **This table should be refined and finalized in the requisite Map, Plan, and Report that would be required for County sewer district formation after an EDU schedule is finalized, a cost sharing method is finalized, and potential funding scenarios are vetted with the involved funding agencies.** Preliminary financing calculations in support of this table are included in Appendix P.

Table 6-7: Estimated Annual User Costs for Recommended Alternative

Financing	Village of Sherman	Town of Mina	Town of Sherman
0% 30 year loan, 35% grant	$737	$1,417	$1,417
0% 30 year loan, 25% grant	$797	$1,543	$1,543
0% 30 year loan, 15% grant	$857	$1,670	$1,670

6.3 Project Schedule

Project Milestone Item	Schedule Date
Complete Final Preliminary Engineering Report	January 2019
Meet with potential co-funding agencies to discuss project	February 2019
Submit Report to NYSEFC	April 2019
Finalize District Boundary, EDU's, and Cost Sharing	Spring 2019
CWSRF Final IUP Project Listing	December 2019
Findley Lake Sewer District Formation	Fall 2019
Acceptance of an Intermunicipal Agreement	Fall 2019
Environmental Review	Fall 2019
Apply for and Obtain Funding	Early 2020
Final Project Design	2020 to 2021
Construction Start	2022
Construction Completion	2023 - 2024

The Village of Sherman is continuing to proceed forward with a wastewater treatment plant upgrade project that does not involve the Findley Lake sewer district extension. Currently, the Village of Sherman is seeking project development and implementation funding for that and will not move forward with the costly design or construction of this project until the desired level of grant funding is obtained. Although, the Village has been a willing participant in these discussion, the Village will likely not wait to upgrade their plant unless significant strides are made, beginning with development/execution of an MOU, and formation of a Findley Lake Sewer District or County Sewer District. It is anticipated that the Village may receive implementation funding for their Village-only WWTP upgrade project by the end of 2019. Should there be significant interest in moving forward with the joint or "Regional" project described in this report, it is recommended that the County proceed with district formation. Since funding situations will be unknown, the district formation process could be contingent on reducing the annual user costs to an affordable level by obtaining a certain dollar value of grant funding as the County did with other sewer district extensions.

The anticipated "high level" project schedule for implementing the recommended joint capital improvement project relies heavily on the involved party's urgency to progress the project and obtaining an adequate loan/grant co-funding package. Listed below are some key project mile stones:

6.4 Suggested Next Steps

The suggested next project steps would be to discuss this PER with the municipal stakeholders and funding agencies to determine the willingness/feasibility of moving forward with the Regional WWTP project. Items such as determining the most realistic funding scenarios, finalizing a district boundary, finalizing an EDU schedule, and finalizing a cost sharing method should be determined in the near future. The following regulatory reviews and/or approvals of the recommended Regional project are anticipated, and will be obtained should the interested parties decide to move the project forward:

- New York State Department of Environmental Conservation (NYSDEC) – Engineering Report and Plan Approval
- Core Project Funding Agencies (NYSEFC, USDA RD) – Engineering Report and Plan Approval
- State Environmental Quality Review Act (SEQRA) – The proposed improvement project is potentially a Type I project, which will require a SEQR/SERP coordinated review
- Memorandum of Understanding (MOU) – developed and executed by the County, two towns and the Village indicating a willingness and intent to move forward

6.5 Smart Growth

The recommended project is consistent with Smart Growth principles and practices as it proposes to extend public sewers to the densely populated lakeside community surrounding Findley Lake where septic systems are degrading the quality of water in the lake. Further, the recommended project utilizes and upgrades existing Village WWTP infrastructure to the extent possible. A completed NYSEFC Smart Growth form is included in Appendix Q.

7.0 Conclusion

Results from this PER indicate that the construction of a new SBR treatment system (Alternative No. 3) is the most cost effective solution to effectively expand the Village of Sherman WWTP into a Regional WWTP. The proposed project would include the construction of a low-pressure collection system around Findley Lake, sewage conveyance infrastructure from Findley Lake to the Village of Sherman, and various major improvements/upgrades to the Village of Sherman WWTP.

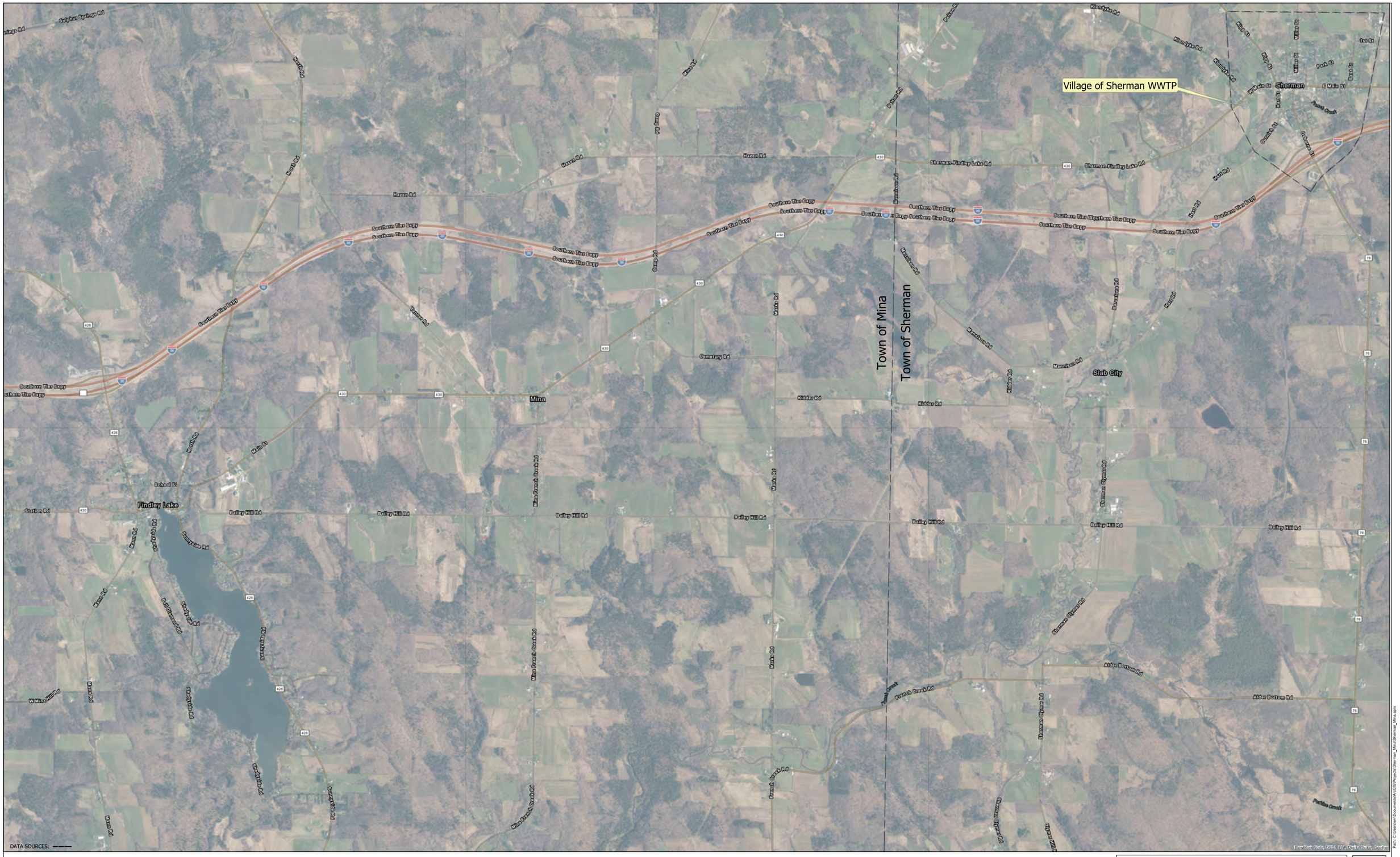
The estimated probable project cost for these improvements is $32,358,000 (in 2022 $). User costs to fund these improvements will vary depending on financing terms, the amount of grant funding received, and how the involved municipalities decide to share capital debt and O&M costs. Although transporting sewage from Findley Lake to Sherman WWTP may be accompanied by a greater upfront capital investment, one larger regional WWTP would result in operational and maintenance cost savings.

See Appendix R for EFC Engineering Report Certification Form.

Figures

Figure 1

Project Location Map



Barton & Loguidice

1 inch = 0.25 miles

0 0.25 0.5 1 1.5 2 Miles

Village of Sherman Regional WWTP Study

Project Location

Chautauqua County | 10/22/2018 | New York

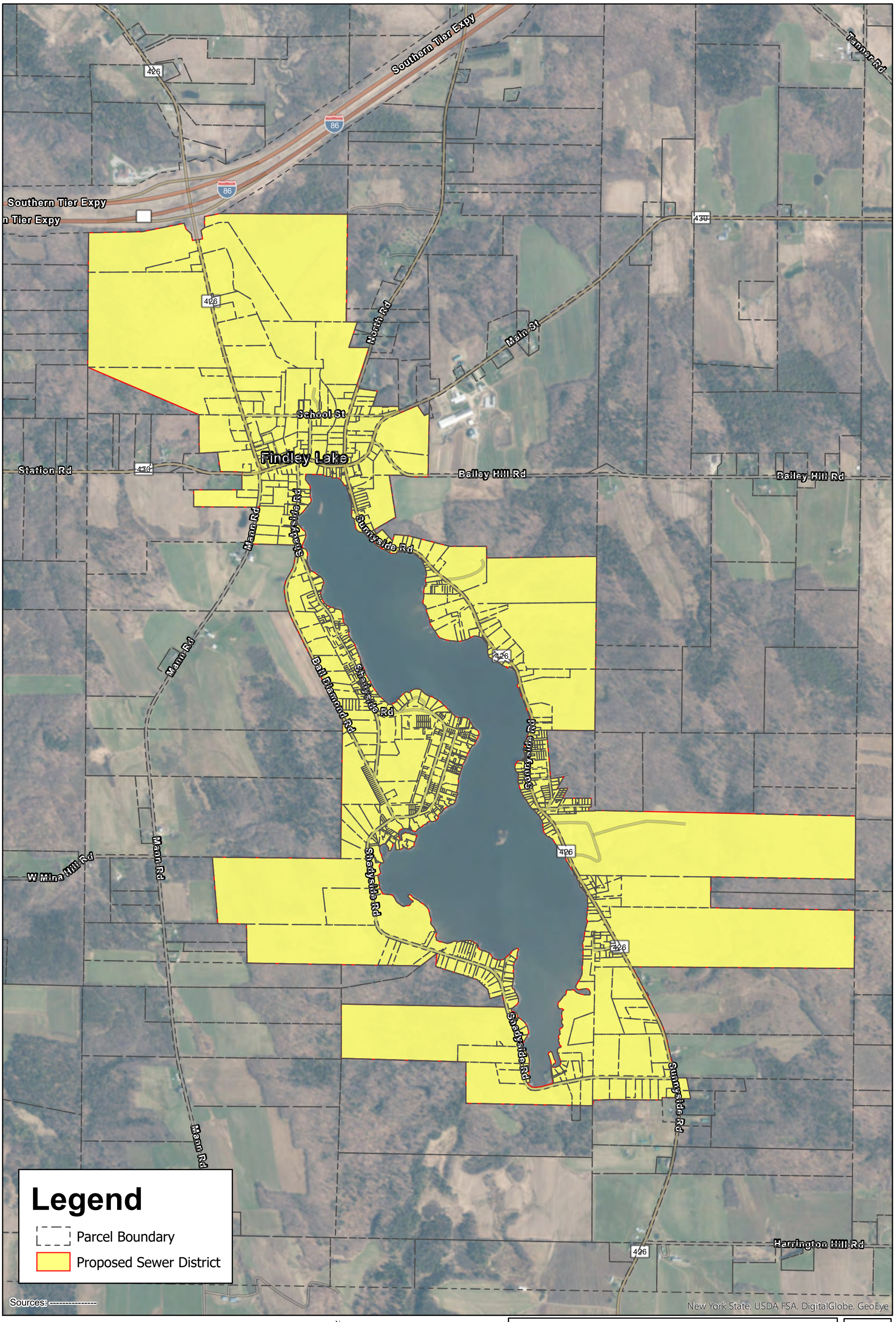
Figure 1

Project No. 2056.001

Path: C:\Users\er\Documents\ArcGIS\Projects\Sherman_Mina\Sherman_Mina.aprx

Figure 2a

Target Sewer Service Area



Barton & Loguidice

N W E S

1 inch = 0.25 miles

Miles

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Village of Sherman Regional WWTP Study

Target Sewer Service Area

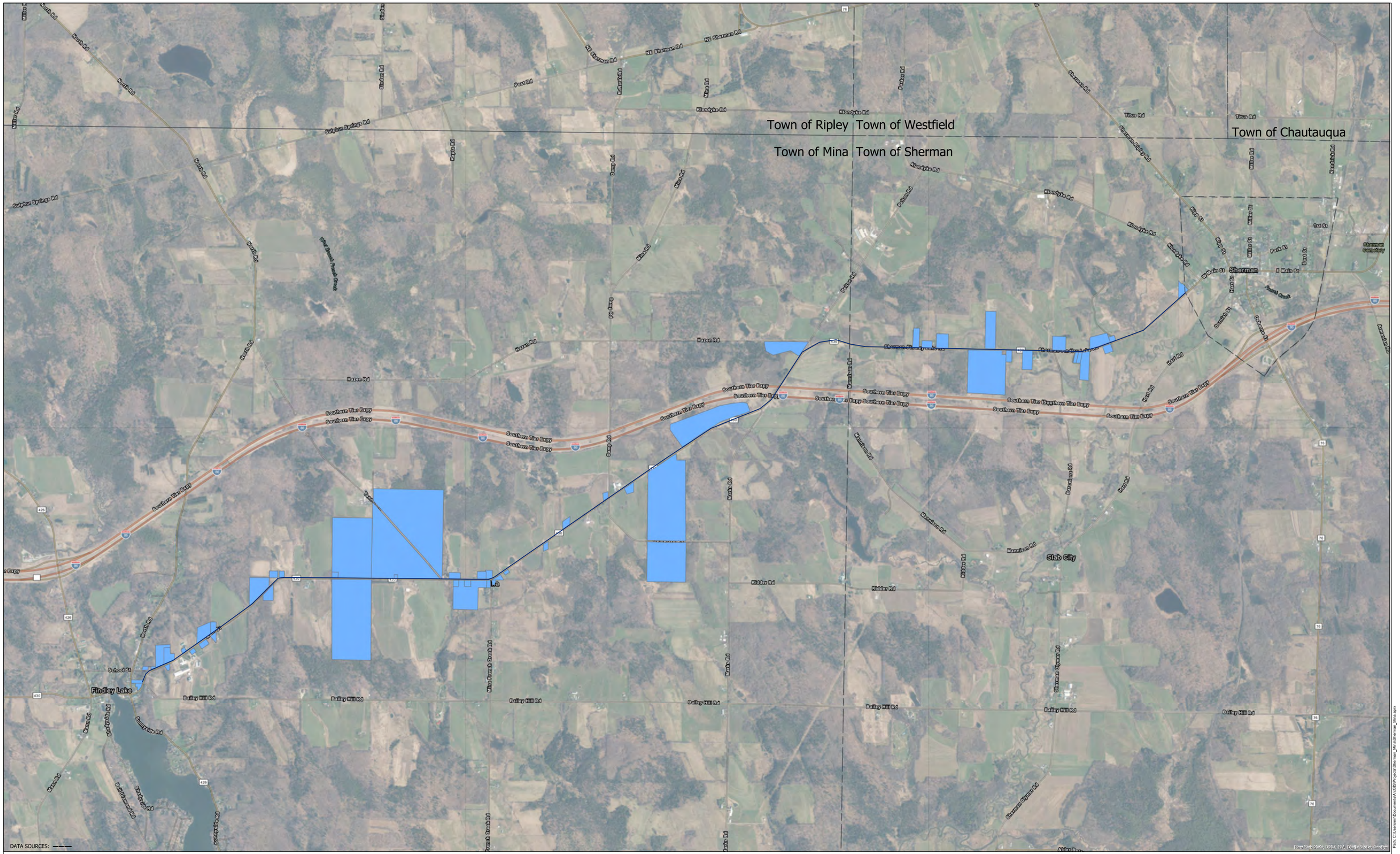
Chautauqua County 11/5/2018 New York

Figure 2a

Project No. 2056.001

Figure 2b

Developed Parcels Along Conveyance Route



Barton & Loguidice

N
W E
S

1 inch = 0.25 miles

0 0.13 0.25 0.5 0.75 1 1.25 Miles

Village of Sherman Regional WWTP Study

Developed Parcels Along Conveyance Route

Chautauqua County | 11/5/2018 | New York

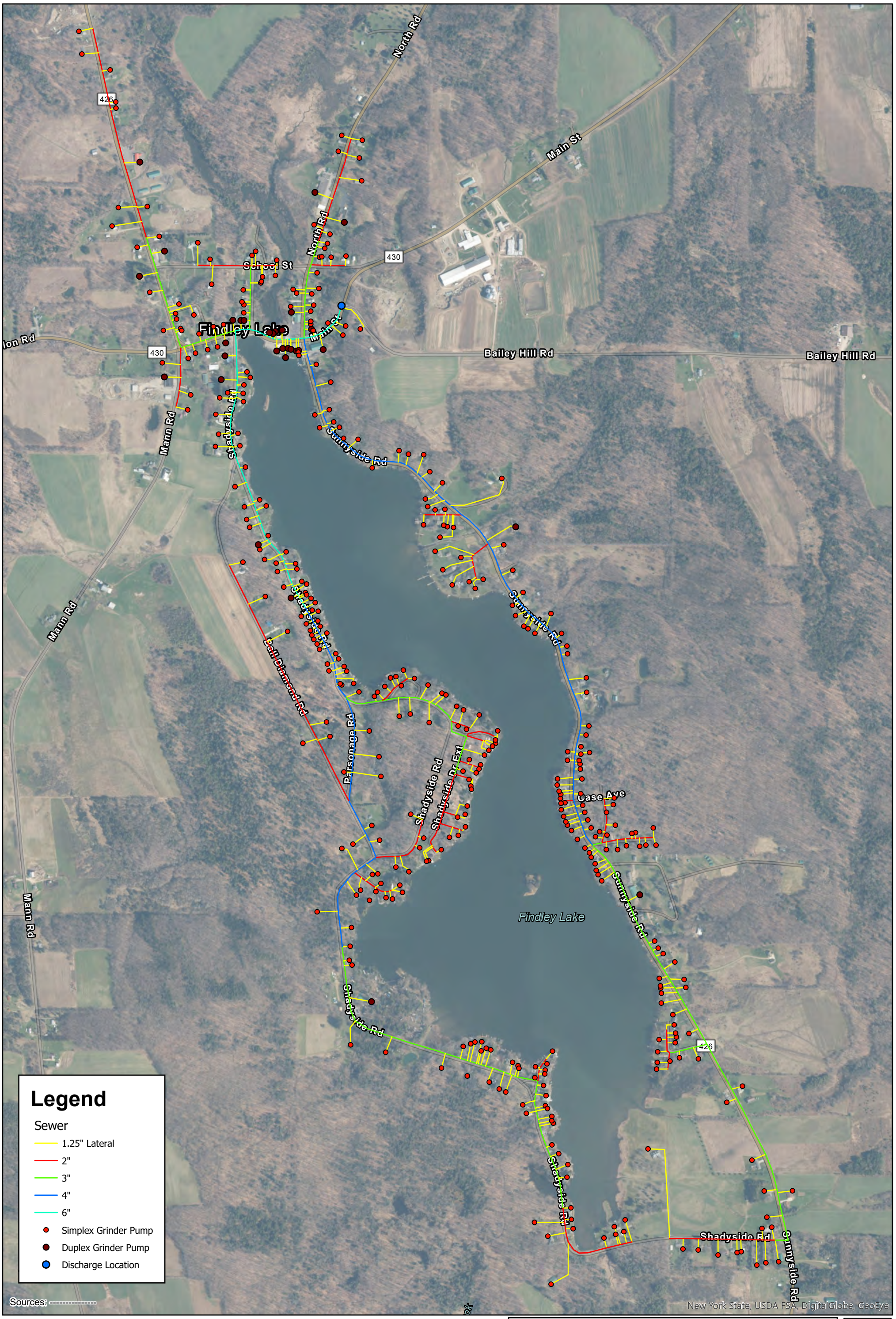
Figure 2b

Project No. 2056.001

Path: C:\Users\ken\Documents\ArcGIS\Projects\Sherman_Misc\Sherman_Misc.aprx

Figure 3

Findley Lake Low Pressure Sewer Collection System



Barton & Loguidice

N W E S

1 inch = 900 feet

0 450 900 1,800 2,700 US Feet

Village of Sherman Regional WWTP Study

Low Pressure Sewer Collection System

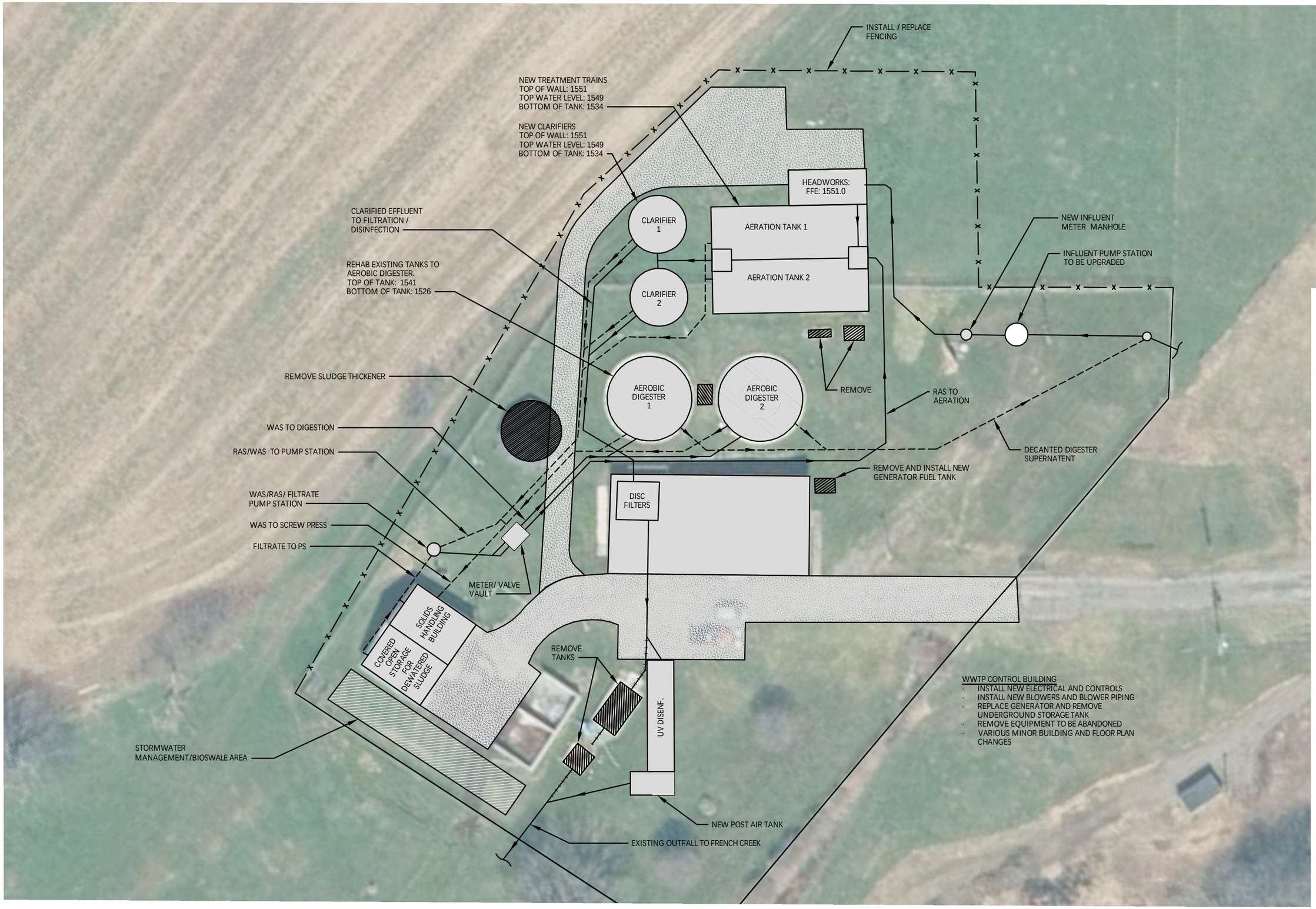
Chautauqua County 11/6/2018 New York

Figure 3

Project No. 2056.001

Figure 4

Alternative No. 2 EAAS CSAS SSN Concept Plan



VILLAGE OF SHERMAN
REGIONAL WWTP STUDY

FIGURE 4 – ALTERNATIVE NO. 2
EAAS/CS/SSN CONCEPT PLAN

CHAUTAUQUA COUNTY, NEW YORK

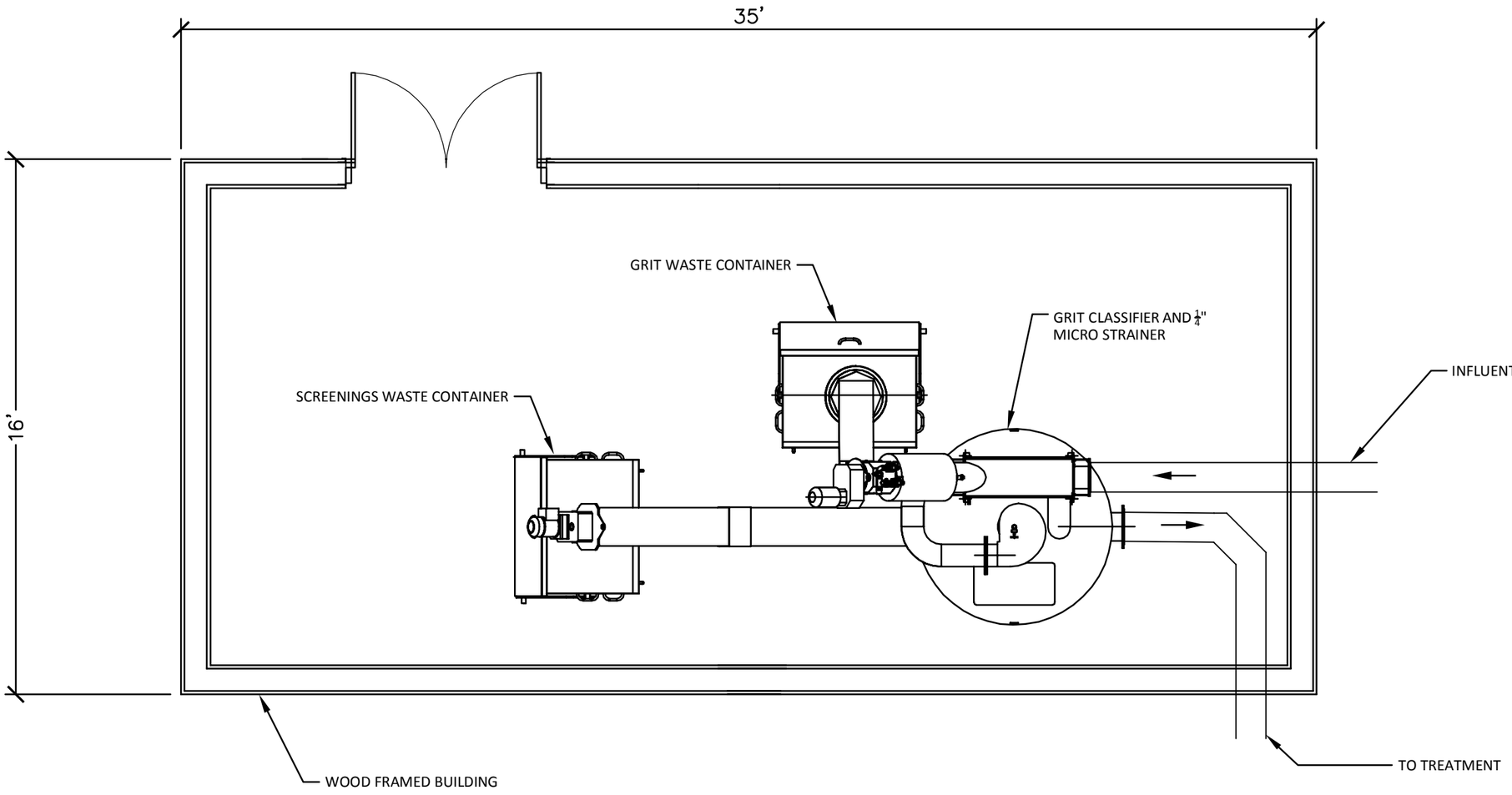
VILLAGE OF SHERMAN

Barton & Loguidice

Date	10/23/18
Scale	1" = 30'
FIGURE	4
Project Number	2056.001.001

Figure 5

Preliminary Headworks Concept Plan



PRELIMINARY HEADWORKS CONCEPT PLAN

NOT TO SCALE

VILLAGE OF SHERMAN
REGIONAL WWTP STUDY

FIGURE 5 – PRELIMINARY HEADWORKS CONCEPT PLAN

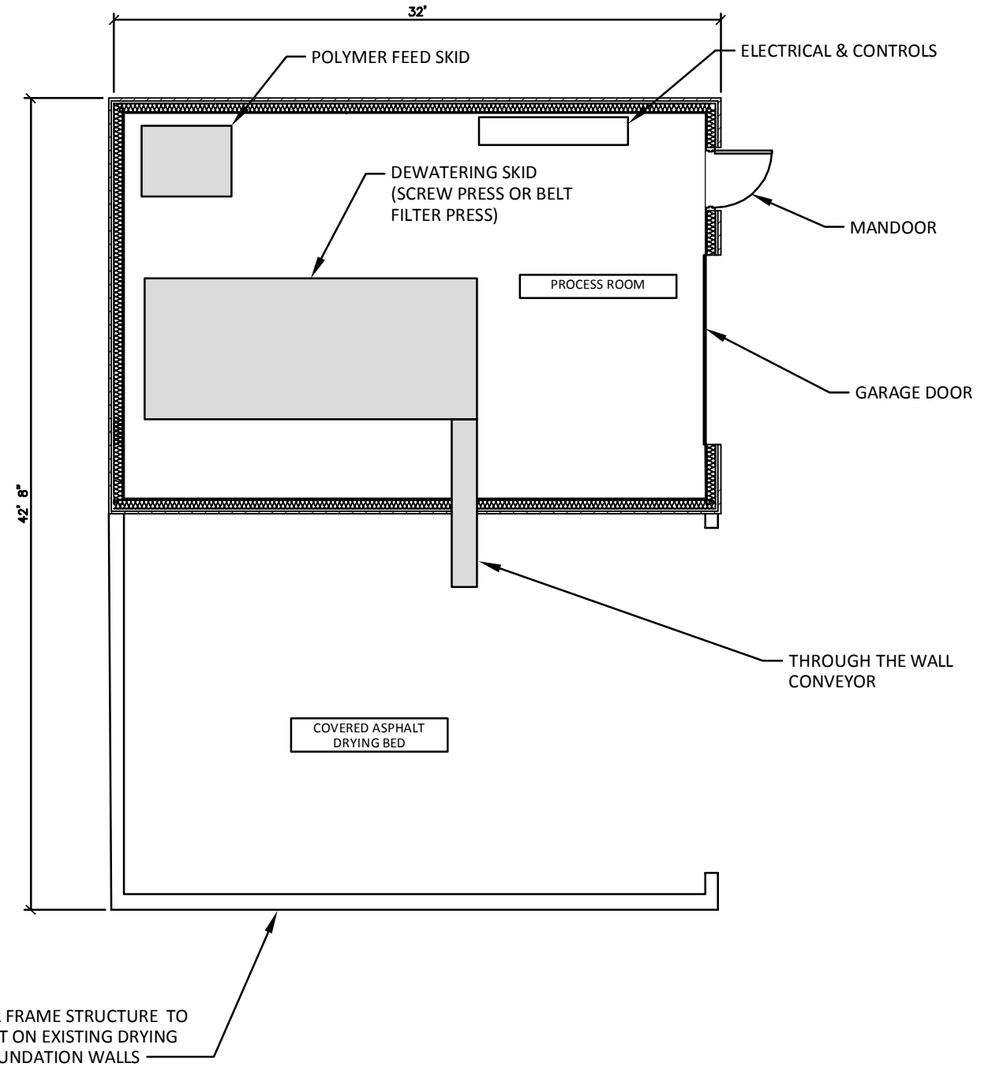
VILLAGE OF SHERMAN
CHAUTAUQUA COUNTY, NEW YORK

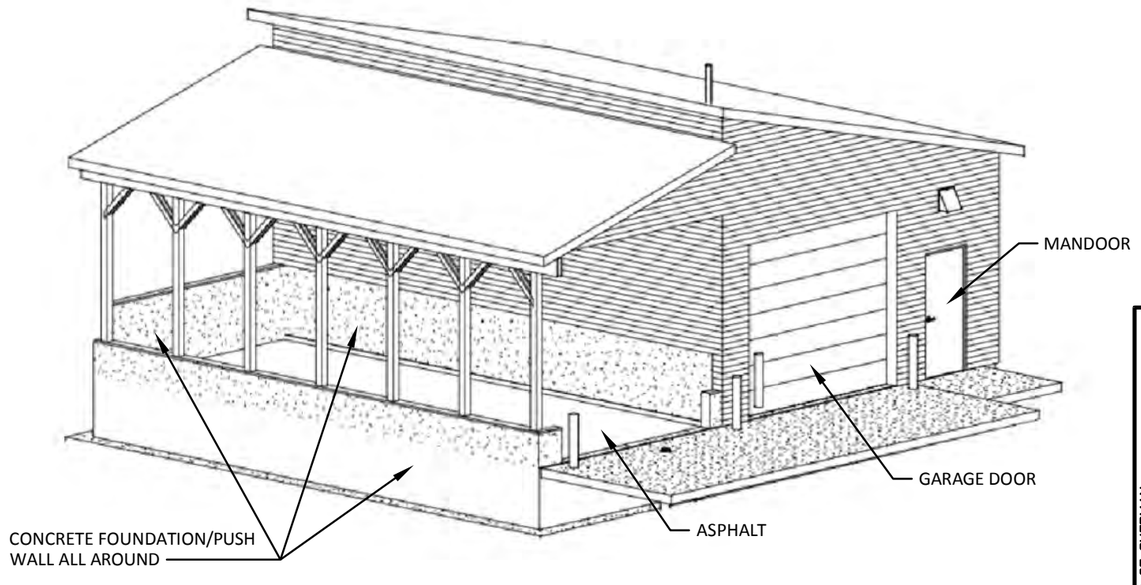
Barton & Loguidice

Date	11/1/18
Scale	NTS
FIGURE	5
Project Number	2056.001.001

Figure 6

Preliminary Solids Handling Building Concept Plan





PRELIMINARY SOLIDS HANDLING BUILDING CONCEPT PLAN

VILLAGE OF SHERMAN
REGIONAL WWTP STUDY

FIGURE 6 – PRELIMINARY SOLIDS HANDLING BUILDING CONCEPT PLAN

CHAUTAUQUA COUNTY, NEW YORK

VILLAGE OF SHERMAN

Barton & Loguidice

Date 7/23/18

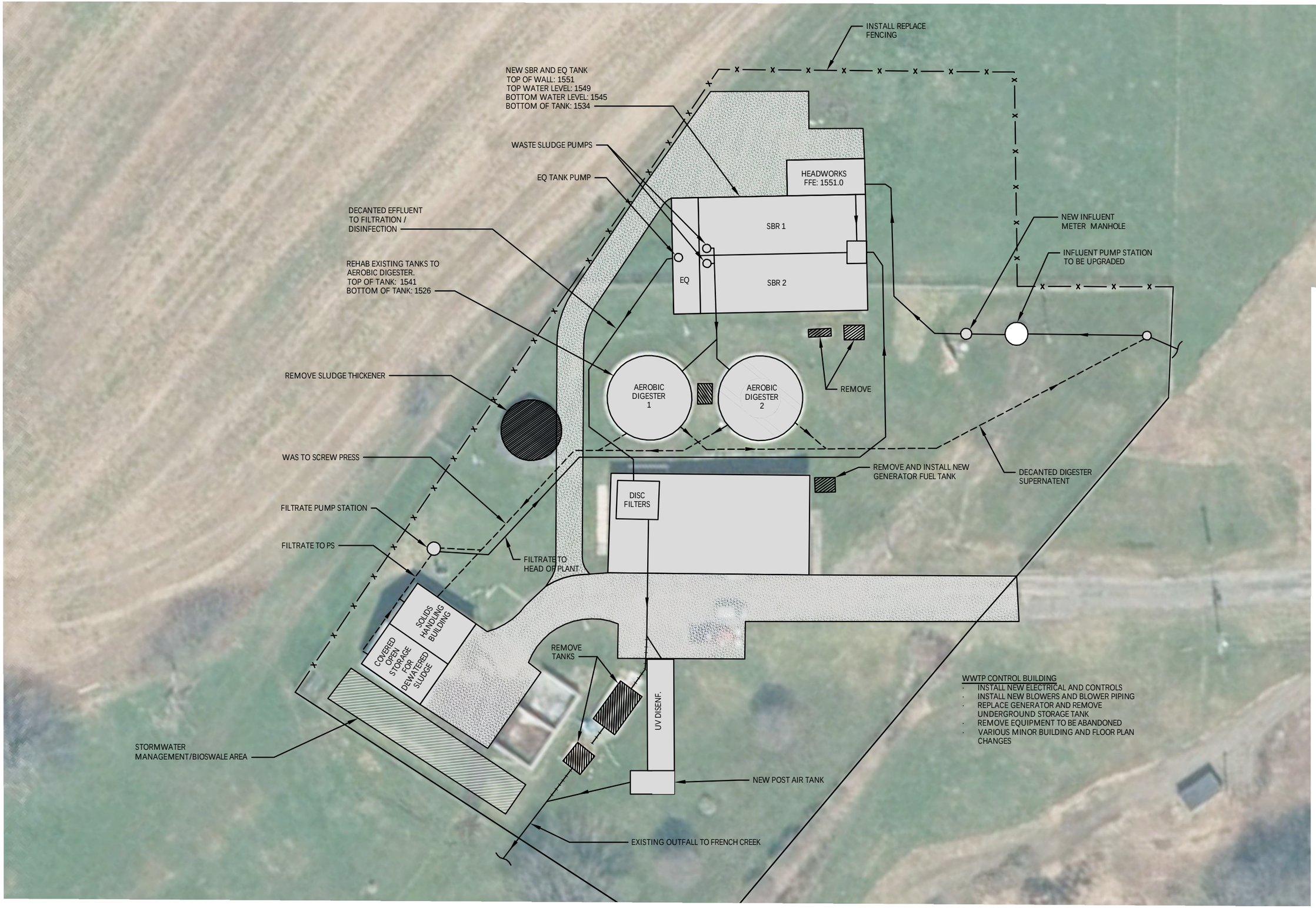
Scale NTS

FIGURE 6

Project Number 2056.001.001

Figure 7

Alternative No. 3 New SBR WWTP Concept Plan



VILLAGE OF SHERMAN
REGIONAL WWTP STUDY

FIGURE 7 – ALTERNATIVE NO. 3
NEW SBR WWTP CONCEPT PLAN

VILLAGE OF SHERMAN

CHAUTAUQUA COUNTY, NEW YORK

Barton & Loguidice

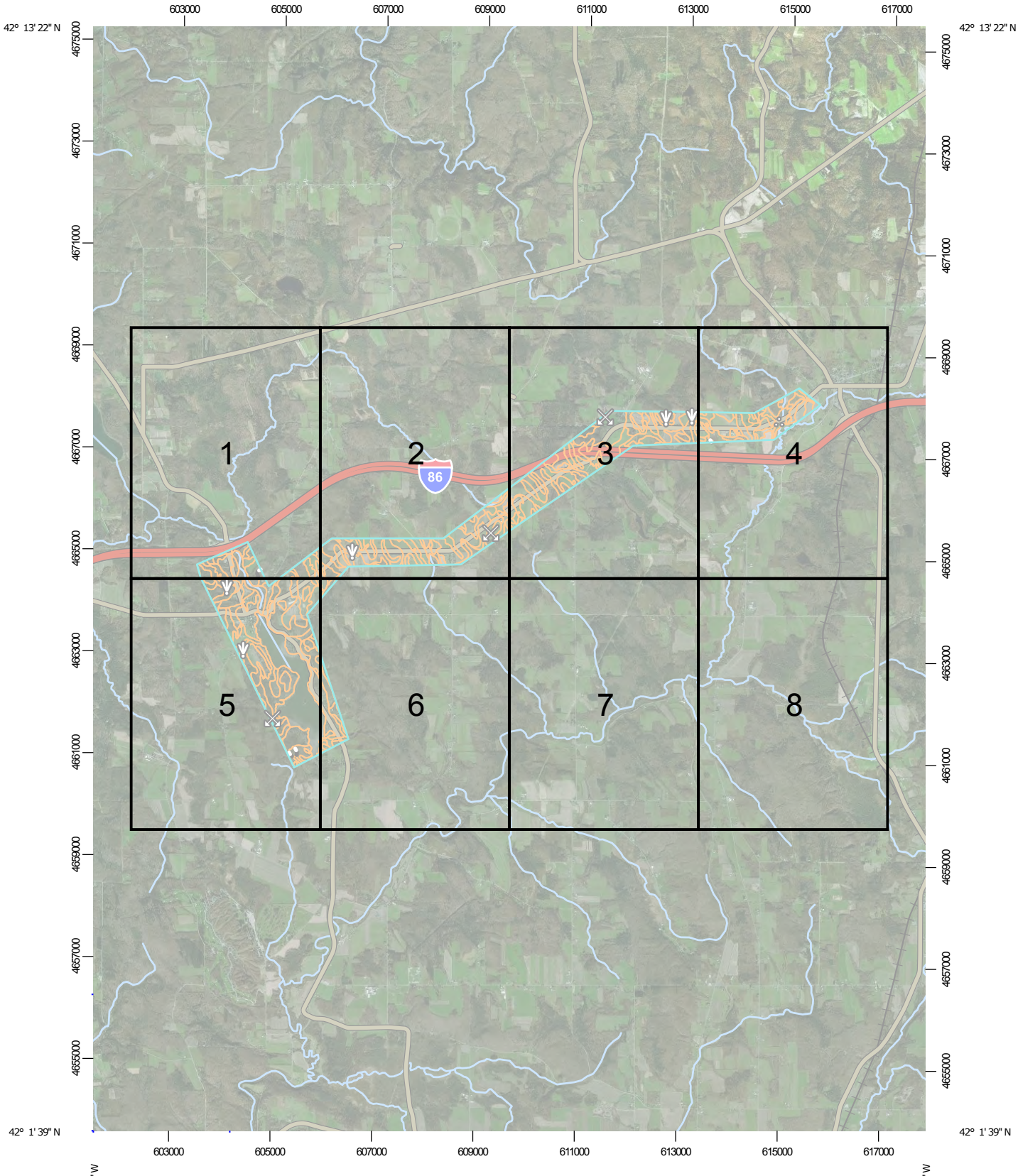
Date	7/23/18
Scale	1" = 30'
FIGURE	7
Project Number	2056.001.001

Appendices

Appendix A

Web Soil Survey

Soil Map—Chautauqua County, New York
(Findley Lake Collection and Conveyance)
Index Sheet



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N

Meters
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Feet
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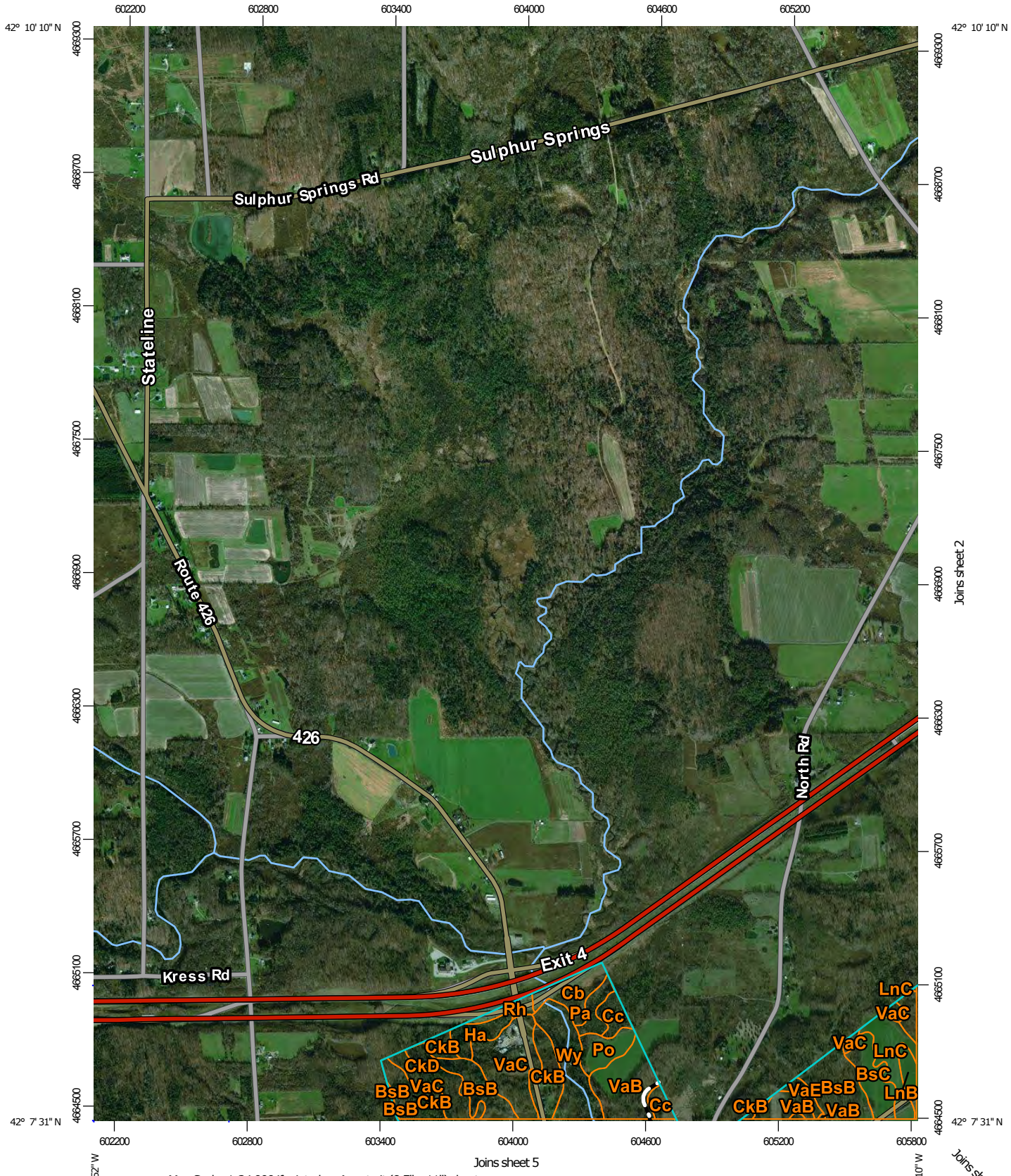
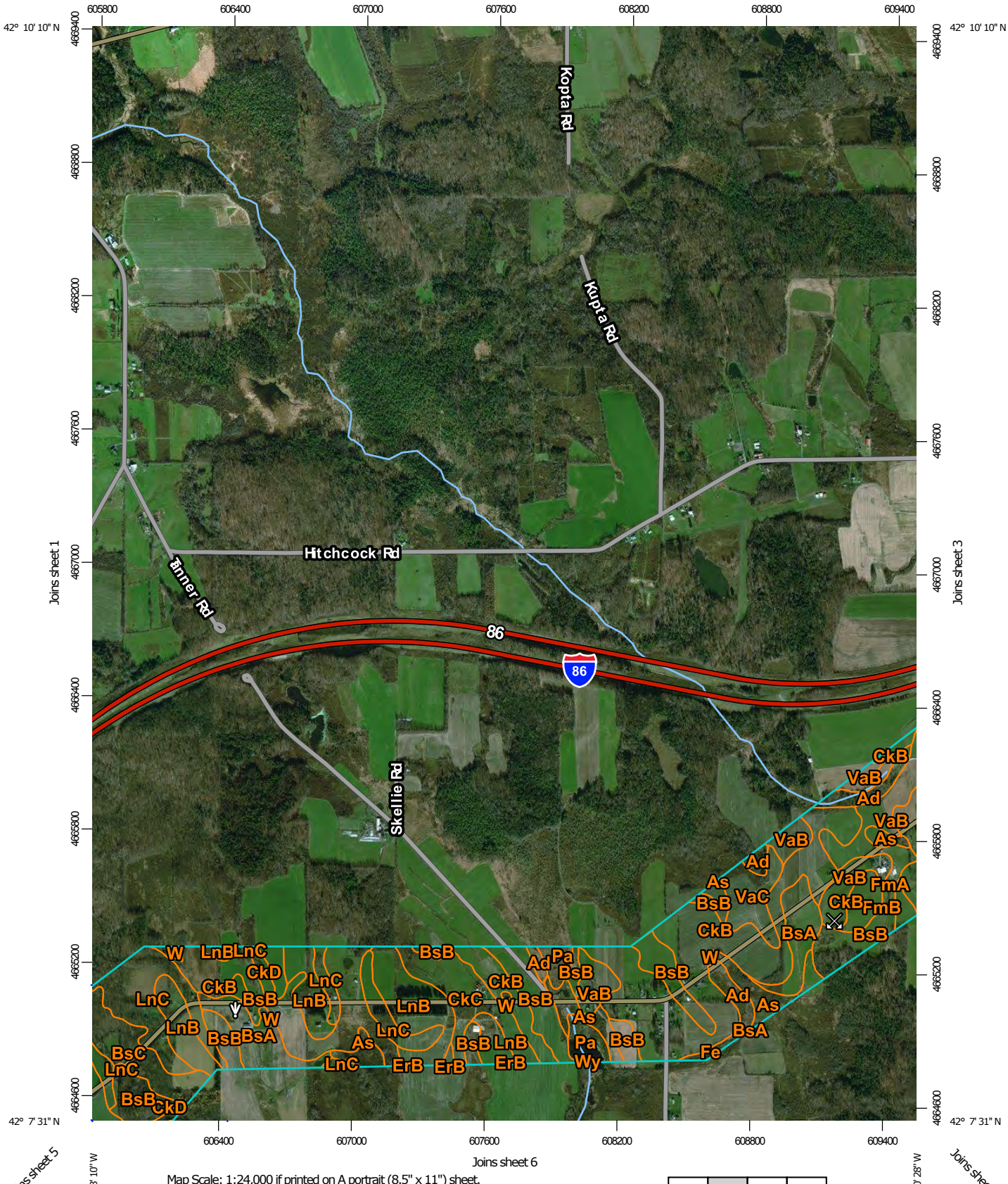
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

Soil Map—Chautauqua County, New York
(Findley Lake Collection and Conveyance)
Map sheet 1 of 8



Soil Map—Chautauqua County, New York
(Findley Lake Collection and Conveyance)
Map sheet 2 of 8



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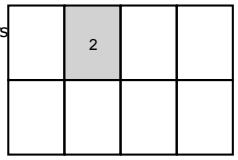

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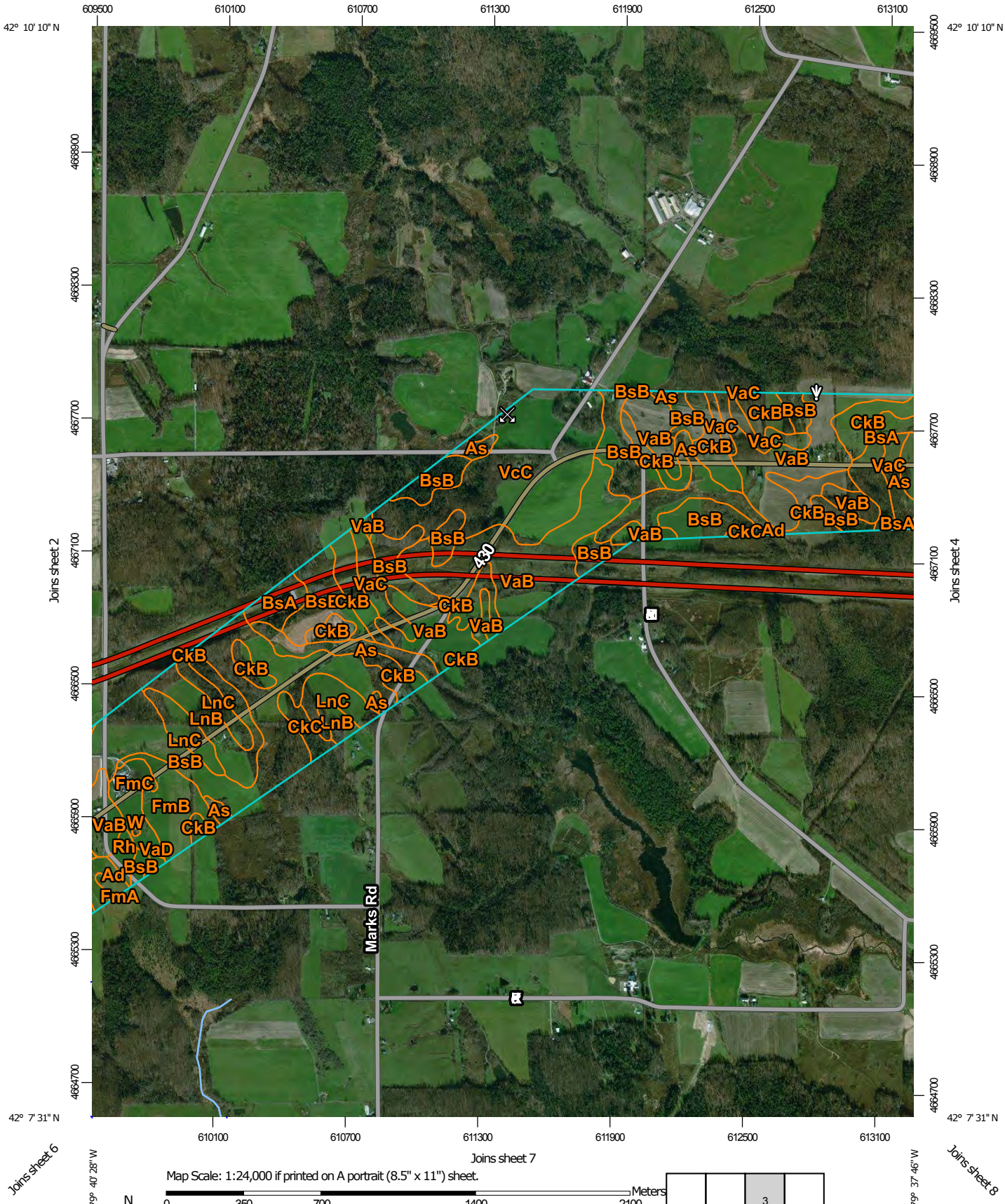
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79° 37' 46" W
42° 10' 10" N
42° 7' 31" N
609500
610100
610700
611300
611900
612500
613100
4669500
4668900
4668300
4667700
4667100
4666500
4665900
4665300
4664700
Joins sheet 2
Joins sheet 4
Joins sheet 6
Joins sheet 7
Joins sheet 8
Marks Rd
430
BsB
As
VaC
CkB
BsA
VaB
VcC
CkCAd
BsA
BsE
LnC
LnB
CkC
FmC
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Map Scale: 1:24,000 if printed on A portrait (8.5" x 11") sheet.
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Feet
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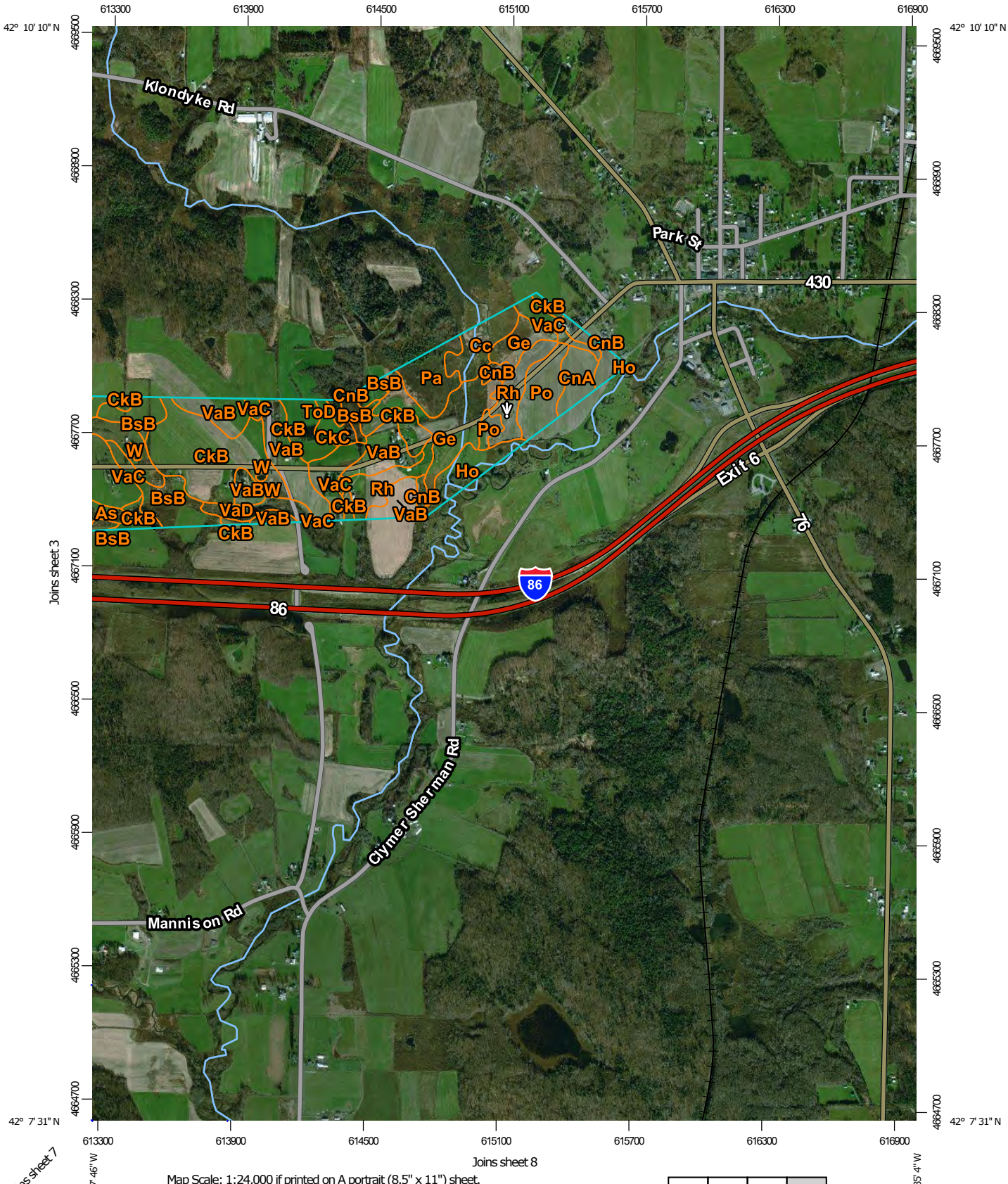
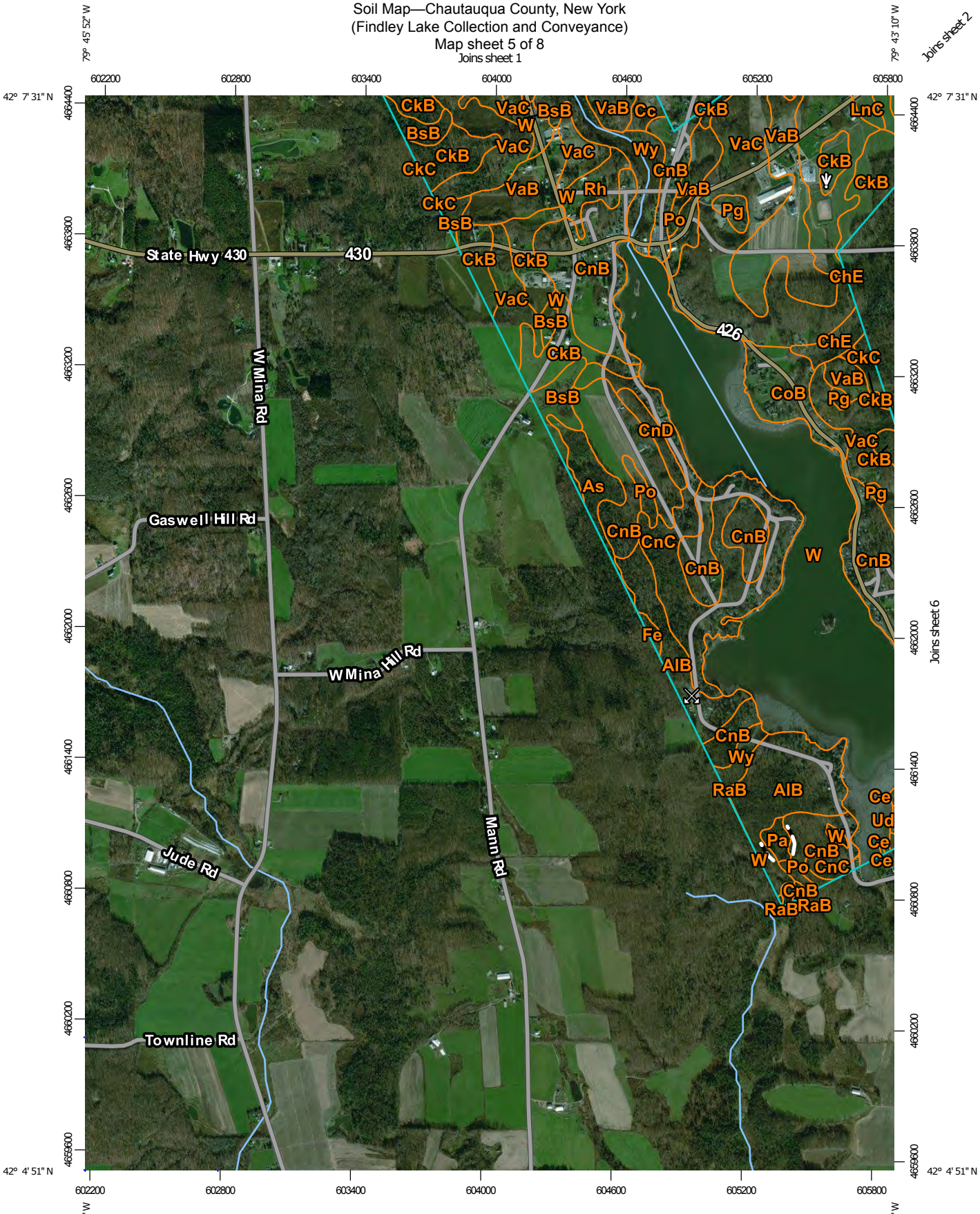
3
Map Sheet Location

Soil Map—Chautauqua County, New York
(Findley Lake Collection and Conveyance)
Map sheet 4 of 8



Soil Map—Chautauqua County, New York
(Findley Lake Collection and Conveyance)
Map sheet 5 of 8



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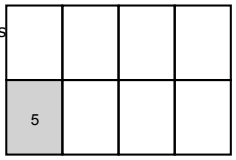

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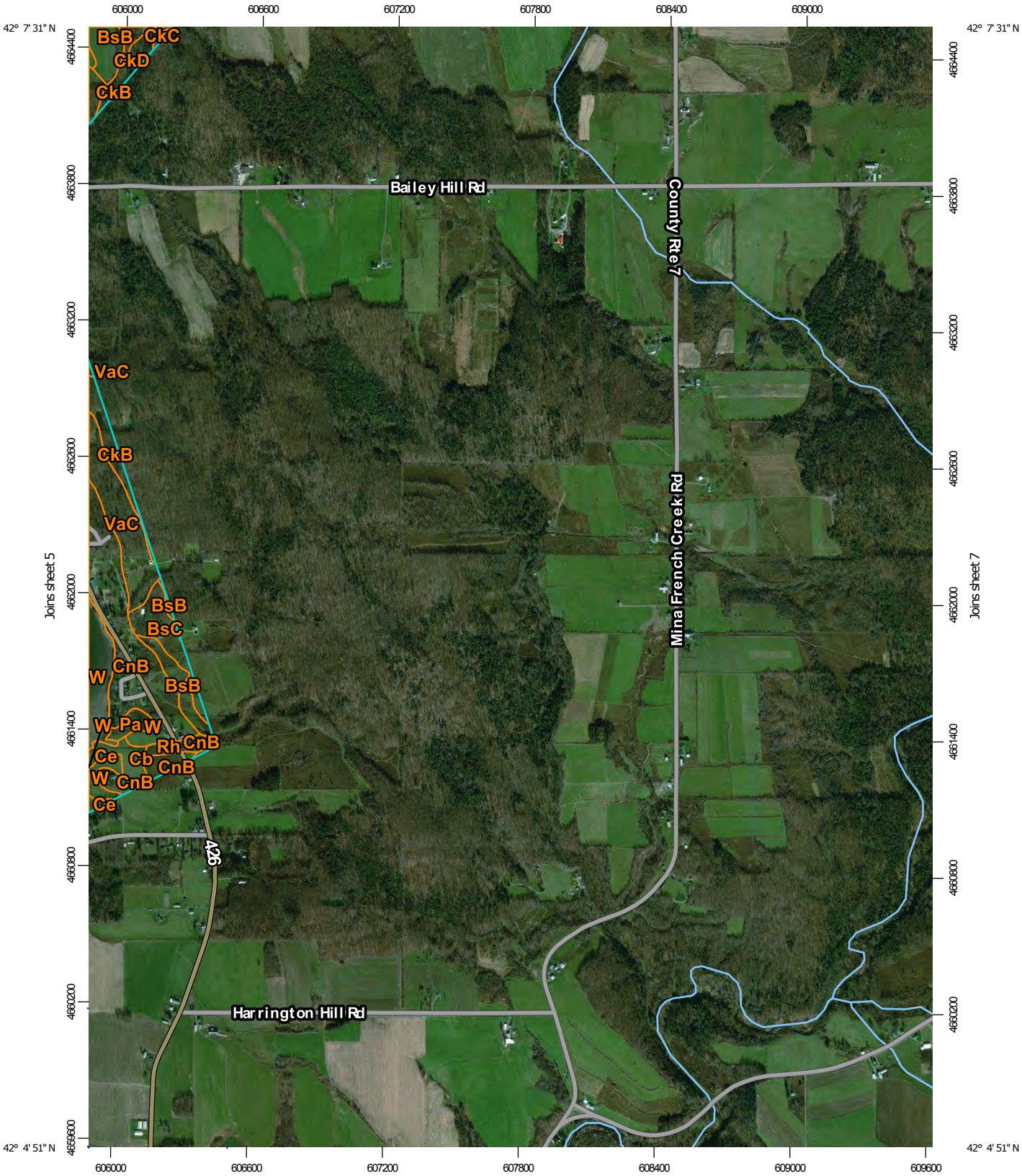

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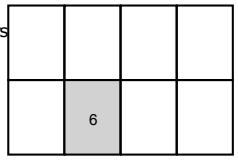
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84



Map Sheet Location

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.

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: Chautauqua County, New York
Survey Area Data: Version 16, Sep 2, 2018

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

Date(s) aerial images were photographed: Dec 31, 2009—May 5, 2016

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
Ad	Alden mucky silt loam	20.4	0.6%
AlB	Allard silt loam, 3 to 8 percent slopes	76.6	2.3%
As	Ashville silt loam	98.9	3.0%
BsA	Busti silt loam, 0 to 3 percent slopes	67.3	2.0%
BsB	Busti silt loam, 3 to 8 percent slopes	465.1	14.1%
BsC	Busti silt loam, 8 to 15 percent slopes	52.2	1.6%
Cb	Canandaigua silt loam, loamy substratum	15.5	0.5%
Cc	Canandaigua mucky silt loam	24.9	0.8%
Ce	Carlisle muck	1.8	0.1%
ChE	Chadakoin silt loam, 25 to 35 percent slopes	8.8	0.3%
CkB	Chautauqua silt loam, 3 to 8 percent slopes	420.6	12.7%
CkC	Chautauqua silt loam, 8 to 15 percent slopes	42.2	1.3%
CkD	Chautauqua silt loam, 15 to 25 percent slopes	13.0	0.4%
CnA	Chenango gravelly loam, 0 to 3 percent slopes	9.1	0.3%
CnB	Chenango gravelly loam, 3 to 8 percent slopes	260.3	7.9%
CnC	Chenango gravelly loam, 8 to 15 percent slopes	88.2	2.7%
CnD	Chenango gravelly loam, 15 to 25 percent slopes	7.7	0.2%
CoB	Chenango channery loam, fan, 3 to 8 percent slopes	29.0	0.9%
ErB	Erie silt loam, 3 to 8 percent slopes	1.0	0.0%
Fe	Fluvaquents-Udifluvents complex, frequently flooded	4.2	0.1%
FmA	Fremont silt loam, 0 to 3 percent slopes	6.3	0.2%
FmB	Fremont silt loam, 3 to 8 percent slopes	24.9	0.8%
FmC	Fremont silt loam, 8 to 15 percent slopes	13.8	0.4%
Ge	Getzville silt loam	33.7	1.0%

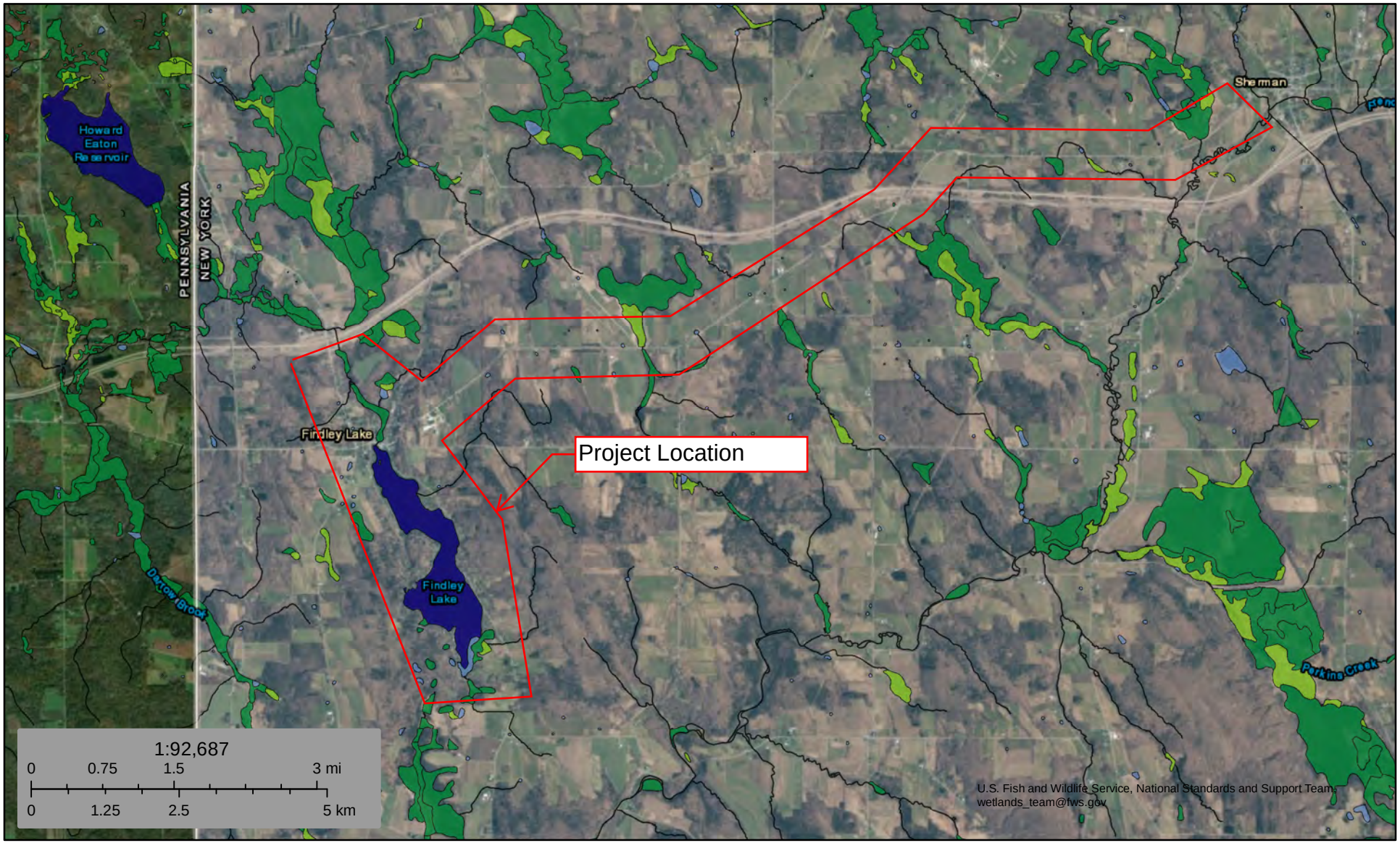
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ha	Halsey mucky silt loam	6.4	0.2%
Ho	Holderton silt loam, 0 to 3 percent slopes, occasionally flooded 140	12.5	0.4%
LnB	Langford silt loam, 3 to 8 percent slopes	106.5	3.2%
LnC	Langford silt loam, 8 to 15 percent slopes	101.9	3.1%
Pa	Palms muck	40.4	1.2%
Pg	Pits, gravel	7.8	0.2%
Po	Pompton silt loam	38.2	1.2%
RaB	Raynham silt loam, 3 to 8 percent slopes	0.7	0.0%
Rh	Red Hook silt loam	48.1	1.5%
ToD	Towerville silt loam, 15 to 25 percent slopes	1.5	0.0%
Ud	Udorthents, landfill	4.6	0.1%
Ue	Udorthents, loamy-skeletal	0.5	0.0%
VaB	Valois gravelly silt loam, 3 to 8 percent slopes	365.1	11.0%
VaC	Valois gravelly silt loam, 8 to 15 percent slopes	310.3	9.4%
VaD	Valois gravelly silt loam, 15 to 25 percent slopes	8.6	0.3%
VaE	Valois gravelly silt loam, 25 to 35 percent slopes	2.6	0.1%
VcC	Valois gravelly silt loam, rolling	95.7	2.9%
W	Water	313.6	9.5%
Wy	Wayland soils complex, 0 to 3 percent slopes, frequently flooded	54.4	1.6%
Totals for Area of Interest		**3,304.4**	**100.0%**

Appendix B

Environmental Resources

U.S. Fish and Wildlife Service
National Wetlands Inventory

Town of Mina



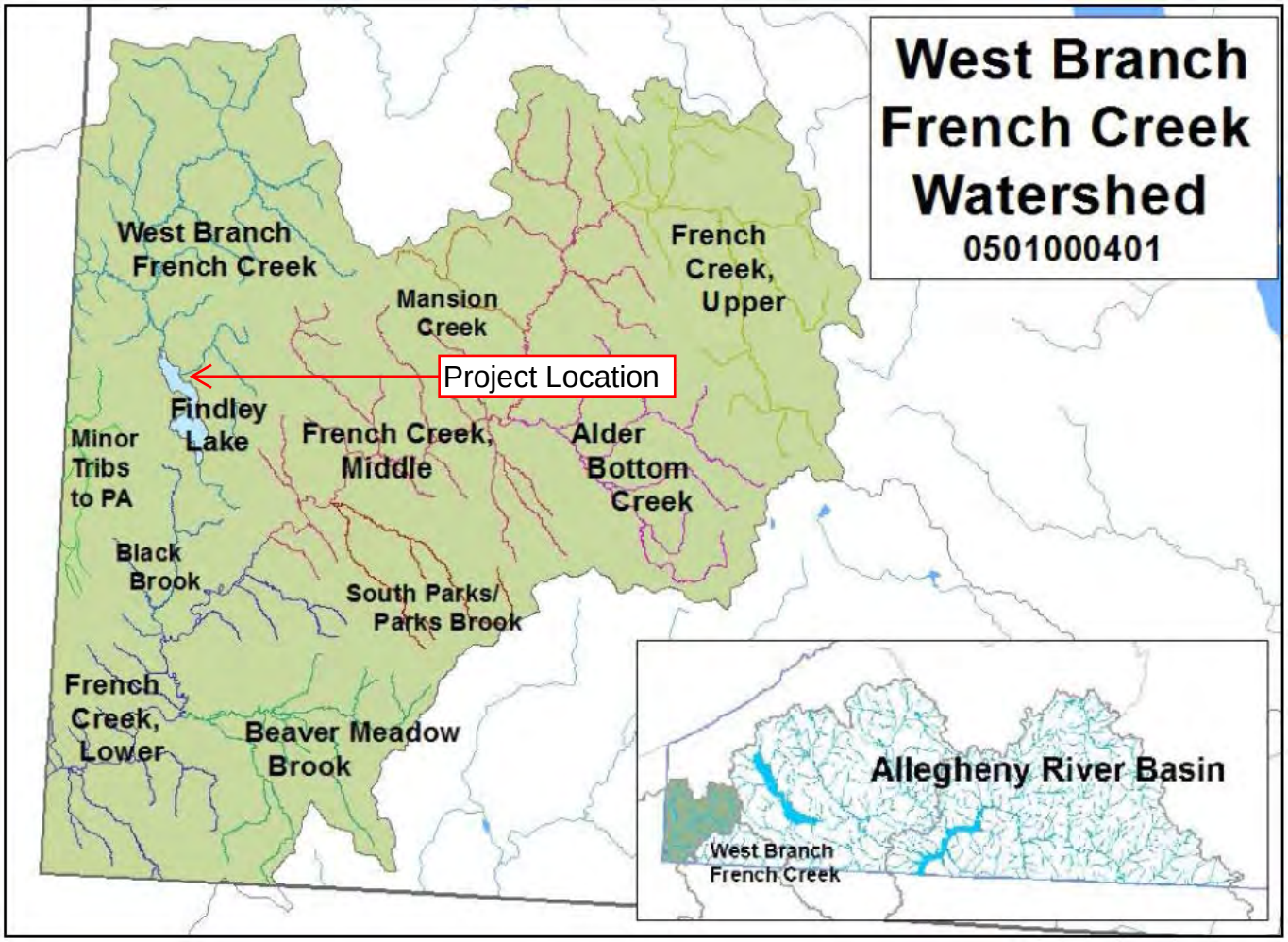
October 19, 2018

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper



West Branch French Creek Watershed
(0501000401)

Water Index Number	Waterbody Segment	Category
Pa-81	French Creek, Lower, and minor tribs (0202-0015)	Minor Impacts
Pa-81	French Creek, Middle, and minor tribs (0202-0063)	Minor Impacts
Pa-81	French Creek, Upper, and tribs (0202-0064)	UnAssessed
Pa-81- 7	Beaver Meadow Brook and tribs (0202-0065)	UnAssessed
Pa-81-10	Black Brook and tribs (0202-0066)	Need Verification
Pa-81-16,17	South Parks/Parks Brook, and tribs (0202-0067)	UnAssessed
Pa-81-25	Alder Bottom Creek and tribs (0202-0068)	UnAssessed
Pa-81-26	Mansion Creek and tribs (0202-0069)	UnAssessed
Pa-82,83	Minor Tribs to Pennsylvania (0202-0070)	UnAssessed
Pa-84	West Branch French Creek and tribs (0202-0071)	UnAssessed
Pa-84- 2-P153	Findley Lake (0202-0004)	Impaired

West Branch French Creek and tribs (0202-0071) Unassessed

Waterbody Location Information

Revised: 07/01/2014

Water Index No:	Pa-84			**Drain Basin:**	Allegheny River
Unit Code:	0501000401	**Class:**	C		French Creek
Water Type/Size:	River	41.5 Miles		**Reg/County:**	9/Chautauqua Co. (7)
Description:	entire stream and tribs, w/in NYS				

Water Quality Problem/Issue Information

Uses Evaluated	**Severity**	**Confidence**
Water Supply	N/A	
Public Bathing	N/A	
Recreation	Unassessed	-
Aquatic Life	Unassessed	-
Fish Consumption	Unassessed	-
Conditions Evaluated		
Habitat/Hydrology	Unknown	
Aesthetics	Unknown	

Type of Pollutant(s)

Known:	- - -
Suspected:	- - -
Unconfirmed:	- - -

Source(s) of Pollutant(s)

Known:	- - -
Suspected:	- - -
Unconfirmed:	- - -

Management Information

Management Status:	Unassessed
Lead Agency/Office:	DOW/BWAM
IR/305(b) Code:	Water with Insufficient Data (IR Category 3)

Further Details

Overview

Currently there is inadequate data/information to evaluate uses and determine a water quality assessment for this waterbody.

Segment Description

This segment includes the entire stream and all tribs. The waters of the stream are Class C,C(T). Tribs to this reach/segment, including Findlay Lake Outlet (-2), are Class C.

Findley Lake (0202-0004) Impaired

Waterbody Location Information

Revised: 02/26/2014

Water Index No:	Pa-84- 2-P153			**Drain Basin:**	Allegheny River
Unit Code:	0501000401	**Class:**	B		French Creek
Water Type/Size:	Lake	307.1 Acres		**Reg/County:**	9/Chautauqua Co. (7)
Description:	entire lake				

Water Quality Problem/Issue Information

Uses Evaluated	**Severity**	**Confidence**
Water Supply	N/A	-
Public Bathing	Stressed	Suspected
Recreation	Impaired	Known
Aquatic Life	Fully Supported	Suspected
Fish Consumption	Unassessed	-
Conditions Evaluated		
Habitat/Hydrology	Fair	
Aesthetics	Poor	

Type of Pollutant(s)

Known:	ALGAL/PLANT GROWTH (native), HARMFUL ALGAL BLOOMS, NUTRIENTS (Phosphorus), D.O./OXYGEN DEMAND,
Suspected:	Aquatic Invasive Species
Unconfirmed:	- - -

Source(s) of Pollutant(s)

Known:	AGRICULTURE, ONSITE/SEPTIC SYSTEMS
Suspected:	Habitat Alteration
Unconfirmed:	- - -

Management Information

Management Status:	Strategy Implementation Scheduled/Underway **Lead**
Agency/Office:	DOW/Reg9
IR/305(b) Code:	Impaired Water,TMDL Completed (IR Category 4a)

Further Details

Overview

Findley Lake is assessed as an impaired waterbody due to recreation uses that are known to be impaired by nutrients (phosphorus), excessive algae, poor water clarity, and shoreline harmful algal blooms from onsite/septic systems and agricultural sources. Public bathing use is also impacted by these conditions, although additional monitoring is necessary to determine if the use is impaired. The aesthetic condition of the lake and associated recreational activities are also affected by excessive aquatic vegetation and the presence of invasive plants. It is frequently reported by the public that the lake “looks bad.”

Use Assessment

This lake waterbody is designated class B, suitable for use as a public bathing beach, general recreation and aquatic life support, but not as a water supply.

Recreation use is considered to be impaired by elevated nutrients (phosphorus), excessive algae, poor water clarity, and shoreline harmful algal blooms. Additional bacteriological sampling is needed to evaluate pathogen levels and the impact on public bathing (swimming) use. Conditions suggest at least stresses to public bathing. Non-contact recreation (boating, fishing) is also affected by excessive aquatic vegetation and the presence of invasive plant growth (Eurasian watermilfoil, curly leafed pondweed). Aesthetic conditions of the lake are considered to be poor due to excessive algae, shoreline algal blooms and excessive aquatic vegetation. It is frequent reported by citizen volunteers that the lake "looks bad." (DEC/DOW, BWAM/CSLAP, July 2013)

There are no known restrictions to aquatic life. Concerns have been noted regarding hypolimnetic oxygen depletion impacts on aquatic life support, however tiger muskie and walleye have been stocked by NYSDEC, and the lake provides a good smallmouth bass and largemouth bass fishery. (DEC/DFWMR, Region 9, January 2007)

Fish Consumption use is considered to be unassessed. There are no health advisories limiting the consumption of fish from this waterbody (beyond the general advice for all waters). However due to the presence of impacts/contaminants in the stream and the uncertainty as to whether the lack of a waterbody-specific health advisory is based on actual sampling, fish consumption use is noted as unassessed, rather than fully supported but unconfirmed. (NYS DOH Health Advisories and DEC/DOW, BWAM, December 2014)

Water quality monitoring by NYSDEC lakes programs focuses primarily on the support of general recreation and aquatic life. Samples to evaluate the bacteriological condition and bathing use of the lake, or to evaluate contamination from organic compounds, metals or other inorganic pollutants are not usually collected as part of these monitoring programs. Monitoring to assess public bathing use and assessments of restrictions on fish consumption are generally the responsibility of state and/or local health departments.

Water Quality Information

Findley Lake has been sampled as part of the NYSDEC Citizen Statewide Lake Assessment Program (CSLAP) beginning in 1986 and continuing through 2012. CSLAP reports are issued annually and are available on the DEC and NYSFOLA websites. These data indicate that the lake continues to be best characterized as eutrophic, or highly productive. Phosphorus levels in the lake typically exceed both the state guidance values of 20 ug/l, as well as the assessment criteria for chlorophyll a, indicative of high algae levels. Lake clarity is often restricted, with water transparency less than what is minimally recommended for swimming beaches. Nutrient (phosphorus and ammonia) levels at the lake bottom are usually elevated suggesting the bottom waters are poorly oxygenated and contribute to increases in surface water nutrient levels throughout the summer. This deepwater oxygen deficit was recorded in the lake at least back to the 1930s. Readings of pH typically fall within the state water quality standards for protection of aquatic life. (DEC/DOW, BWAM/CSLAP, July 2013)

The Lake experiences summer algal blooms and shows a high susceptibility for harmful algal blooms (HABs). High levels of blue green algae have been found in the open water and extremely high blue green algae concentrations in shoreline blooms have been noted. Analysis of shoreline algal blooms indicates algal toxin levels exceeding the criteria for public bathing, although open water levels were below this threshold. Cyanobacteria also suggest some threat to pets that come into contact with the water. (DEC/DOW, BWAM/CSLAP, July 2013)

Public perception of the lake and its uses is also evaluated as part of the CSLAP program. This assessment indicates the recreational suitability of the lake to be somewhat unfavorable. The lake is described most frequently as "slightly" impacted for most recreational uses, and occasionally described as "substantially"

impacted. These impacts were often associated with excessive algae or poor water clarity, and somewhat less frequently with excessive weeds. Aquatic plants are dominated by a mix of native and non-native species (though invasives may be on the decline) and have been cited as impacting recreational uses. (DEC/DOW, BWAM/CSLAP, July 2013)

Source Assessment
Evaluation of sources of nutrient (phosphorus) loading to the Lake and estimates of the corresponding loads of each were conducted as part of the 2008 TMDL for Phosphorus in Findley Lake. The TMDL identified contributions from residential onsite wastewater treatment (septic) systems and nonpoint source runoff from agricultural activities (primarily cropland production) as the primary sources. Loading from groundwater transport of nutrients was also noted. Internal loading (nutrient recycling) was not considered in the development of the TMDL due to lack of data to confirm internal loading contribution. However, the TMDL acknowledged the need for additional monitoring to determine if phosphorus migrates from the hypolimnion to the epiliminion, and if phosphorus release from sediment plays a significant role in phosphorus loading in Findley Lake. (DEC/DOW, BWM, TMDL for Phosphorus for Findley Lake, September 2008)

Management Action
A TMDL for addressing phosphorus loadings to the Lake was completed in 2008 and is currently being implemented. The TMDL includes specific management strategies to address residential septic systems, agricultural runoff, and urban stormwater management. (DEC/DOW, BWRM, TMDL for Phosphorus for Findley Lake, September 2008)

Findley Lake is served by the Findley Lake Watershed Foundation. The lake association is involved in a variety of lake management activities focused on water level control, shoreline stabilization, aquatic vegetation control (weed harvesting) and maintenance of navigation buoys. The Findley Lake Watershed Foundation maintains a website at http://www.flwf.org/.

303(d) Listing Information
Findley Lake is not included on Section 303(d) List. The Lake was added to the List in 2004 due to impairments from phosphorus and low dissolved oxygen. The Lake was subsequently delisted in 2008 due to the completion of a TMDL to address phosphorus and resulting low dissolved oxygen. Note that delisting the waterbody due to the completion of a TMDL does not necessarily mean impaired uses have been restored. (DEC/DOW, BWAM, July 2013)

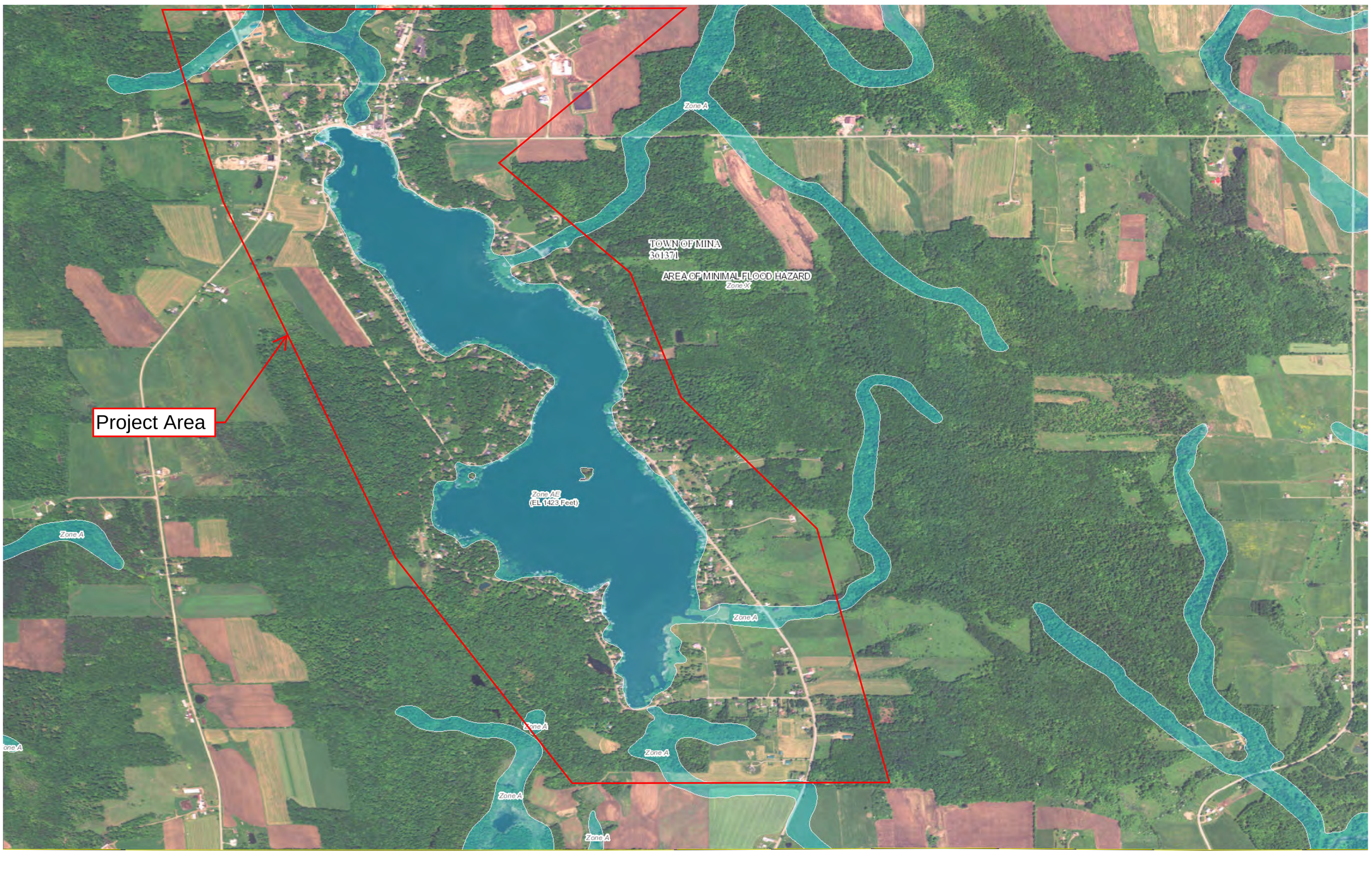
Segment Description
This segment includes the entire area of the lake.

Appendix C

Flood Maps

42°8'26.10"N

79°45'0.99"W



USGS The National Map: Orthoimagery. Data refreshed October 2017.

42°4'14.46"N

79°41'14.03"W

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / B — Cross Sections with 1% Annual Chance
- 17.5 — Water Surface Elevation
- 8 — Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can beordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

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SCALE

N

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: NGVD29
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map please see the Flood Insurance Study(FIS) Report for your community at https://msc.fema.gov

1 inch = 1,000 feet 1:12,000

0 500 1,000 2,000 3,000 4,000 Feet

0 105 210 420 630 840 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

MINA, TOWN OF
CHAUTAUQUA COUNTY
NEW YORK

PANEL **25** OF **30**

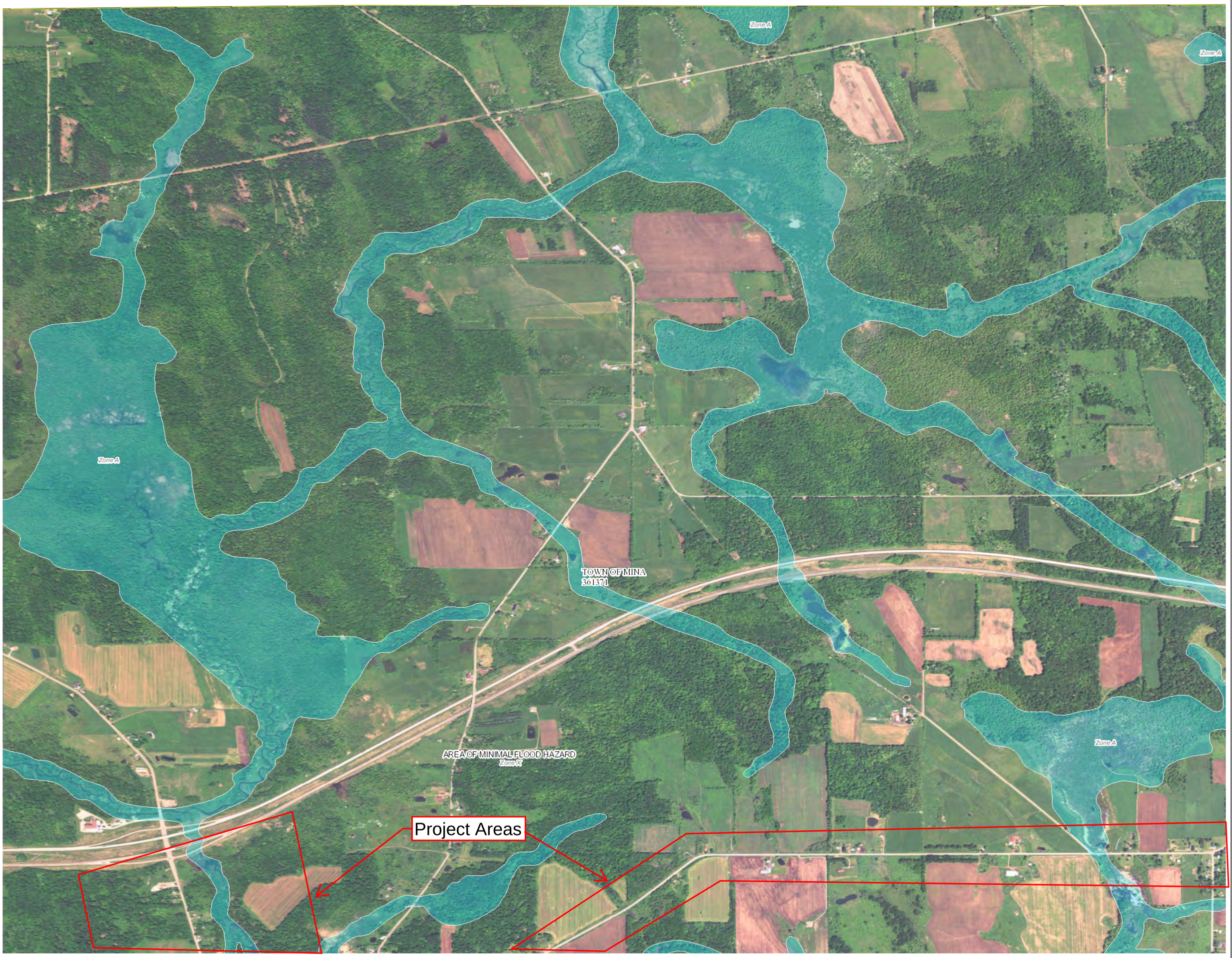
Panel Contains:

COMMUNITY	NUMBER	PANEL
TOWN OF MINA NEW YORK	361371	0025

MAP NUMBER
3613710025B
EFFECTIVE DATE
01/02/2003

42°11'3.13"N

79°45'0.99"W



USGS The National Map: Orthoimagery. Data refreshed October 2017.

42°6'51.49"N

79°44'14.03"W

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
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- Levee, Dike, or Floodwall

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- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

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SCALE

N

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: No elevation features on this FIRM
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1 inch = 1,000 feet 1:12,000

0 500 1,000 2,000 3,000 4,000 Feet

0 105 210 420 630 840 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

MINA, TOWN OF CHAUTAUQUA COUNTY NEW YORK

PANEL **10** OF **30**

Panel Contains:

COMMUNITY	NUMBER	PANEL
TOWN OF MINA NEW YORK	361371	0010

MAP NUMBER
3613710010B
EFFECTIVE DATE
01/02/2003

42°10'0.22"N

79°40'53.86"W

79°38'0.38"W

42°7'54.40"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
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SCALE

N

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: No elevation features on this FIRM
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1 inch = 500 feet 1:6,000

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

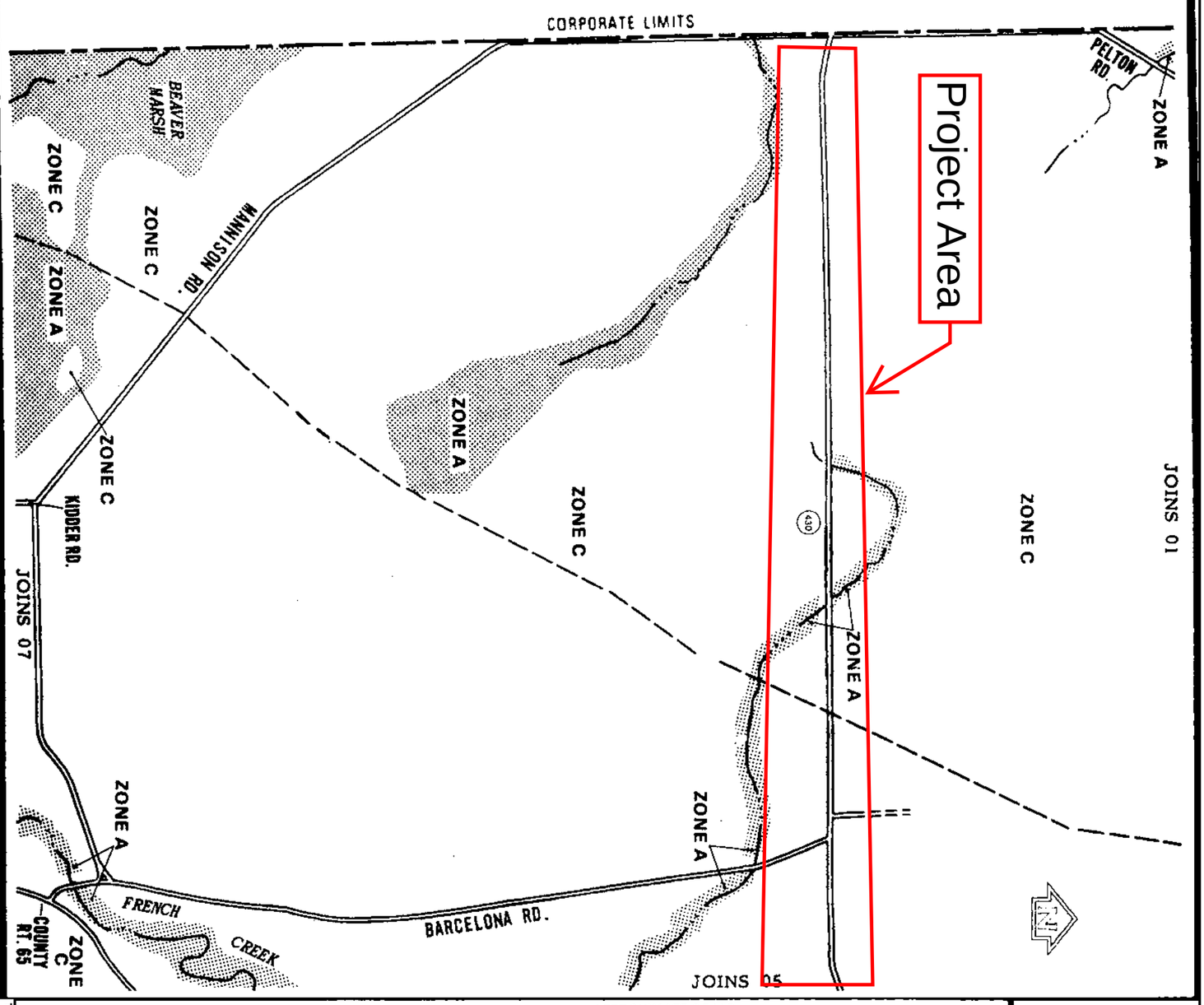
MINA, TOWN OF CHAUTAUQUA COUNTY NEW YORK

PANEL **15** OF **30**

Panel Contains:

COMMUNITY	NUMBER	PANEL
TOWN OF MINA NEW YORK	361371	0015

MAP NUMBER
3613710015B
EFFECTIVE DATE
01/02/2003



APPROXIMATE SCALE

1000 0 1000 2000 3000 FEET

federal emergency management agency

TOWN OF SHERMAN, NY

(CHAUTAUQUA COUNTY)

EFFECTIVE DATE

JANUARY 6, 1984

Appendix D

Current and Potential Future Effluent Permit Limits

EXISTING SPDES PERMIT

PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	June 1 – October 31	French Creek	5/01/2017	3/31/2019

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
								Location		
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Inf.	Eff.	
Flow	Monthly Average	0.14	MGD			Continuous	Meter	X		
Flow	Daily Maximum	Monitor	MGD			Continuous	Meter	X		
Temperature	Daily Maximum	Monitor	Deg. C			1/day	Grab	X	X	
pH	Range	6.5 – 8.5	SU			1/day	Grab	X	X	
BOD_5	Daily Maximum	5	mg/l	6	lbs/d	1/month	6-hr. Comp.	X	X	(1)
Solids, Suspended	Daily Maximum	10	mg/l	12	lbs/d	1/month	6-hr. Comp.	X	X	(1)
Solids, Settleable	Daily Maximum	0.1	ml/l			1/day	Grab	X	X	
Dissolved Oxygen	Daily Minimum	7.0	mg/l			1/day	Grab		X	
Nitrogen, Ammonia (as NH_3)	Monthly Average	2.0	mg/l			1/month	6-hr. Comp.		X	
Effluent Disinfection Required		[X] All Year		[ ] Seasonal from _____ to _____						
Coliform, Fecal	30-Day Geometric Mean	200	No./ 100 ml			1/month	Grab		X	
Coliform, Fecal	7-Day Geometric Mean	400	No./ 100 ml			1/month	Grab		X	
Chlorine, Total Residual	Daily Maximum	0.18	mg/l			1/day	Grab		X	
Chlorine, Total Residual	Daily Maximum	0.02	mg/l			1/day	Grab		X	(2)

FOOTNOTES:

(1) And effluent shall not exceed __15__ % and __15__ % of influent concentration values for BOD_5 & TSS respectively.

(2) Shall become effective 18 months following the effective date of the permit modification (i.e., 11/01/2018).

EXISTING SPDES PERMIT

PERMIT LIMITS, LEVELS AND MONITORING

OUTFALL	LIMITATIONS APPLY:	RECEIVING WATER	EFFECTIVE	EXPIRING
001	November 1 – May 31	French Creek	5/01/2017	3/31/2019

PARAMETER	EFFLUENT LIMIT					MONITORING REQUIREMENTS				FN
	Type	Limit	Units	Limit	Units	Sample Frequency	Sample Type	Location Inf.	Location Eff.	
Flow	Monthly Average	0.14	MGD			Continuous	Meter	X		
Flow	Daily Maximum	Monitor	MGD			Continuous	Meter	X		
Temperature	Daily Maximum	Monitor	Deg. C			1/day	Grab	X	X	
pH	Range	6.5 – 8.5	SU			1/day	Grab	X	X	
BOD_5	Monthly Average	30	mg/l	35	lbs/d	1/month	6-hr. Comp.	X	X	(1)
BOD_5	7-Day Average	45	mg/l	53	lbs/d	1/month	6-hr. Comp.	X	X	
Solids, Suspended	Monthly Average	30	mg/l	35	lbs/d	1/month	6-hr. Comp.	X	X	(1)
Solids, Suspended	7-Day Average	45	mg/l	53	lbs/d	1/month	6-hr. Comp.	X	X	
Solids, Settleable	Daily Maximum	0.1	ml/l			1/day	Grab	X	X	
Effluent Disinfection Required		[X] All Year		[ ] Seasonal from _____ to _____						
Coliform, Fecal	30-Day Geometric Mean	200	No./ 100 ml			1/month	Grab		X	
Coliform, Fecal	7-Day Geometric Mean	400	No./ 100 ml			1/month	Grab		X	
Chlorine, Total Residual	Daily Maximum	0.18	mg/l			1/day	Grab		X	
Chlorine, Total Residual	Daily Maximum	0.05	mg/l			1/day	Grab		X	(2)

FOOTNOTES:

(1) And effluent shall not exceed 15 % and 15 % of influent concentration values for BOD_5 & TSS respectively.

(2) Shall become effective 18 months following the effective date of the permit modification (i.e., 11/01/2018).

SPDES Permit Statement of Basis – Surface Water Discharges

Permittee: Village of Sherman
Facility: Sherman WWTP
SPDES No: NY0036315

Date: 07/09/2018
Permit Writer: Melanie Stein
WQ Engineer: Aseem Kumar/Aslam Mirza

Discussion:

A water quality analysis was requested for two scenarios: (1) the existing discharge from the Village of Sherman Wastewater Treatment Plant (WWTP) in Chautauqua County, New York, and (2) an increased discharge from the WWTP, accounting for additional flow from a potential satellite collection system serving Findley Lake and other developed parcels in the Town of Mina. The average daily flow for the first scenario is assumed to be the current permitted flow, 140,000 gallons per day (gpd). The average daily flow for the second scenario is assumed to be 217,000 gpd.

The discharge for both scenarios would be to French Creek through the existing outfall, Outfall 001. French Creek (Water Index Number Pa-81) is a Class C stream in the Allegheny River Basin (Conewango Creek sub-basin).

Water quality analyses were previously performed in 2014 and 2016 in support of a permit modification for the WWTP. The most recently calculated 7-day/10-year (7Q10) and 30-day/10-year (30Q10) statistical low flows and resulting dilution factors for both scenarios are shown in Table 1 below:

Table 1: Receiving Water Statistical Low Flows & Dilution Factors

	Sherman Only		**Sherman + Mina**	
	Summer	**Winter**	**Summer**	**Winter**
Design Waste Flow (cfs)	0.22	0.22	0.34	0.34
Stream Low Flow (7Q10) (cfs)	0.56	0.80	0.56	0.80
Stream Low Flow (30Q10) (cfs)	0.67	0.96	0.67	0.96
Dilution Factor (7Q10)	3.5	4.6	2.6	3.4
Dilution Factor (30Q10)	4.1	5.4	3.0	3.8

The effluent limits that are proposed to be included in a SPDES permit under each scenario are listed in Table 2 on the following page. Certain limits would be rolled over from the existing permit due to anti-backsliding requirements, including the Intermittent Stream Effluent Limits (ISELs) that were applied in 1975 for the summer season. In addition, the current monitoring requirements (e.g., influent and effluent temperature; daily maximum influent flow; and influent BOD_5, TSS, and settleable solids) would be rolled over from the existing permit.

Table 2: Proposed Effluent Limitations

Parameter	Sherman Only	Sherman + Mina	Type	Basis/Remarks
Flow (gpd)	140,000	217,000	MA	
pH Range	6.5 – 8.5	6.5 – 8.5	Range	TOGS 1.3.3
BOD_5 (mg/L), Summer	5	5	DM	TOGS 1.3.1
BOD_5 (lbs/d), Summer	6	9	DM	Calculated
BOD_5 (mg/L), Winter	30/45	30/45	MA/WA	TOGS 1.3.3/40 CFR Part 133.102
BOD_5 (lbs/d), Winter	35/53	54/81	MA/WA	Calculated
Total Suspended Solids (mg/L), Summer	10	10	DM	TOGS 1.3.1
Total Suspended Solids (lbs/d), Summer	12	18	DM	Calculated
Total Suspended Solids (mg/L), Winter	30/45	30/45	MA/WA	TOGS 1.3.3/40 CFR Part 133.102
Total Suspended Solids (lbs/d), Winter	35/53	54/81	MA/WA	Calculated
Settleable Solids (mL/L)	0.1 with sand filtration; 0.3 without	0.1 with sand filtration; 0.3 without	DM	TOGS 1.3.3
Ammonia (as N) (mg/L), Summer[3]	1.6	1.6	MA	TOGS 1.1.1, TOGS 1.3.1E; pH=7.6, T=25°C; 30Q10
Ammonia (as N) (mg/L), Winter	10	7.1	MA	TOGS 1.1.1, TOGS 1.3.1E; pH=7.4, T=10°C; 30Q10
Dissolved Oxygen (mg/L), Summer	7.0	7.0	Daily Min.	TOGS 1.3.1
Dissolved Oxygen (mg/L), Winter	None	None	Daily Min.	
Total Residual Chlorine (mg/L), Summer[4]	0.02	0.02	DM	TOGS 1.1.1, TOGS 1.3.1E, TOGS 1.3.3; 7Q10
Total Residual Chlorine (mg/L), Winter	0.02	0.02	DM	TOGS 1.1.1, TOGS 1.3.1E, TOGS 1.3.3; 7Q10
Fecal Coliform (cfu/100 mL)	200/400	200/400	30-day/7-day GM	TOGS 1.3.3

Notes:

1. DM – Daily Maximum; WA – Weekly Average; MA – Monthly Average; GM – Geometric Mean
2. Summer season = June 1 – October 31; Winter season = November 1 – May 31
3. The current permit includes a summer season effluent ammonia limitation **as NH_3**. This limit has been converted to a limitation **as N** as per current Department guidance.
4. The water quality-based effluent limit (WQBEL) for Total Residual Chlorine under the combined Sherman + Mina scenario was calculated to be 0.01 mg/L for the summer season. The permit limit would be set to the practical quantitation limit (PQL), which is currently considered to be 0.02 mg/L.

Appendix E

Design Flows and Loads

JOB (V) Sherman - Findley Lake Sewer District

SHEET NO. 1 OF 2

CALCULATED BY MJZ DATE 5/25/2018

CHECKED BY KMK DATE 5/25/2018

DESCP Prelim. BOD - WWTP Design Flows and Loads

Findley Lake - Flows and Loads

Number of EDU's	711			Based on Data from 2017 MPR prepared by GPI
People/ EDU	2.7			
People	1,920			
GPD/ Person	75			Based on experience with Similar LPS Systems (10 States estimates 100 gpd/person)
Est. Avg Flow	143,978	gpd		
Est. Avg Flow	100	gpm		
Est. Peak Day Flow	287,955	gpd	200 gpm	Based on experience, generally 2x's Average

2038 - Potential Growth of Outside Users - Conveyance Corridor

Est. Number of EDU's	50	
People/ EDU	2.7	
People	135	
GPD/ Person	75	
Est. Avg Flow	10,125	gpd

Design Flows

	2018		**2038**	
Year				
People	1,920		2,060	
GPD/ Person	75		75	
Average Daily Flow	144,000	**gpd**	154,500	**gpd**
	100	**gpm**	107	**gpm**
Max. Daily (2 x Average)	288,000	**gpd**	309,000	**gpd**
	200	**gpm**	215	**gpm**

Peaking Factor = (18+√Population in thousands) / (4+√Population in thousands)

Peaking Factor	3.60	**Max.Day (2 x Average)**	3.58
Peak Hourly Flow	360 **gpm**	**Peak Hourly Flow**	384 **gpm**

Design Loads - Based on 10 State Standards (*BOD5 and TSS loading are based on the conservative assumption that garbage grinders are in use)

2018 Design Loads

BOD_5		1,920	People	
0.22	lb BOD_5/capita/day per 10 States Standards (11.253b)*, the BOD load is:		422	lb/day
144,000	gpd average daily flow, future average influent concentration of BOD is		352	mg/l
TSS		1,920	People	
0.25	lb TSS/capita/day per 10 States Standards (11.253b)*, the future TSS load is:		480	lb/day
144,000	gpd average daily flow, future average influent concentration of TSS is		400	mg/l

2038 Design Loads

BOD_5		2,060	People	
0.22	lb BOD_5/capita/day per 10 States Standards (11.253b)*, the BOD load is:		453	lb/day
154,500	gpd average daily flow, future average influent concentration of BOD is		352	mg/l
TSS		2,060	People	
0.25	lb TSS/capita/day per 10 States Standards (11.253b)*, the future TSS load is:		515	lb/day
154,500	gpd average daily flow, future average influent concentration of TSS is		400	mg/l

Barton & Loguidice

JOB	(V) Sherman - Findley Lake Sewer District
SHEET NO.	2 OF 2
CALCULATED BY	MJZ DATE 5/25/2018
CHECKED BY	KMK DATE 5/25/2018
DESCP	Prelim. BOD - WWTP Design Flows and Loads

Design Loads - Based on Wastewater Engineering Treatment, Disposal, and Reuse (Metcalf and Eddy, Inc.)

2018 Flow 144,000 gpd

2038 Flow 154,500 gpd

Contaminants	Unit	Weak	Medium	Strong	Selected	2018	2038	
Solids (TS)	mg/L	350	720	1200	720			
Dissolved Total (TDS)	mg/L	250	500	850	500			
Fixed	mg/L	145	300	525	300			
Volatile	mg/L	105	200	325	200			
Suspended Solids (TSS)	mg/L	100	220	350	220	264	283	lb / day
Fixed	mg/L	20	55	75	55			
Volatile	mg/L	80	165	275	165			
Settleable Solids	mL/L	5	10	20	10			
BOD5	mg/L	110	220	400	220	264	283	lb / day
Total Organic Carbon (TOC)	mg/L	80	160	290	160			
Chemical Oxygen Demand (COD)	mg/L	250	500	1000	500			
Nitrogen (total as N)	mg/L	20	40	85	40			
Organic	mg/L	8	15	35	15			
Free Ammonia	mg/L	12	25	50	25	30	32	lb / day
Nitrates	mg/L	0	0	0	0			
Nitrites	mg/L	0	0	0	0			
Phosphorus (Total as P)	mg/L	4	8	15	8	10	10	lb / day
Organic	mg/L	1	3	5	3			
Inorganic	mg/L	3	5	10	5			
Chlorides	mg/L	30	50	100	50			
Sulfides	mg/L	20	30	50	30			
Alkalinity (as CaCO3)	mg/L	50	100	200	100			
Grease	mg/L	50	100	150	100			
Total Coliform	no/100 ML	10^6 to 10^7	10^7 to 10^8	10^8 to 10^9	10000000			
Volatile Organic Compounds (VOC's)	ug/L	<100	100-400	>400	250			

Selected Design Loads for Findley Lake Sewer District

2038 - BOD_5	**453**	**lb/day**
2038 - TSS	**515**	**lb/day**
2038 - Nitrogen as Ammonia	**35**	**lb/day**
2038 - Phosphorus	**12**	**lb/day**

Potential Flows and Loads to Regional Sewer Plant (Village of Sherman and Findley Lake Sewer District)

2038			
	Sherman	**Findley Lake**	**Total**
Population of District	735	2,060	2,795
Avg. Day Flow (GPD)	62,500	154,500	217,000
Max Day Flow (GPD)	168,000	309,000	477,000
Peak Hr Flow Rate (GPM)	233	384	617
BOD5	130	453	583
TSS	130	515	645
Nitrogen as Ammonia	15	35	50
Phosphorus	5	12	17

Appendix F

Low Pressure Sewer System Design Analysis

Environment One Corporation

Pressure Sewer Preliminary Cost and Design Analysis For Mina, NY

Prepared For:
Barton and Loguidice. D.P.C.

NY **United States**

Tel:
Fax:
Prepared By: N. Shafarzek
July 23, 2018

Mina, NY

Prepared by : N. Shafarzek **On:** July 23, 2018

Notes :
station recommendations preliminary.

analysis based on drawings and data provided.

GPD values effect retention times only, not line sizing or hydraulics.

pre-existing layout on autoCAD drawing used for LPS layout.

Pump station outfall should be located at the end of zone 85 to avoid massive static head.

Retention time reaches over 14 hrs. in sections furthest from pump station - system may require odor control depending on outfall conditions.

<<<<< E N D O F N O T E S >>>>>

July 23, 2018

Budgetary Low Pressure Sewer System Costs

Mina, NY

	Quantity	Description	Unit Cost	Installation	Sub Total
Valves	5	Air/Vacuum Release Valve	$0.00	0.00	$0.00
	53	Clean Out	$0.00	0.00	$0.00
					$0.00
Pumps	29	DH152-93	$0.00	0.00	$0.00
	391	DH071-93	$0.00	0.00	$0.00
	420	Pump/Panel Installation	$0.00	0.00	$0.00
	420	Lateral Kits (Includes Ball/Check Valve Assembly)	$0.00	0.00	$0.00
	420	Lateral (Boundary) Installation	$0.00	0.00	$0.00
	21,000	Linear feet of 1-1/4" lateral pipe	$0.00	0.00	$0.00
					$0.00
Piping	16,998	2.00" Pipe	$0.00	0.00	$0.00
	15,232	3.00" Pipe	$0.00	0.00	$0.00
	10,677	4.00" Pipe	$0.00	0.00	$0.00
	3,745	5.00" Pipe	$0.00	0.00	$0.00
	610	6.00" Pipe	$0.00	0.00	$0.00
					$0.00

Number of Connections	**420**		
Total Per Connection	**$0.00**	**Total (w/o other)** >>>>>>>>>>>>>	**$0.00**
Grand Total Per Connection	**$0.00**	**Grand Total (including other)** >>>>>>>>>>>>>	**$0.00**

Note: The System Costs above are based on piping sized for, and Grinder Pumps manufactured by Environment One Corporation.

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By:
N. Shafarzek

Mina, NY

July 23, 2018

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Gals/day per Pump	Max Flow Per Pump (gpm)	Max Sim Ops	Max Flow (GPM)	Pipe Size (inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum Fric Loss (feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (feet)	Total Dynamic Head (ft)
This spreadsheet was calculated using pipe diameters for: SDR11HDPE											Friction loss calculations were based on a Constant for inside roughness "C" of: 150						
1.00	2.00	3	3	200	11.00	2	22.00	2.00	2.38	149.00	1.19	1.77	116.05	1,468.00	1,424.00	44.00	160.05
2.00	3.00	6	9	200	11.00	3	33.00	2.00	3.57	836.00	2.52	21.06	114.28	1,468.00	1,422.00	46.00	160.28
3.00	4.00	9	18	200	11.00	4	44.00	3.00	2.19	1,197.00	0.65	7.78	93.22	1,468.00	1,422.00	46.00	139.22
4.00	7.00	5	23	200	11.00	5	55.00	3.00	2.74	326.00	0.98	3.20	85.44	1,468.00	1,430.00	38.00	123.44
5.00	6.00	3	3	200	11.00	2	22.00	2.00	2.38	138.00	1.19	1.64	86.93	1,468.00	1,426.00	42.00	128.93
6.00	7.00	2	5	200	11.00	3	33.00	2.00	3.57	121.00	2.52	3.05	85.29	1,468.00	1,422.00	46.00	131.29
7.00	8.00	1	29	200	11.00	5	55.00	3.00	2.74	218.00	0.98	2.14	82.24	1,468.00	1,452.00	16.00	98.24
8.00	9.00	20	49	200	11.00	6	66.00	3.00	3.29	2,630.00	1.38	36.22	80.10	1,468.00	1,426.00	42.00	122.10
9.00	12.00	4	53	200	11.00	7	77.00	4.00	2.32	853.00	0.54	4.60	43.88	1,468.00	1,422.00	46.00	89.88
10.00	11.00	3	3	200	11.00	2	22.00	2.00	2.38	77.00	1.19	0.92	49.92	1,468.00	1,422.00	46.00	95.92
11.00	12.00	6	9	200	11.00	3	33.00	2.00	3.57	386.00	2.52	9.72	49.00	1,468.00	1,422.00	46.00	95.00
12.00	15.00	2	64	200	11.00	7	77.00	4.00	2.32	284.00	0.54	1.53	39.28	1,468.00	1,424.00	44.00	83.28
13.00	14.00	3	3	200	11.00	2	22.00	2.00	2.38	494.00	1.19	5.87	50.02	1,468.00	1,454.00	14.00	64.02
14.00	15.00	2	5	200	11.00	3	33.00	2.00	3.57	254.00	2.52	6.40	44.15	1,468.00	1,424.00	44.00	88.15
15.00	17.00	3	72	200	11.00	7	77.00	4.00	2.32	663.00	0.54	3.58	37.75	1,468.00	1,436.00	32.00	69.75
16.00	16.10	3	3	200	11.00	2	22.00	2.00	2.38	1,903.00	1.19	22.63	79.70	1,498.00	1,494.00	4.00	83.70
16.10	17.00	3	6	200	11.00	3	33.00	2.00	3.57	909.00	2.52	22.90	57.07	1,476.00	1,468.00	8.00	65.07
17.00	18.00	2	80	200	11.00	7	77.00	4.00	2.32	504.00	0.54	2.72	34.17	1,468.00	1,444.00	24.00	58.17
18.00	38.00	2	82	200	11.00	8	88.00	4.00	2.65	615.00	0.69	4.25	31.45	1,468.00	1,438.00	30.00	61.45
19.00	21.00	3	3	200	11.00	2	22.00	2.00	2.38	351.00	1.19	4.17	65.92	1,480.00	1,424.00	56.00	121.92
20.00	21.00	3	3	200	11.00	2	22.00	2.00	2.38	255.00	1.19	3.03	64.78	1,480.00	1,424.00	56.00	120.78
21.00	23.00	0	6	200	11.00	3	33.00	2.00	3.57	128.00	2.52	3.22	61.75	1,480.00	1,470.00	10.00	71.75
22.00	23.00	3	3	200	11.00	2	22.00	2.00	2.38	166.00	1.19	1.97	60.50	1,480.00	1,422.00	58.00	118.50
23.00	25.00	0	9	200	11.00	3	33.00	2.00	3.57	417.00	2.52	10.51	58.53	1,480.00	1,480.00	0.00	58.53
24.00	25.00	3	3	200	11.00	2	22.00	2.00	2.38	200.00	1.19	2.38	50.40	1,478.00	1,422.00	56.00	106.40
25.00	28.00	1	13	200	11.00	4	44.00	3.00	2.19	150.00	0.65	0.97	48.02	1,476.00	1,468.00	8.00	56.02
26.00	27.00	3	3	200	11.00	2	22.00	2.00	2.38	134.00	1.19	1.59	51.18	1,474.00	1,430.00	44.00	95.18
27.00	28.00	1	4	200	11.00	3	33.00	2.00	3.57	101.00	2.52	2.54	49.59	1,474.00	1,462.00	12.00	61.59
28.00	31.00	1	18	200	11.00	4	44.00	3.00	2.19	266.00	0.65	1.73	47.05	1,474.00	1,434.00	40.00	87.05
29.00	31.00	3	3	200	11.00	2	22.00	2.00	2.38	197.00	1.19	2.34	47.66	1,474.00	1,422.00	52.00	99.66
30.00	31.00	2	2	200	11.00	2	22.00	2.00	2.38	333.00	1.19	3.96	49.28	1,474.00	1,424.00	50.00	99.28
31.00	33.00	0	23	200	11.00	5	55.00	3.00	2.74	276.00	0.98	2.71	45.32	1,474.00	1,472.00	2.00	47.32
32.00	33.00	3	3	200	11.00	2	22.00	2.00	2.38	208.00	1.19	2.47	45.08	1,474.00	1,436.00	38.00	83.08
33.00	34.00	4	30	200	11.00	5	55.00	3.00	2.74	429.00	0.98	4.21	42.61	1,474.00	1,436.00	38.00	80.61
34.00	37.00	3	33	200	11.00	6	66.00	3.00	3.29	411.00	1.38	5.66	38.40	1,474.00	1,474.00	0.00	38.40

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One.

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By:
N. Shafarzek

Mina, NY

July 23, 2018

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Gals/day per Pump	Max Flow Per Pump (gpm)	Max Sim Ops	Max Flow (GPM)	Pipe Size (inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum Fric Loss (feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (feet)	Total Dynamic Head (ft)
This spreadsheet was calculated using pipe diameters for: SDR11HDPE											Friction loss calculations were based on a Constant for inside roughness "C" of: 150						
35.00	36.00	3	3	200	11.00	2	22.00	2.00	2.38	110.00	1.19	1.31	40.32	1,468.00	1,422.00	46.00	86.32
36.00	37.00	4	7	200	11.00	3	33.00	2.00	3.57	249.00	2.52	6.27	39.01	1,468.00	1,432.00	36.00	75.01
37.00	38.00	1	41	200	11.00	6	66.00	3.00	3.29	402.00	1.38	5.54	32.74	1,468.00	1,426.00	42.00	74.74
38.00	39.00	22	145	200	11.00	9	99.00	4.00	2.98	1,056.00	0.86	9.08	27.20	1,468.00	1,420.00	48.00	75.20
39.00	40.00	33	178	200	11.00	10	110.00	5.00	2.17	2,612.00	0.37	9.73	18.12	1,468.00	1,422.00	46.00	64.12
40.00	49.00	4	182	200	11.00	11	121.00	5.00	2.39	522.00	0.44	2.32	8.39	1,468.00	1,418.00	50.00	58.39
41.00	42.00	3	3	200	11.00	2	22.00	2.00	2.38	813.00	1.19	9.67	68.75	1,468.00	1,442.00	26.00	94.75
42.00	43.00	6	9	200	11.00	3	33.00	2.00	3.57	1,488.00	2.52	37.49	59.08	1,468.00	1,426.00	42.00	101.08
43.00	44.00	9	18	200	11.00	4	44.00	3.00	2.19	1,000.00	0.65	6.50	21.59	1,468.00	1,444.00	24.00	45.59
44.00	47.00	3	21	200	11.00	5	55.00	3.00	2.74	226.00	0.98	2.22	15.09	1,468.00	1,442.00	26.00	41.09
45.00	46.00	3	3	200	11.00	2	22.00	2.00	2.38	454.00	1.19	5.40	22.75	1,472.00	1,466.00	6.00	28.75
46.00	47.00	1	4	200	11.00	3	33.00	2.00	3.57	178.00	2.52	4.48	17.35	1,468.00	1,462.00	6.00	23.35
47.00	48.00	5	30	200	11.00	5	55.00	3.00	2.74	392.00	0.98	3.85	12.87	1,468.00	1,432.00	36.00	48.87
48.00	49.00	4	34	200	11.00	6	66.00	3.00	3.29	214.00	1.38	2.95	9.02	1,468.00	1,426.00	42.00	51.02
49.00	54.00	1	217	200	11.00	12	132.00	5.00	2.60	13.00	0.52	0.07	6.07	1,468.00	1,426.00	42.00	48.07
50.00	53.00	3	3	200	11.00	2	22.00	2.00	2.38	557.00	1.19	6.62	17.00	1,468.00	1,424.00	44.00	61.00
51.00	52.00	3	3	200	11.00	2	22.00	2.00	2.38	169.00	1.19	2.01	15.26	1,468.00	1,426.00	42.00	57.26
52.00	53.00	3	6	200	11.00	3	33.00	2.00	3.57	114.00	2.52	2.87	13.25	1,468.00	1,428.00	40.00	53.25
53.00	54.00	6	15	200	11.00	4	44.00	3.00	2.19	674.00	0.65	4.38	10.38	1,468.00	1,422.00	46.00	56.38
54.00	85.00	11	243	200	11.00	12	132.00	5.00	2.60	598.00	0.52	3.12	6.00	1,468.00	1,420.00	48.00	54.00
55.00	56.00	3	3	200	11.00	2	22.00	2.00	2.38	513.00	1.19	6.10	122.17	1,468.00	1,424.00	44.00	166.17
56.00	57.00	6	9	200	11.00	3	33.00	2.00	3.57	596.00	2.52	15.02	116.07	1,468.00	1,444.00	24.00	140.07
57.00	62.00	8	17	200	11.00	4	44.00	3.00	2.19	2,416.00	0.65	15.70	101.05	1,468.00	1,442.00	26.00	127.05
58.00	61.00	3	3	200	11.00	2	22.00	2.00	2.38	176.00	1.19	2.09	90.09	1,468.00	1,424.00	44.00	134.09
59.00	60.00	3	3	200	11.00	2	22.00	2.00	2.38	103.00	1.19	1.22	93.02	1,468.00	1,424.00	44.00	137.02
60.00	61.00	3	6	200	11.00	3	33.00	2.00	3.57	151.00	2.52	3.80	91.80	1,468.00	1,424.00	44.00	135.80
61.00	62.00	2	11	200	11.00	4	44.00	3.00	2.19	408.00	0.65	2.65	88.00	1,468.00	1,430.00	38.00	126.00
62.00	63.00	2	30	200	11.00	5	55.00	3.00	2.74	547.00	0.98	5.37	85.35	1,468.00	1,432.00	36.00	121.35
63.00	69.00	18	48	200	11.00	6	66.00	3.00	3.29	1,906.00	1.38	26.25	79.98	1,468.00	1,420.00	48.00	127.98
64.00	65.00	3	3	200	11.00	2	22.00	2.00	2.38	281.00	1.19	3.34	62.72	1,468.00	1,444.00	24.00	86.72
65.00	68.00	4	7	200	11.00	3	33.00	2.00	3.57	198.00	2.52	4.99	59.38	1,468.00	1,440.00	28.00	87.38
66.00	67.00	3	3	200	11.00	2	22.00	2.00	2.38	152.00	1.19	1.81	66.35	1,476.00	1,468.00	8.00	74.35
67.00	68.00	6	9	200	11.00	3	33.00	2.00	3.57	403.00	2.52	10.15	64.54	1,470.00	1,436.00	34.00	98.54
68.00	69.00	0	16	200	11.00	4	44.00	3.00	2.19	102.00	0.65	0.66	54.39	1,468.00	1,436.00	32.00	86.39
69.00	71.00	11	75	200	11.00	7	77.00	4.00	2.32	516.00	0.54	2.78	53.73	1,468.00	1,424.00	44.00	97.73

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One.

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Prepared By:
N. Shafarzek

Mina, NY

July 23, 2018

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Gals/day per Pump	Max Flow Per Pump (gpm)	Max Sim Ops	Max Flow (GPM)	Pipe Size (inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum Fric Loss (feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (feet)	Total Dynamic Head (ft)
This spreadsheet was calculated using pipe diameters for: SDR11HDPE											Friction loss calculations were based on a Constant for inside roughness "C" of: 150						
70.00	71.00	3	3	200	11.00	2	22.00	2.00	2.38	145.00	1.19	1.72	52.67	1,468.00	1,428.00	40.00	92.67
71.00	72.00	3	81	200	11.00	8	88.00	4.00	2.65	166.00	0.69	1.15	50.95	1,468.00	1,426.00	42.00	92.95
72.00	75.00	27	108	200	11.00	8	88.00	4.00	2.65	2,862.00	0.69	19.78	49.80	1,468.00	1,418.00	50.00	99.80
73.00	74.00	3	3	200	11.00	2	22.00	2.00	2.38	143.00	1.19	1.70	40.06	1,468.00	1,422.00	46.00	86.06
74.00	75.00	4	7	200	11.00	3	33.00	2.00	3.57	331.00	2.52	8.34	38.36	1,468.00	1,422.00	46.00	84.36
75.00	78.00	1	116	200	11.00	9	99.00	4.00	2.98	418.00	0.86	3.59	30.02	1,468.00	1,440.00	28.00	58.02
76.00	77.00	3	3	200	11.00	2	22.00	2.00	2.38	230.00	1.19	2.73	33.54	1,468.00	1,428.00	40.00	73.54
77.00	78.00	4	7	200	11.00	3	33.00	2.00	3.57	174.00	2.52	4.38	30.81	1,468.00	1,434.00	34.00	64.81
78.00	85.00	21	144	200	11.00	9	99.00	4.00	2.98	2,740.00	0.86	23.55	26.43	1,468.00	1,422.00	46.00	72.43
79.00	80.00	3	3	200	11.00	2	22.00	2.00	2.38	180.00	1.19	2.14	37.78	1,468.00	1,426.00	42.00	79.78
80.00	81.00	6	9	200	11.00	3	33.00	2.00	3.57	968.00	2.52	24.39	35.64	1,468.00	1,426.00	42.00	77.64
81.00	83.00	3	12	200	11.00	4	44.00	3.00	2.19	258.00	0.65	1.68	11.25	1,468.00	1,432.00	36.00	47.25
82.00	83.00	3	3	200	11.00	2	22.00	2.00	2.38	365.00	1.19	4.34	13.91	1,468.00	1,440.00	28.00	41.91
83.00	84.00	3	18	200	11.00	4	44.00	3.00	2.19	307.00	0.65	2.00	9.57	1,468.00	1,424.00	44.00	53.57
84.00	85.00	9	27	200	11.00	5	55.00	3.00	2.74	477.00	0.98	4.69	7.57	1,468.00	1,428.00	40.00	47.57
85.00	85.00	6	420	200	11.00	18	198.00	6.00	2.75	610.00	0.47	2.88	2.88	1,468.00	1,440.00	28.00	30.88

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One.

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)

Prepared By:
N. Shafarzek

Mina, NY

July 23, 2018

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (inches)	Gallons per 100 lineal feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR11HDPE								Gals per Day per Dwelling		200
1.00	2.00	3	2.00	15.40	149.00	22.95	600	26.14	0.92	13.95
2.00	3.00	9	2.00	15.40	836.00	128.77	1,800	13.98	1.72	13.03
3.00	4.00	18	3.00	33.47	1,197.00	400.59	3,600	8.99	2.67	11.31
4.00	7.00	23	3.00	33.47	326.00	109.10	4,600	42.16	0.57	8.64
5.00	6.00	3	2.00	15.40	138.00	21.26	600	28.23	0.85	9.37
6.00	7.00	5	2.00	15.40	121.00	18.64	1,000	53.66	0.45	8.52
7.00	8.00	29	3.00	33.47	218.00	72.96	5,800	79.50	0.30	8.07
8.00	9.00	49	3.00	33.47	2,630.00	880.17	9,800	11.13	2.16	7.77
9.00	12.00	53	4.00	55.31	853.00	471.82	10,600	22.47	1.07	5.62
10.00	11.00	3	2.00	15.40	77.00	11.86	600	50.59	0.47	5.82
11.00	12.00	9	2.00	15.40	386.00	59.46	1,800	30.27	0.79	5.34
12.00	15.00	64	4.00	55.31	284.00	157.09	12,800	81.48	0.29	4.55
13.00	14.00	3	2.00	15.40	494.00	76.09	600	7.89	3.04	8.24
14.00	15.00	5	2.00	15.40	254.00	39.12	1,000	25.56	0.94	5.19
15.00	17.00	72	4.00	55.31	663.00	366.73	14,400	39.27	0.61	4.25
16.00	16.10	3	2.00	15.40	1,903.00	293.12	600	2.05	11.72	18.17
16.10	17.00	6	2.00	15.40	909.00	140.01	1,200	8.57	2.80	6.44
17.00	18.00	80	4.00	55.31	504.00	278.78	16,000	57.39	0.42	3.64
18.00	38.00	82	4.00	55.31	615.00	340.18	16,400	48.21	0.50	3.22
19.00	21.00	3	2.00	15.40	351.00	54.06	600	11.10	2.16	9.15
20.00	21.00	3	2.00	15.40	255.00	39.28	600	15.28	1.57	8.56
21.00	23.00	6	2.00	15.40	128.00	19.72	1,200	60.87	0.39	6.98
22.00	23.00	3	2.00	15.40	166.00	25.57	600	23.47	1.02	7.61
23.00	25.00	9	2.00	15.40	417.00	64.23	1,800	28.02	0.86	6.59
24.00	25.00	3	2.00	15.40	200.00	30.81	600	19.48	1.23	6.97
25.00	28.00	13	3.00	33.47	150.00	50.20	2,600	51.79	0.46	5.73
26.00	27.00	3	2.00	15.40	134.00	20.64	600	29.07	0.83	6.56
27.00	28.00	4	2.00	15.40	101.00	15.56	800	51.42	0.47	5.74
28.00	31.00	18	3.00	33.47	266.00	89.02	3,600	40.44	0.59	5.27
29.00	31.00	3	2.00	15.40	197.00	30.34	600	19.77	1.21	5.89
30.00	31.00	2	2.00	15.40	333.00	51.29	400	7.80	3.08	7.75
31.00	33.00	23	3.00	33.47	276.00	92.37	4,600	49.80	0.48	4.68
32.00	33.00	3	2.00	15.40	208.00	32.04	600	18.73	1.28	5.48
33.00	34.00	30	3.00	33.47	429.00	143.57	6,000	41.79	0.57	4.20
34.00	37.00	33	3.00	33.47	411.00	137.55	6,600	47.98	0.50	3.62

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)

Prepared By:
N. Shafarzek

Mina, NY

July 23, 2018

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (inches)	Gallons per 100 lineal feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR11HDPE								Gals per Day per Dwelling		200
35.00	36.00	3	2.00	15.40	110.00	16.94	600	35.41	0.68	4.46
36.00	37.00	7	2.00	15.40	249.00	38.35	1,400	36.50	0.66	3.78
37.00	38.00	41	3.00	33.47	402.00	134.54	8,200	60.95	0.39	3.12
38.00	39.00	145	4.00	55.31	1,056.00	584.11	29,000	49.65	0.48	2.73
39.00	40.00	178	5.00	84.50	2,612.00	2,207.21	35,600	16.13	1.49	2.24
40.00	49.00	182	5.00	84.50	522.00	441.10	36,400	82.52	0.29	0.76
41.00	42.00	3	2.00	15.40	813.00	125.23	600	4.79	5.01	11.97
42.00	43.00	9	2.00	15.40	1,488.00	229.19	1,800	7.85	3.06	6.96
43.00	44.00	18	3.00	33.47	1,000.00	334.66	3,600	10.76	2.23	3.91
44.00	47.00	21	3.00	33.47	226.00	75.63	4,200	55.53	0.43	1.67
45.00	46.00	3	2.00	15.40	454.00	69.93	600	8.58	2.80	4.86
46.00	47.00	4	2.00	15.40	178.00	27.42	800	29.18	0.82	2.06
47.00	48.00	30	3.00	33.47	392.00	131.19	6,000	45.74	0.52	1.24
48.00	49.00	34	3.00	33.47	214.00	71.62	6,800	94.95	0.25	0.72
49.00	54.00	217	5.00	84.50	13.00	10.99	43,400	3,950.72	0.01	0.46
50.00	53.00	3	2.00	15.40	557.00	85.79	600	6.99	3.43	5.69
51.00	52.00	3	2.00	15.40	169.00	26.03	600	23.05	1.04	3.66
52.00	53.00	6	2.00	15.40	114.00	17.56	1,200	68.34	0.35	2.61
53.00	54.00	15	3.00	33.47	674.00	225.56	3,000	13.30	1.80	2.26
54.00	85.00	243	5.00	84.50	598.00	505.33	48,600	96.18	0.25	0.46
55.00	56.00	3	2.00	15.40	513.00	79.02	600	7.59	3.16	16.48
56.00	57.00	9	2.00	15.40	596.00	91.80	1,800	19.61	1.22	13.32
57.00	62.00	17	3.00	33.47	2,416.00	808.55	3,400	4.21	5.71	12.10
58.00	61.00	3	2.00	15.40	176.00	27.11	600	22.13	1.08	8.96
59.00	60.00	3	2.00	15.40	103.00	15.86	600	37.82	0.63	8.98
60.00	61.00	6	2.00	15.40	151.00	23.26	1,200	51.59	0.47	8.34
61.00	62.00	11	3.00	33.47	408.00	136.54	2,200	16.11	1.49	7.88
62.00	63.00	30	3.00	33.47	547.00	183.06	6,000	32.78	0.73	6.39
63.00	69.00	48	3.00	33.47	1,906.00	637.87	9,600	15.05	1.59	5.66
64.00	65.00	3	2.00	15.40	281.00	43.28	600	13.86	1.73	6.57
65.00	68.00	7	2.00	15.40	198.00	30.50	1,400	45.91	0.52	4.84
66.00	67.00	3	2.00	15.40	152.00	23.41	600	25.63	0.94	6.08
67.00	68.00	9	2.00	15.40	403.00	62.07	1,800	29.00	0.83	5.15
68.00	69.00	16	3.00	33.47	102.00	34.14	3,200	93.74	0.26	4.32
69.00	71.00	75	4.00	55.31	516.00	285.42	15,000	52.55	0.46	4.06

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)

Prepared By:
N. Shafarzek

Mina, NY

July 23, 2018

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (inches)	Gallons per 100 lineal feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR11HDPE								Gals per Day per Dwelling		200
70.00	71.00	3	2.00	15.40	145.00	22.33	600	26.86	0.89	4.50
71.00	72.00	81	4.00	55.31	166.00	91.82	16,200	176.43	0.14	3.61
72.00	75.00	108	4.00	55.31	2,862.00	1,583.06	21,600	13.64	1.76	3.47
73.00	74.00	3	2.00	15.40	143.00	22.03	600	27.24	0.88	3.47
74.00	75.00	7	2.00	15.40	331.00	50.98	1,400	27.46	0.87	2.59
75.00	78.00	116	4.00	55.31	418.00	231.21	23,200	100.34	0.24	1.71
76.00	77.00	3	2.00	15.40	230.00	35.43	600	16.94	1.42	3.35
77.00	78.00	7	2.00	15.40	174.00	26.80	1,400	52.24	0.46	1.93
78.00	85.00	144	4.00	55.31	2,740.00	1,515.58	28,800	19.00	1.26	1.47
79.00	80.00	3	2.00	15.40	180.00	27.73	600	21.64	1.11	5.56
80.00	81.00	9	2.00	15.40	968.00	149.10	1,800	12.07	1.99	4.45
81.00	83.00	12	3.00	33.47	258.00	86.34	2,400	27.80	0.86	2.47
82.00	83.00	3	2.00	15.40	365.00	56.22	600	10.67	2.25	3.85
83.00	84.00	18	3.00	33.47	307.00	102.74	3,600	35.04	0.68	1.60
84.00	85.00	27	3.00	33.47	477.00	159.64	5,400	33.83	0.71	0.92
85.00	85.00	420	6.00	119.90	610.00	731.38	84,000	114.85	0.21	0.21

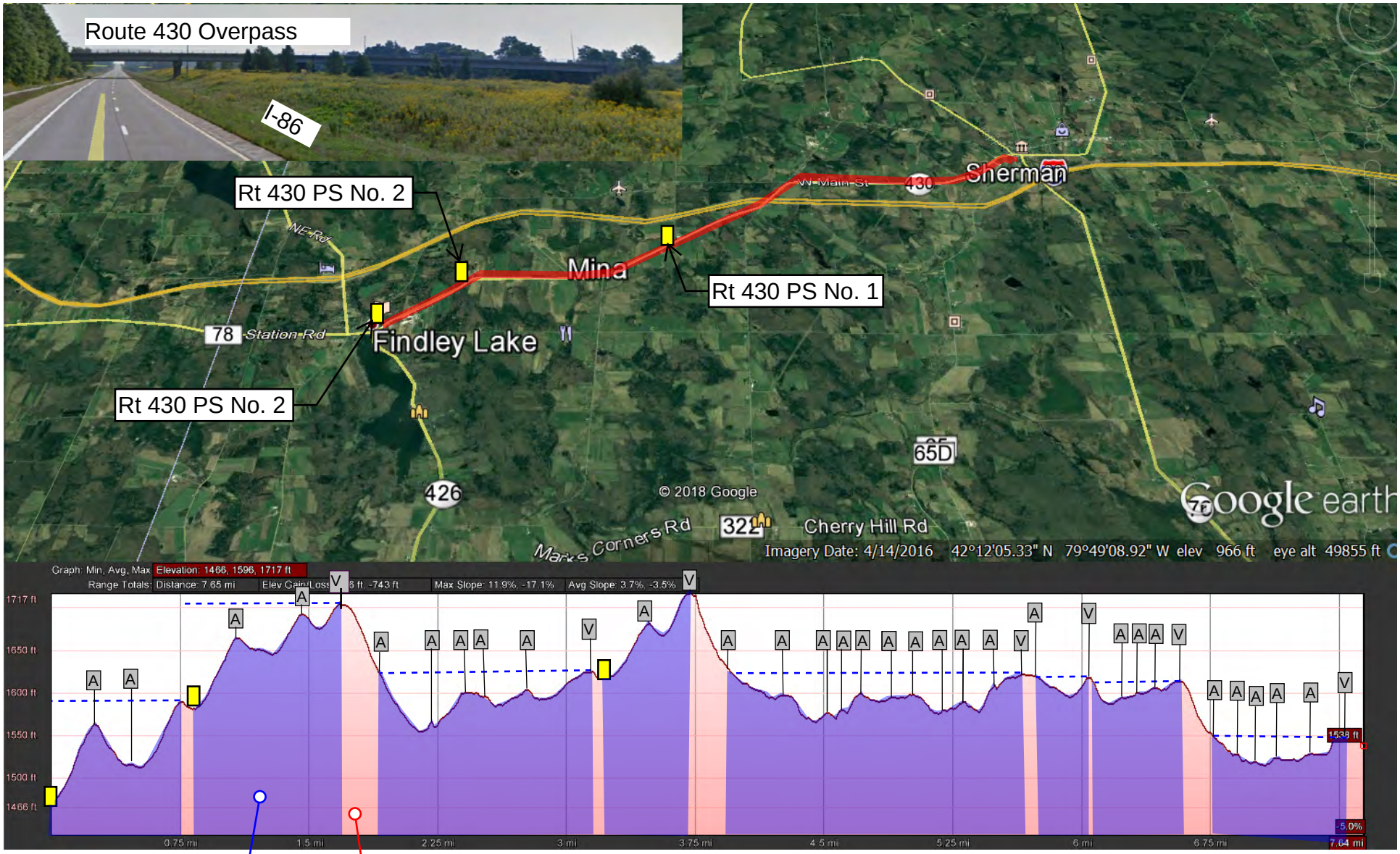
Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One

Appendix G

Sewage Transmission to Sherman Concept Plan and Calculations

Appendix G - Sewage Transmission to Sherman Concept Plan and Calcs

Barton & Loguidice



Full Forcemain (Typ.)

Dry Forcemain (Gravity Drains) (Typ.)

- Pump Station
- A Air Release Manhole
- V Air/Vac. Release Manhole

Barton & Loguidice

JOB NO.	2056.001 - Regional WWTP Alternative		
SHEET	1	OF	2
CALC BY	MJZ	DATE	10/19/2018
CHECK BY	KMK	DATE	11/7/18
SUBJ	Bailey Hill and Main Street Pump Station		

Pump Station Calculation : Bailey Hill and Main Street Pump Station

Pump Station Design Flow	400	gpm					
Average Daily Flow	107	gpm					
Force Main Sizing							
Nominal Size of Force Main	8.0	in	Actual Inner Diameter	7.980	in		
Material of Force Main	DR18 C900 PVC		Minimum Pumping Rate =			312	gpm
Selected Minimum Pumping Rate	400.0	gpm					
Wet Well Sizing and Pump Station Operation							
Wet Well Rim Elevation =	1465.00	ft					
Bottom of Wet Well =	1448.00	ft	Wet Well Depth =	17.00	ft		
Lowest Invert Elevation =	1460.00	ft					
Lead Pump On Elevation =	1454.50	ft					
Lag Pump On Elevation =	1455.50	ft					
Pump Off Elevation =	1451.00	ft					
High Level Alarm =	1456.00						
Inside Diameter of WW=	10.00	ft					
Suction Lift Calculations							
Suction Pipe Diameter	6.00	in	C- Factor	120		Est. EQ Length	45 ft
Total Atm. Pressure @ Sea Elev. (ft)	33.90	ft					
Total Dynamic Suction Lift (O.P.)	16.71	ft					
Altitude Correction (ft)	1.00	ft					
Safety Factor (ft)	6.00	ft					
Vapor Pressure (ft)	1.00	ft					
Net Positive Suction Head Available	9.19	ft					
Pump Cycles and Fill Times							
Cycle Volume (Pump on - Pump Off) =	274.89	ft^3	2056.31	gal			
Wet Well Fill time at Average Day Flow	19.22	minutes	Empty Time at ADF			6.52	minutes
Wet Well Fill time at Peak Hour Flow	5.14	minutes	Empty Time at PHF			10.28	minutes
Total Pump Starts/ Hour at ADF	2.33		Total Pump Starts/ Hour at PHF			3.89	
Starts/ Hour / Pump at ADF	1.17		Starts/ Hour / Pump at PHF			1.95	
Storage and Response Times							
Volume Between High Alarm and Invert =	314.16	ft^3	2350.07	gal			
ADF Response time for Double Pump/Power Failure =			21.96	mins			
PHF Response time for Double Pump/Power Failure =			5.88	mins			

* Utilize a permanent onsite emergency generator or a LP autostart backup pump due to limited storage time

Barton & Loguidice

JOB NO.	2056.001 - Regional WWTP Alternative		
SHEET	2	OF	2
CALC BY	MJZ	DATE	10/19/2018
CHECK BY	KMK	DATE	11/7/18
SUBJ	Bailey Hill and Main Street Pump Station		

Pump Station Calculation : Bailey Hill and Main Street Pump Station

Pump to Next PS

8-inch DR18 PVC C900

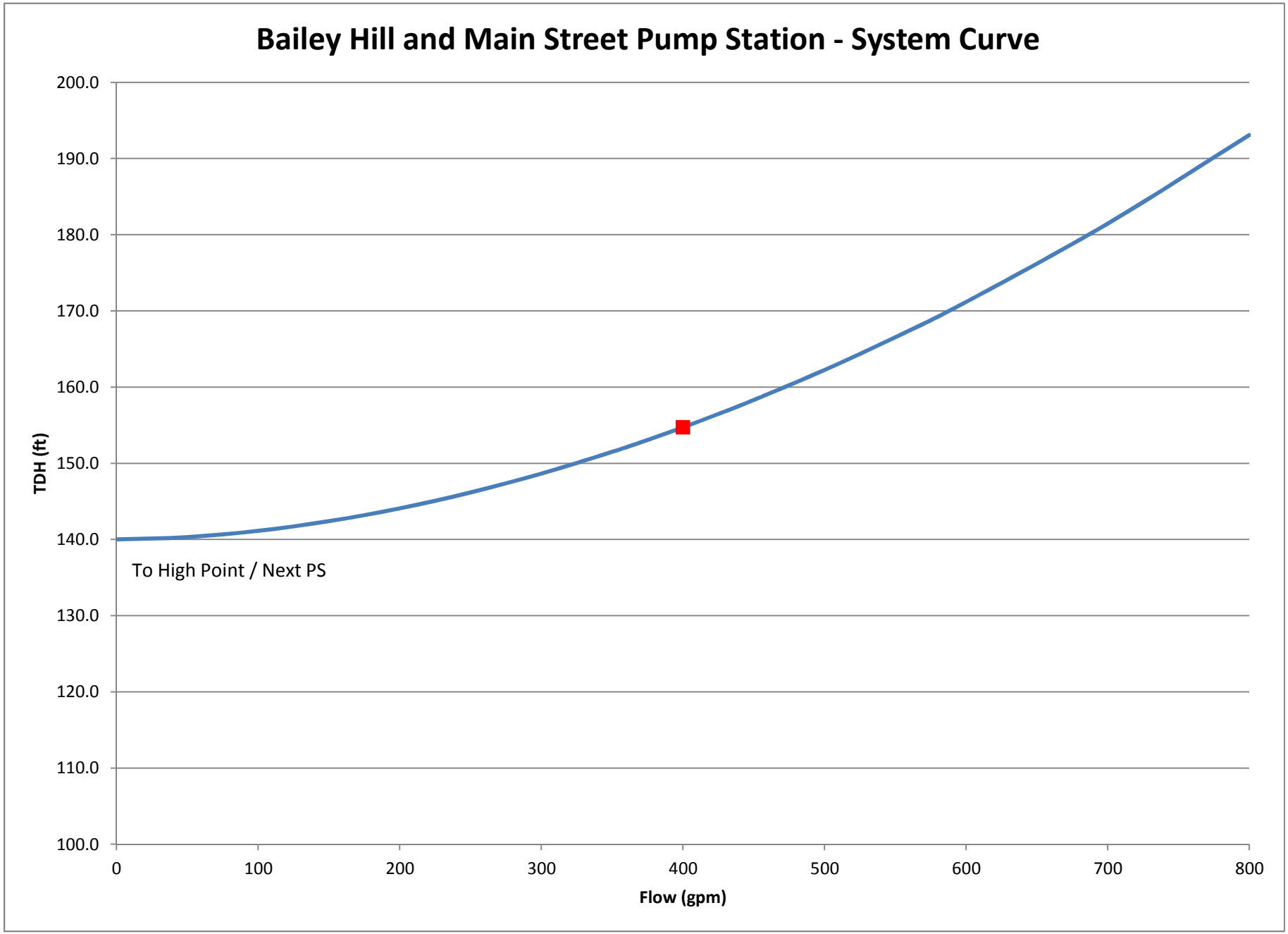
Length of Pipe:	4,120	ft
Inside Diameter of Pipe:	7.980	in

Equivalent Lengths of Pipe		Type of Connection	# of Each	Totals
10.0	ft	45° Elbow 8" diameter	8	80.0
20	ft	90° Elbow 8" diameter	3	60.0
4.5	ft	Gate valve(open) 8" diameter	1	4.5
50	ft	Check valve(open) 8" diameter	1	50.0
				194.5

Total Equivalent Length of Pipe:	**4,315**	**ft**	
Volume of Pipe Section:	**11,209**	**gal**	**Number of Cycles to Remove Volume:** **5.5**

C Factor :	130	
Start Elevation	1449	ft
Discharge Elevation	1589	ft
Static Head (H_s):	140.00	

Flow	HF - 8" Pipe	Velocity	TDH	
0	0.0	0.00	140.0	
50	0.3	0.32	140.3	
100	1.1	0.64	141.1	
150	2.4	0.96	142.4	
200	4.1	1.28	144.1	
250	6.2	1.60	146.2	
300	8.6	1.92	148.6	
350	11.5	2.25	151.5	
375	13.1	2.41	153.1	
400	14.7	2.57	154.7	**Design Operating Pt**
425	16.5	2.73	156.5	
450	18.3	2.89	158.3	
500	22.2	3.21	162.2	
550	26.5	3.53	166.5	
600	31.2	3.85	171.2	
700	41.5	4.49	181.5	
800	53.1	5.13	193.1	


Bailey Hill and Main Street Pump Station - System Curve
200.0
190.0
180.0
170.0
160.0
150.0
140.0
130.0
120.0
110.0
100.0
TDH (ft)
To High Point / Next PS
0
100
200
300
400
500
600
700
800
Flow (gpm)

Barton & Loguidice

JOB NO.	2056.001 - Regional WWTP Alternative		
SHEET	1	OF	2
CALC BY	MJZ	DATE	10/19/2018
CHECK BY	KMK	DATE	11/7/18
SUBJ	Route 430 Pump Station No. 1		

Pump Station Calculation : Route 430 Pump Station No. 1

Pump Station Design Flow	400	gpm					
Average Daily Flow	107	gpm					
Force Main Sizing							
Nominal Size of Force Main	8.0	in	Actual Inner Diameter	7.980	in		
Material of Force Main	DR18 C900 PVC		Minimum Pumping Rate =			312	gpm
Selected Minimum Pumping Rate	400.0	gpm					
Wet Well Sizing and Pump Station Operation							
Wet Well Rim Elevation =	1584.00	ft					
Bottom of Wet Well =	1567.00	ft	Wet Well Depth =	17.00	ft		
Lowest Invert Elevation =	1579.00	ft					
Lead Pump On Elevation =	1573.50	ft					
Lag Pump On Elevation =	1574.50	ft					
Pump Off Elevation =	1570.00	ft					
High Level Alarm =	1575.00						
Inside Diameter of WW=	10.00	ft					
Suction Lift Calculations							
Suction Pipe Diameter	6.00	in	C- Factor	120	Est. EQ Lengt	45	ft
Total Atm. Pressure @ Sea Elev. (ft)	33.90	ft					
Total Dynamic Suction Lift (O.P.)	16.71	ft					
Altitude Correction (ft)	1.00	ft					
Safety Factor (ft)	6.00	ft					
Vapor Pressure (ft)	1.00	ft					
Net Positive Suction Head Available	9.19	ft					
Pump Cycles and Fill Times							
Cycle Volume (Pump on - Pump Off) =	274.89	ft^3	2056.31	gal			
Wet Well Fill time at Average Day Flow	19.22	minutes	Empty Time at ADF			6.52	minutes
Wet Well Fill time at Peak Hour Flow	5.14	minutes	Empty Time at PHF			10.28	minutes
Total Pump Starts/ Hour at ADF	2.33		Total Pump Starts/ Hour at PHF			3.89	
Starts/ Hour / Pump at ADF	1.17		Starts/ Hour / Pump at PHF			1.95	
Storage and Response Times							
Volume Between High Alarm and Invert =	314.16	ft^3	2350.07	gal			
ADF Response time for Double Pump/Power Failure =			21.96	mins			
PHF Response time for Double Pump/Power Failure =			5.88	mins			

* Utilize a permanent onsite emergency generator or a LP autostart backup pump due to limited storage time

Barton & Loguidice

JOB NO.	2056.001 - Regional WWTP Alternative		
SHEET	2	OF	2
CALC BY	MJZ	DATE	10/19/2018
CHECK BY	KMK	DATE	11/7/18
SUBJ	Route 430 Pump Station No. 1		

Pump Station Calculation : Route 430 Pump Station No. 1

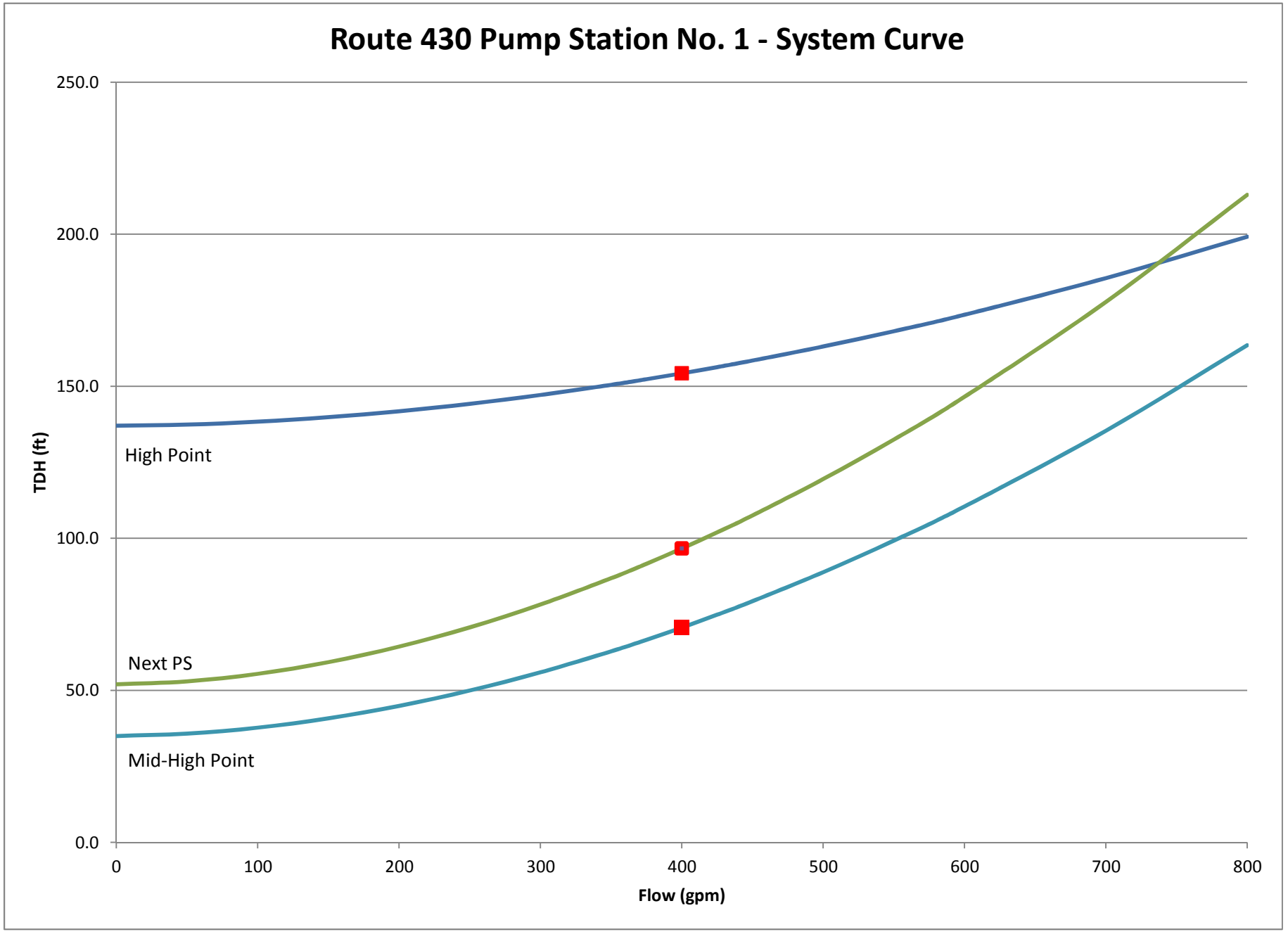
	To High Point		To Next PS		Mid-High Point	
Pipe: 8-inch DR18 PVC C900						
Length of Pipe:	4,860	ft	12,890	ft	10,250	ft
Inside Diameter of Pipe:	7.980	in	7.980	in	7.980	in

Equivalent Lengths of Pipe		Type of Connection	# of Each	Totals
10.0	ft	45° Elbow 8" diameter	8	80.0
20	ft	90° Elbow 8" diameter	3	60.0
4.5	ft	Gate valve(open) 8" diameter	1	4.5
50	ft	Check valve(open) 8" diameter	1	50.0
				194.5

Total Equivalent Length of Pipe (High Point):	**5,055**	**ft**
Total Equivalent Length of Pipe (Next PS):	**13,085**	**ft**
Total Eqiv. Length of Pipe (Mid-High Pt):	**10,445**	**ft**

	High Point		Next PS		Mid-High Pt.	
C Factor :	130		130		130	
Start Elevation	1568	ft	1568	ft	1568	ft
Discharge Elevation	1705	ft	1620	ft	1603	ft
Static Head (H_s):	137.00		52.00		35.00	

	Flow	High Point HF	Next PS HF	Mid High Point HF	Velocity	High Point TDH	Next PS TDH	Mid High Point TDH
	0	0.0	0.00	0.00	0.00	137.0	52.0	35.0
	50	0.4	0.95	0.76	0.32	137.4	53.0	35.8
	100	1.3	3.44	2.74	0.64	138.3	55.4	37.7
	150	2.8	7.27	5.81	0.96	139.8	59.3	40.8
	200	4.8	12.38	9.89	1.28	141.8	64.4	44.9
	250	7.2	18.71	14.94	1.60	144.2	70.7	49.9
	300	10.1	26.22	20.93	1.92	147.1	78.2	55.9
	350	13.5	34.87	27.84	2.25	150.5	86.9	62.8
	375	15.3	39.62	31.63	2.41	152.3	91.6	66.6
Design Op. Pt	400	17.2	44.65	35.64	2.57	154.2	96.6	70.6
	425	19.3	49.94	39.87	2.73	156.3	101.9	74.9
	450	21.4	55.52	44.31	2.89	158.4	107.5	79.3
	500	26.1	67.46	53.85	3.21	163.1	119.5	88.9
	550	31.1	80.47	64.23	3.53	168.1	132.5	99.2
	600	36.5	94.53	75.45	3.85	173.5	146.5	110.5
	700	48.6	125.72	100.35	4.49	185.6	177.7	135.4
	800	62.2	160.95	128.47	5.13	199.2	212.9	163.5


Route 430 Pump Station No. 1 - System Curve
250.0
200.0
150.0
100.0
50.0
0.0
TDH (ft)
High Point
Next PS
Mid-High Point
0
100
200
300
400
500
600
700
800
Flow (gpm)

Barton & Loguidice

JOB NO.	2056.001 - Regional WWTP Alternative		
SHEET	1	OF	2
CALC BY	MJZ	DATE	10/19/2018
CHECK BY	KMK	DATE	11/7/18
SUBJ	Route 430 Pump Station No. 2 (Rt 13)		

Pump Station Calculation : Route 430 Pump Station No. 2 (Rt 13)

Pump Station Design Flow	400	gpm					
Average Daily Flow	107	gpm					
Force Main Sizing							
Nominal Size of Force Main	8.0	in	Actual Inner Diameter	7.980	in		
Material of Force Main	DR18 C900 PVC		Minimum Pumping Rate =			312	gpm
Selected Minimum Pumping Rate	400.0	gpm					
Wet Well Sizing and Pump Station Operation							
Wet Well Rim Elevation =	1620.00	ft					
Bottom of Wet Well =	1603.00	ft	Wet Well Depth =	17.00	ft		
Lowest Invert Elevation =	1615.00	ft					
Lead Pump On Elevation =	1609.50	ft					
Lag Pump On Elevation =	1610.50	ft					
Pump Off Elevation =	1606.00	ft					
High Level Alarm =	1611.00						
Inside Diameter of WW=	10.00	ft					
Suction Lift Calculations							
Suction Pipe Diameter	6.00	in	C- Factor	120	Est. EQ Lengt	45	ft
Total Atm. Pressure @ Sea Elev. (ft)	33.90	ft					
Total Dynamic Suction Lift (O.P.)	16.71	ft					
Altitude Correction (ft)	1.00	ft					
Safety Factor (ft)	6.00	ft					
Vapor Pressure (ft)	1.00	ft					
Net Positive Suction Head Available	9.19	ft					
Pump Cycles and Fill Times							
Cycle Volume (Pump on - Pump Off) =	274.89	ft^3	2056.31	gal			
Wet Well Fill time at Average Day Flow	19.22	minutes	Empty Time at ADF			6.52	minutes
Wet Well Fill time at Peak Hour Flow	5.14	minutes	Empty Time at PHF			10.28	minutes
Total Pump Starts/ Hour at ADF	2.33		Total Pump Starts/ Hour at PHF			3.89	
Starts/ Hour / Pump at ADF	1.17		Starts/ Hour / Pump at PHF			1.95	
Storage and Response Times							
Volume Between High Alarm and Invert =	314.16	ft^3	2350.07	gal			
ADF Response time for Double Pump/Power Failure =			21.96	mins			
PHF Response time for Double Pump/Power Failure =			5.88	mins			

* Utilize a permanent onsite emergency generator or a LP autostart backup pump due to limited storage time

Barton & Loguidice

JOB NO.	2056.001 - Regional WWTP Alternative		
SHEET	2	OF	2
CALC BY	MJZ	DATE	10/19/2018
CHECK BY	KMK	DATE	11/7/18
SUBJ	Route 430 Pump Station No. 2 (Rt 13)		

Pump Station Calculation : Route 430 Pump Station No. 2 (Rt 13)

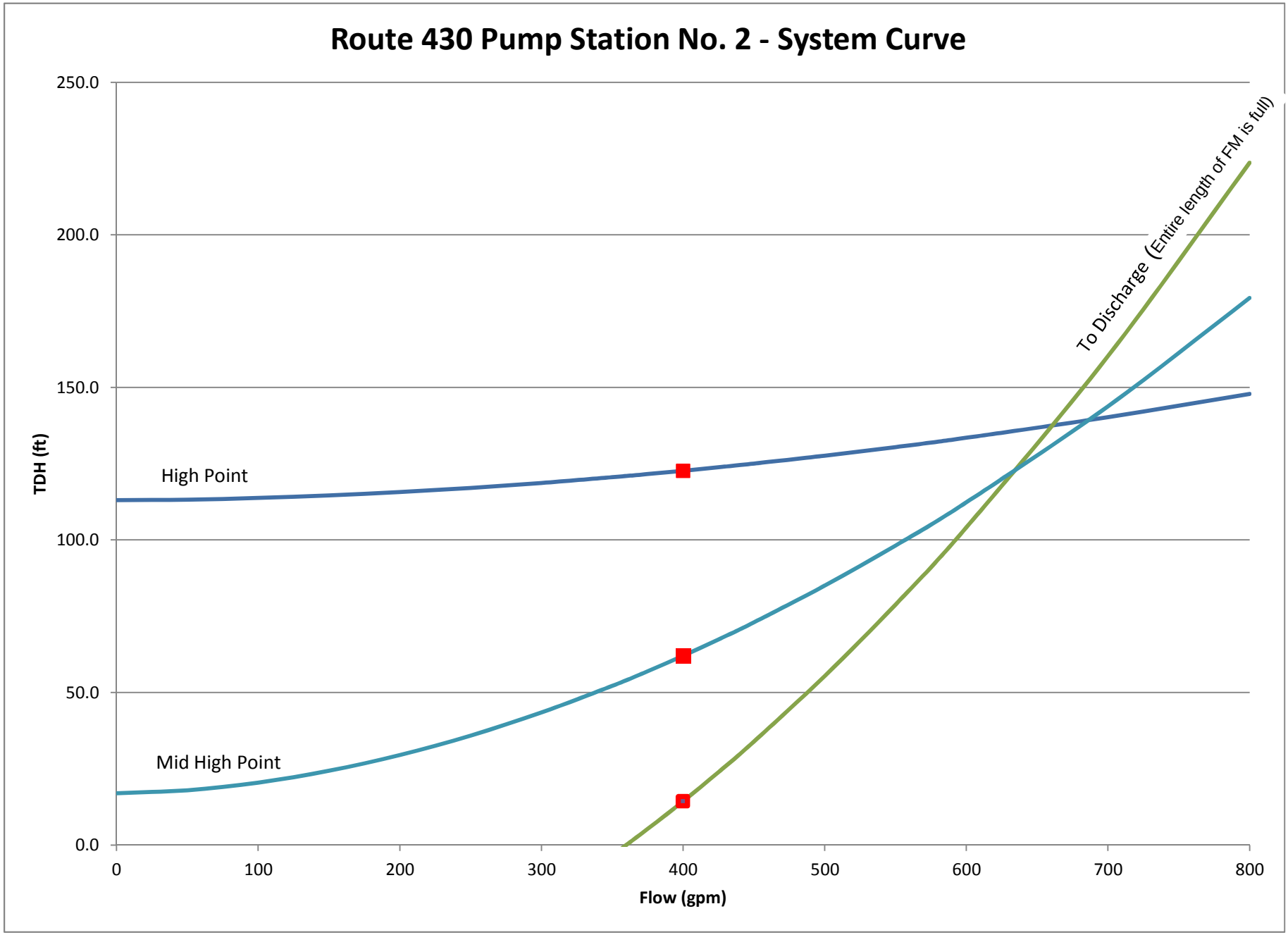
Pipe: 8-inch DR18 PVC C900	To High Point	To Next PS	Mid-High Point
Length of Pipe:	2,640 ft	23,350 ft	13,000 ft
Inside Diameter of Pipe:	7.980 in	7.980 in	7.980 in

Equivalent Lengths of Pipe		Type of Connection	# of Each	Totals
10.0	ft	45° Elbow 8" diameter	8	80.0
20	ft	90° Elbow 8" diameter	3	60.0
4.5	ft	Gate valve(open) 8" diameter	1	4.5
50	ft	Check valve(open) 8" diameter	1	50.0
				194.5

Total Equivalent Length of Pipe (High Point):	**2,835**	**ft**
Total Equivalent Length of Pipe (Next PS):	**23,545**	**ft**
Total Eqiv. Length of Pipe (Mid-High Pt):	**13,195**	**ft**

	High Point		Next PS		Mid-High Pt.	
C Factor :	130		130		130	
Start Elevation	1604	ft	1604	ft	1604	ft
Discharge Elevation	1717	ft	1538	ft	1621	ft
Static Head (H_s):	113.00		-66.00		17.00	

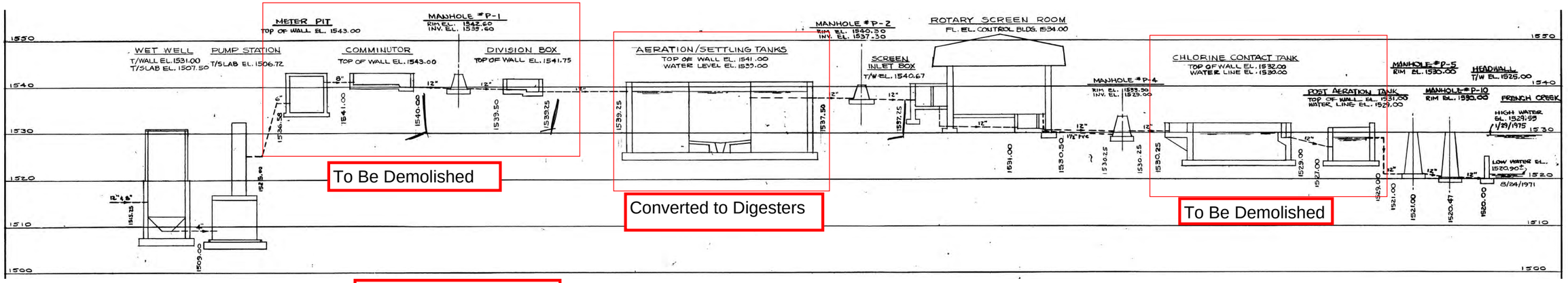
	Flow	High Point HF	Next PS HF	Mid High Point HF	Velocity	High Point TDH	Next PS TDH	Mid High Point TDH
	0	0.0	0.00	0.00	0.00	113.0	-66.0	17.0
	50	0.2	1.71	0.96	0.32	113.2	-64.3	18.0
	100	0.7	6.18	3.46	0.64	113.7	-59.8	20.5
	150	1.6	13.09	7.33	0.96	114.6	-52.9	24.3
	200	2.7	22.28	12.49	1.28	115.7	-43.7	29.5
	250	4.1	33.67	18.87	1.60	117.1	-32.3	35.9
	300	5.7	47.18	26.44	1.92	118.7	-18.8	43.4
	350	7.6	62.75	35.17	2.25	120.6	-3.2	52.2
	375	8.6	71.29	39.95	2.41	121.6	5.3	57.0
Design Op. Pt	400	9.7	80.34	45.02	2.57	122.7	14.3	62.0
	425	10.8	89.87	50.36	2.73	123.8	23.9	67.4
	450	12.0	99.89	55.98	2.89	125.0	33.9	73.0
	500	14.6	121.39	68.03	3.21	127.6	55.4	85.0
	550	17.4	144.80	81.15	3.53	130.4	78.8	98.1
	600	20.5	170.09	95.32	3.85	133.5	104.1	112.3
	700	27.2	226.22	126.78	4.49	140.2	160.2	143.8
	800	34.9	289.61	162.30	5.13	147.9	223.6	179.3


Route 430 Pump Station No. 2 - System Curve
250.0
200.0
150.0
100.0
50.0
0.0
TDH (ft)
High Point
Mid High Point
To Discharge (Entire length of FM is full)
0
100
200
300
400
500
600
700
800
Flow (gpm)

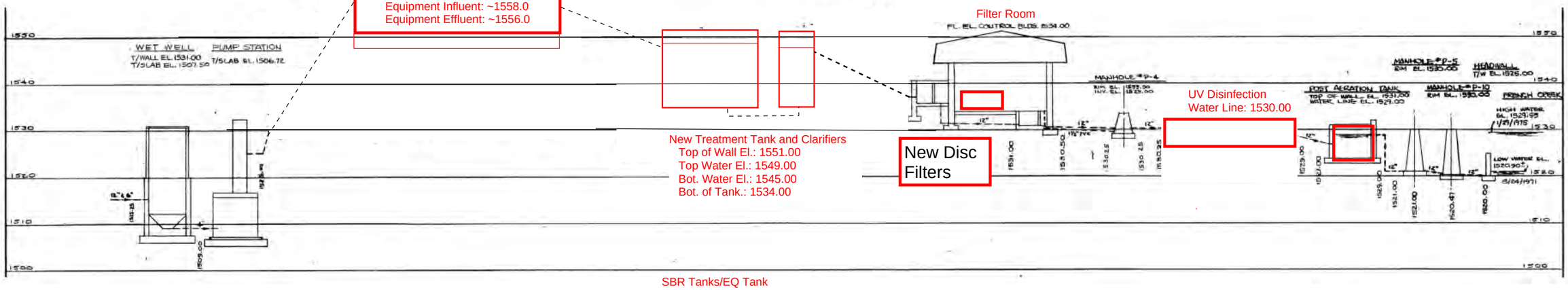
Appendix H

Preliminary Hydraulic Profile and Control Building Plans

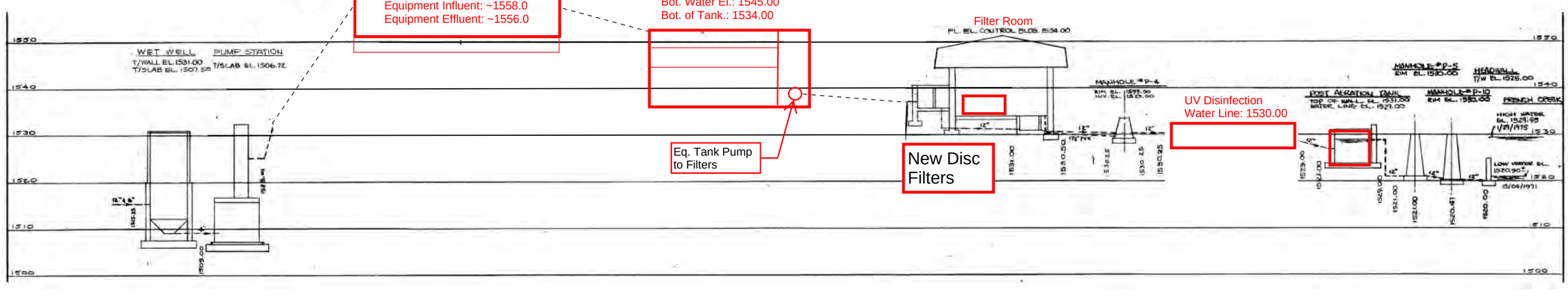
Existing Hydraulic Profile

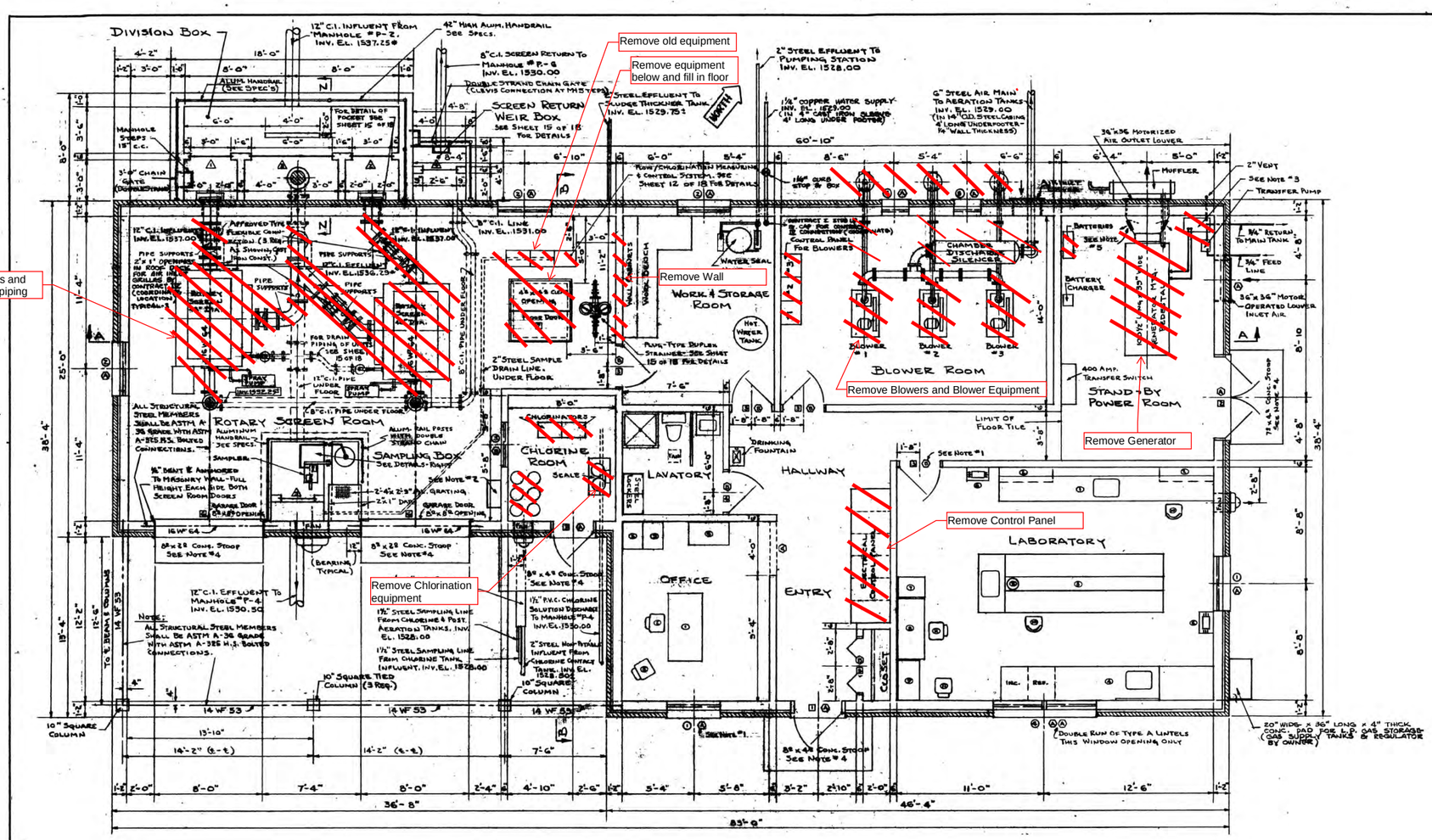


Alternative 2: Hydraulic Profile



Alternative 3: Hydraulic Profile





PRELIMINARY DEMOLITION PLAN

PROJECT NO. C-36-914

REVISIONS		

THE VILLAGE OF SHERMAN
CHAUTAUQUA COUNTY, NEW YORK
WASTEWATER FACILITIES PROJECT
PROCESS UNITS
CONTROL BUILDING & DETAILS

HILL & HILL ENGINEERS, INC. · NORTH EAST, PA.

DRAWN BY	CHK'D	SCALE	DRAWING NO.
TRACED	APPR'D JKH	DATE Sept., 1977	10 OF 18

PR 8607-178

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

REVISIONS

VILLAGE OF SHERMAN
SEWER ASSESSMENT STUDY

CONTROL BUILDING DEMOLITION AND MODIFICATION PLAN

CHAUTAUQUA COUNTY, NEW YORK

VILLAGE OF SHERMAN

Barton & Loguidice

Date
JULY, 2018

Scale
AS SHOWN

Sheet Number
1

Project Number
2056.001

Designed by ____ Drawn by ____ Checked by ____ In charge of ____

Plotted: Jul 25, 2018 - 12:07pm
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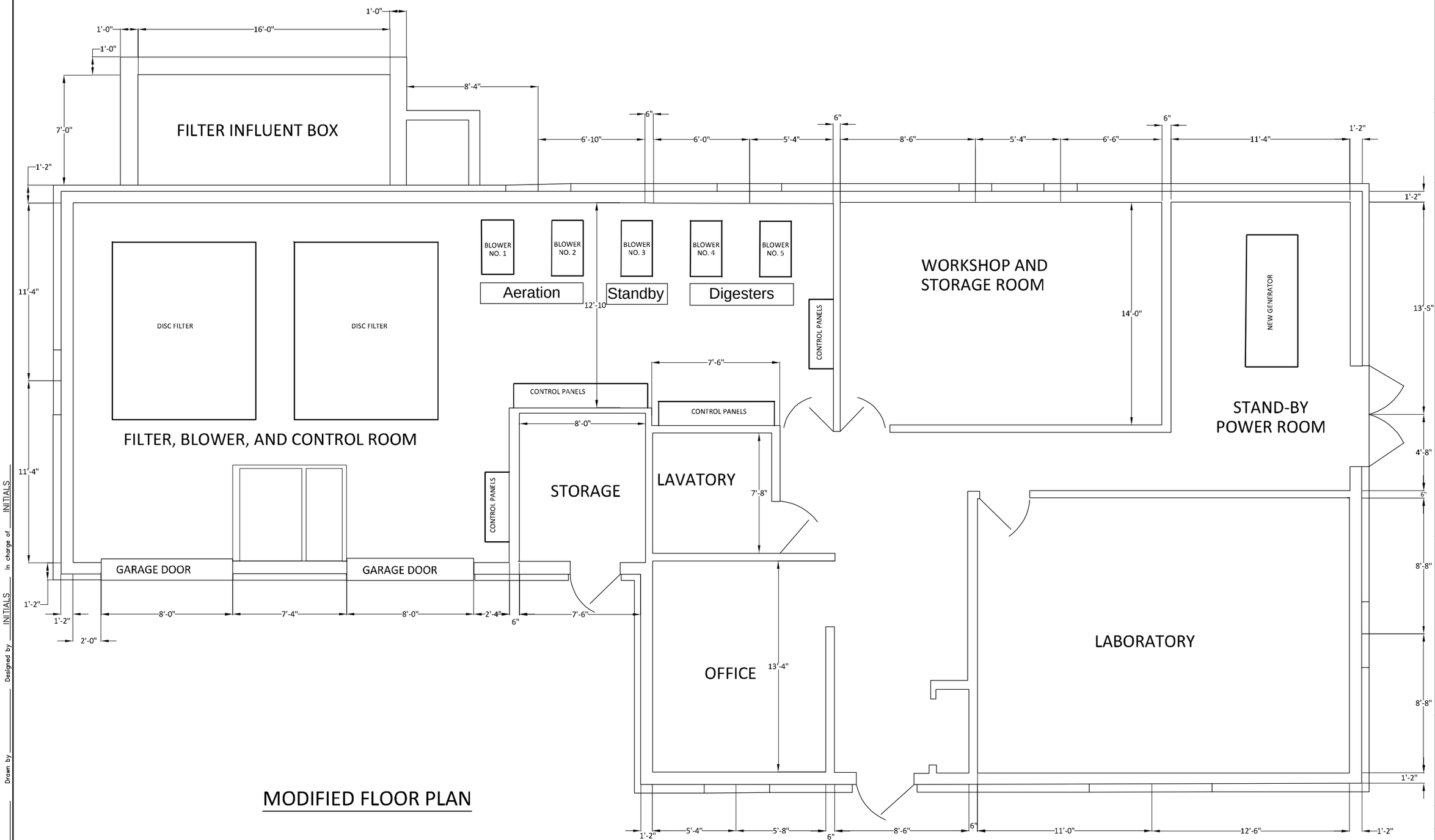

MODIFIED FLOOR PLAN

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED, THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

REVISIONS

SHERMAN WWTP FLOOR PLAN

VILLAGE OF SHERMAN
REGIONAL WWTP STUDY

CHAUTAUQUA COUNTY, NEW YORK

Barton & Loguidice

Date
OCTOBER 2018

Scale
AS SHOWN

Sheet Number
1

Project Number
2056.001

Designed by ____ INITIALS ____ In charge of ____ INITIALS ____

Drawn by ____

Checked by ____

Plotted: Nov 04, 2018 - 1:53PM SYR By: mlz
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Appendix I

Influent Pump Station Design Calculations

Barton & Loguidice

JOB NO.	2056.001 - Regional WWTP Alternative		
SHEET	1	OF	2
CALC BY	MJZ	DATE	11/4/2018
CHECK BY	KMK	DATE	11/7/18
SUBJ	Influent Pump Station Calculations		

Influent Pump Station Calculations

8-inch C900 PVC

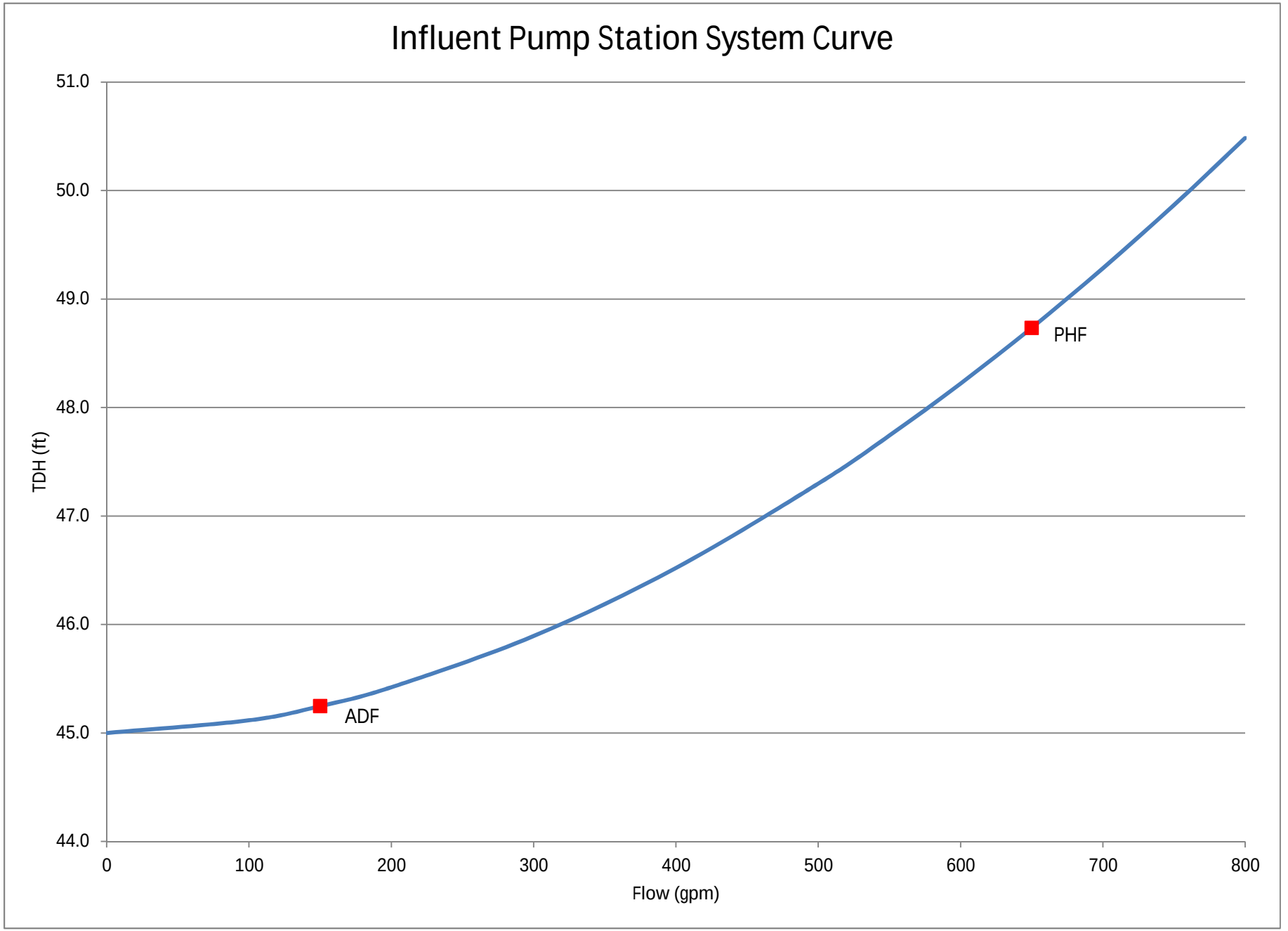
Length of Pipe:	175	ft
Inside Diameter of Pipe:	7.680	in

Equivalent Lengths of Pipe		Type of Connection	# of Each	Totals
10.0	ft	45° Elbow 8" diameter	8	80.0
14	ft	90° Elbow 8" diameter	4	56.0
4.5	ft	Gate valve(open) 8" diameter	2	9.0
50	ft	Check valve(open) 8" diameter	1	50.0
				195.0

Total Equivalent Length of Pipe: **370** ft

C Factor :	130	
Pump Elevation	1513	ft
Discharge Elevation	1558	ft
Static Head (H_s):	45.00	

Flow	HF - 8" Pipe	Velocity	TDH	
0	0.0	0.00	45.0	
100	0.1	0.69	45.1	
150	0.2	1.04	45.2	* Design Point ADF
200	0.4	1.39	45.4	
300	0.9	2.08	45.9	
400	1.5	2.77	46.5	
500	2.3	3.46	47.3	
550	2.7	3.81	47.7	
600	3.2	4.16	48.2	
650	3.7	4.50	48.7	*Design Point PHF
700	4.3	4.85	49.3	
750	4.9	5.19	49.9	
800	5.5	5.54	50.5	


Influent Pump Station System Curve
51.0
50.0
49.0
48.0
47.0
46.0
45.0
44.0
TDH (ft)
PHF
ADF
0
100
200
300
400
500
600
700
800
Flow (gpm)

Appendix J

Alternative No. 2 Treatment Design Calculations

Barton & Loguidice

JOB 2056.001 - Regional WWTP Alternative

SHEET NO. 1 OF 1

CALCULATED BY MJZ DATE 10/2/2018

CHECKED BY KMK DATE 11/8/2018

DESCP Alternative No. 2 - Aeration Sizing Calculations

Aeration Tanks

General Considerations

* The existing undersized clarifiers will be undersized at design PHF
* The existing tanks will not be large enough for treatment even if the clarifiers are moved outside the tank
* The existing tanks would be large enough for aeorbic digestion

Proposed Conditions

* Retrofit the existing treatment tanks for aerobic digestion only
* Install two new circular clarifiers
* Install new rectangular tank containing two treatment trains

Design Flows and Loads:	**Design BOD**	583	lb/day	
	Design TSS	645	lb/day	
	Design Average Day Flow	150	gpm	216,000 gpd
	Design Max Day Flow	331	gpm	476,640 gpd
	Design Peak Hour Flow	617	gpm	888,480 gpd

Clarifier Calculations

Number of Clarifiers	2				
Design PHF Per Clarifier	309	gpm	444,240	gpd	
Design Peak TSS Per Clarifier	1613	lb/day	<=*Conservative (130* 2.5 Peak to Avg factor)*		
Max. Surface Overflow Rate at Design Peak Hour Flow			1,000	gpd/ft^2	**< Acceptable 10 States 72.232 (per ext air or single state nitrification)**
Minimum Area of Clarifier	444.24	ft^3	**Minimum Diameter of Clarifier**	23.79	ft
Selected Diameter	25	ft	**Selected Area of Clarifier**	490.87	ft^3
Surface Overflow Rate at Design Peak Hour Flow			905	gpd/ft^2	**< Acceptable 10 States 72.232 (< 1,000 ext air or single state nitrification)**
Peak Solids Loading Rate at Design Max Day Flow			3.3	gpd/ft^2	**< Acceptable 10 States 72.232 (< 35 ext air or single state nitrification)**
Estimate LF of Weir	72.2566	ft			
Weir Loading at Design PHF	6148.09	gpd/ft			**< Acceptable 10 States Section 72.43 (less than 20,000)**

Aeration Calculations

Volume of Aeration Tank Per Hydraulic Detention Time

Metcalf & Eddy :

Contact Stabilization (5 - 10 HDT) - Min. Volume for 5 hr HDT @ Max Day*	297,900	gal	148,950 gal per train
* Assumes Contact Zone is 1/3 of entire volume			
Extended Aeration (20 - 40 HDT) - Min. Volume for 20 hr HDT @ Average Day	180,000	gal	90,000 gal per train
Single State Nitrification (6- 15 HDT) - Min. Volume for 6 hr HDT @ Avg Day	54,000	gal	27,000 gal per train

Volume of Aeration Tank Per Organic Loading Rate

Max Organic Loading Rate for Ext. Aeration or SSN (lb/day of BOD /1000 ft^3) =	15	**< Per 10 States Section 92.31**	
Minimum Volume of Aeration =	38,867	gal	19,433 gal per train
Max Organic Loading Rate for Contact Stabilization (lb/day of BOD /1000 ft^3) =	50	**< Per 10 States Section 92.31**	
Minimum Volume of Aeration =	11,660	gal	5,830 gal per train

Volume of Aeration and Sizing

Total Volume Wanted	325,000	gallons	162,500	gal per train	21,725 ft^3 per train
Side Water Depth of Treatment Train	15	feet			
Length to Width Ration	3	to 1			
Inside Dimensions of each rectangular treatment train	65.92	ft Length	21.97	ft width	

Selected Sizing	66	ft length	22	ft width	15	ft height	Per Train	
Vol. of Aeration (One train)	162,914	gal	**Vol. of Aeration (Two train)**				325,829	gal
Vol. of Contact Zone (One train)	54,305	gal	**Vol. of Contact Zone (Two train)**				108,610	gal
Vol. of Re-air Zone (One train)	108,610	gal	**Vol. of Re-air Zone (Two train)**				217,219	gal

Organic Loading Rate (lb/day of BOD /1000 ft^3) =	13.38	**< Acceptable 10 States**		
HDT in Aeration @ ADF	36.2 hrs	**HDT in Aeration @ Max Day**	16.4	hrs **< Acceptable**
HDT in Contact Zone @ Max Day	5.5 hrs			**< Acceptable**
Typical RAS Rate	**150 gpm = 100.0% of ADF**	**< Acceptable 10 States Section 92.41 (between 50% and 150% of Design ADF)**		

Appendix K

Aerobic Digester Sizing and Sludge Production Calculations

Barton & Loguidice

JOB	2056.001.001 (V) Sherman Regional WWTP Alternative
SHEET NO.	1 OF 1
CALCULATED BY	MJZ DATE 10/2/2018
CHECKED BY	KMK DATE 11/7/18
DESC	Aerobic Digester Sizing and Sludge Production Calcs

Parameters

Influent Flow	0.217	MGD			
Influent BOD	322	mg/l	Influent BOD	583	ppd
Influent TSS	356	mg/l	Influent TSS	645	ppd

Digester Size

No. of Digesters 2 Diameter 38 ft Water Ht. 13 ft

Total Volume of Digesters 29,487 Cubic Feet 220,563 Gallons

Minimum Size (per 85.31 of 10 States) = 4.5 ft^3 / Person x 2800 people x 1.25 supernatant separation

= 15,750 ft^3 = 117,810 gallons * Size provided > Minimum Size

Activated Sludge

Sludge Production (lb solids/lb BOD Rem.)	0.85	lb/lb
Sludge Production	496	ppd

Aerobic Digester Solids Residence Time

Total Sludge Production	496	ppd	
Sludge Concentration (WAS Solids from SBR)	0.85%		
Sludge Volume	6,990	gpd	<= Similar to SBR Calcs, OK
Volatile Solids %	75%		
Volatile Reduction	40%		
Total Volatile Solids	372	ppd	
Total Inert Solids	124	ppd	
Volatile Reduction	149	ppd	
Volatile Portion Remaining	223	ppd	
Inert Remaining	124	ppd	
Total Sludge Solids Remaining	347	ppd	
Thickened Sludge Concentration	2.0%		
Daily Thickened Sludge	2,080	gpd	
Yearly Thickened Sludge	759,071	gal	
Daily Supernatant	4,911	gpd	
Digester Solids Residence Time	106	days	<= Greater than 40 days, OK

Solids Disposal Costs and Calculations

Liquid Hauling Disposal Costs

Yearly Thickened Sludge			759,071	gal
Cost/gallon for hauling and disposal	$0.12	Total Cost	$91,089	per year

Sludge Dewatering Disposal Costs

Annual Sludge Production (Dry)	63	dry tons per year
Annual Sludge Production w/Chemical Sludge (Dry)	76	dry tons per year
Cake % Solids	20%	
Annual Sludge Production (Wet)	380	wet tons per year
Estimated Hauling Charge	100	$ per wet ton
Annual Sludge Disposal Cost	$37,980	$ per year

Appendix L

WWTP Facility Scoring Sheet

Facility Name Village of Sherman **SPDES #** NY0036315 **Facility Operator** Jay Irwin

EXISTING WWTP

Facility phone number (___) _____ **Date Completed** _____ **Regional Reviewer** _____ **Circle units/items that apply**

Design Flow - 3 points per MGD or part (Minimum 1 point - Maximum 50 points) **3 points x** .14 **MGD =** 1 **Flow Points**

Unit or Item	Points	Unit or Item	Points
Preliminary Treatment (Maximum 8 points)		Phosphorus Removal (required by permit), 4K	8
Bar Screens and/or Comminutor, 1A	2	Chemical Addition for neutralization, 4L	3
Manual Grit Removal, 1B	2	**Advanced Treatment Subtotal$_4$**	11
Mechanical or Aerated Grit Removal, 1C	3	**Disinfection (Maximum 8 points)**	
Pre-aeration, 1D	2	Chlorination:	
Raw sewage or Effluent pumping, 1E	3	Gas Chlorination, 5A	5
Flow equalization basin, 1F	3	Other Chlorination, 5B	2
(Preliminary Score) Subtotal$_1$	5	Dechlorination, 5C	3
Primary Treatment (Maximum 5 points)		Ultraviolet, 5D	5
Primary Treatment Including: Primary Clarifiers, Imhoff tanks, Spirogesters, Clarigesters, Fixed Screens, and Hydroscreens, 2A	5	Ozonization, 5E	5
		Bromine Chloride, 5F	5
Primary Treatment Subtotal$_2$	0	**Disinfection Subtotal$_5$**	5
Secondary Treatment (Maximum 25 points)		**Solids Handling / Disposal (Maximum 25 points)**	
Lagoon (unaerated), 3B	3	Gravity Thickener, 6A	5
Intermittent sand filters without recirculation, 3C	3	Dissolved air floatation thickener, 6B	8
Intermittent sand filters with recirculation, 3D	5	Centrifugation, (includes all modifications) 6C	8
Aerated Lagoon, 3E	7	Aerobic Digestion, 6D	5
Trickling Filter / Biological Filter without recirculation, 3F	9	Single Stage Anaerobic Digestion (unheated), 6E	5
Trickling Filter / Biological Filter with recirculation, 3G	11	Single Stage Anaerobic Digestion (heated), 6F	8
Rotating Biological Contactors, 3H	11	Two Stage Anaerobic Digestion, 6G	10
Activated Sludge (includes all process modifications), 3I	20	Sludge Drying Beds, except vacuum assisted drying bed, 6H	3
Chemical Coagulation with rapid mix, flocculation, clarification, 3J	20	Belt Filter Press, 6I	8
Secondary Treatment Subtotal$_3$	20	Plate & Frame Press, 6O	8
Advanced Waste Treatment / Tertiary Treatment (Maximum 20 points)		Vacuum Filters, 6P	8
Polishing pond, 4A	2	All other dewatering units, 6J	5
Microscreens, 4B	3	Land Application, 6K	5
Intermittent sand filter, 4C	3	Composting:	
Rapid sand filter, 4D	5	Invessel, 6L	10
Activated carbon columns or beds, 4E	5	Static Pile, 6M	5
Reverse osmosis, electrodialysis, ion exchange, 4F	5	Solids Reduction (incineration, wet oxidation), 6N	15
Nitrification required by permit (Ammonia, TKN, or UOD limit):		**Solids Handling/Disposal Subtotal$_6$**	13
by Activated Sludge, 4G	8	**Miscellaneous**	
Nitrification by other process, 4H	5	Nutrient addition (nitrogen and/or phosphorus), 7A	3
Denitrification required by permit (Nitrate or Total Nitrogen limit):		Carbon Regeneration (onsite), 7B	10
Nitrification by Activated Sludge and Denitrification, 4I	13	**Miscellaneous Subtotal$_7$**	0
Nitrification by other process and Denitrification, 4J	10	**Total Score (add subtotals 1 thru 7 plus Flow Points)**	55

Facility Name Village of Sherman **SPDES #** NY0036315 **Facility Operator** Jay Irwin Alt. No. 2 & Alt No. 3

Facility phone number (___) _____ **Date Completed** _____ **Regional Reviewer** _____ **Circle units/items that apply**

Design Flow - 3 points per MGD or part (Minimum 1 point - Maximum 50 points) **3 points x** .217 **MGD =** 1 **Flow Points**

Unit or Item	Points	Unit or Item	Points
Preliminary Treatment (Maximum 8 points)		Phosphorus Removal (required by permit), 4K	8
Bar Screens and/or Comminutor, 1A	2	Chemical Addition for neutralization, 4L	3
Manual Grit Removal, 1B	2	**Advanced Treatment Subtotal$_4$**	11
Mechanical or Aerated Grit Removal, 1C	3	**Disinfection (Maximum 8 points)**	
Pre-aeration, 1D	2	Chlorination:	
Raw sewage or Effluent pumping, 1E	3	Gas Chlorination, 5A	5
Flow equalization basin, 1F	3	Other Chlorination, 5B	2
(Preliminary Score) Subtotal$_1$	8	Dechlorination, 5C	3
Primary Treatment (Maximum 5 points)		Ultraviolet, 5D	5
Primary Treatment Including: Primary Clarifiers, Imhoff tanks, Spirogesters, Clarigesters, Fixed Screens, and Hydroscreens, 2A	5	Ozonization, 5E	5
		Bromine Chloride, 5F	5
Primary Treatment Subtotal$_2$	0	**Disinfection Subtotal$_5$**	5
Secondary Treatment (Maximum 25 points)		**Solids Handling / Disposal (Maximum 25 points)**	
Lagoon (unaerated), 3B	3	Gravity Thickener, 6A	5
Intermittent sand filters without recirculation, 3C	3	Dissolved air floatation thickener, 6B	8
Intermittent sand filters with recirculation, 3D	5	Centrifugation, (includes all modifications) 6C	8
Aerated Lagoon, 3E	7	Aerobic Digestion, 6D	5
Trickling Filter / Biological Filter without recirculation, 3F	9	Single Stage Anaerobic Digestion (unheated), 6E	5
Trickling Filter / Biological Filter with recirculation, 3G	11	Single Stage Anaerobic Digestion (heated), 6F	8
Rotating Biological Contactors, 3H	11	Two Stage Anaerobic Digestion, 6G	10
Activated Sludge (includes all process modifications), 3I	20	Sludge Drying Beds, except vacuum assisted drying bed, 6H	3
Chemical Coagulation with rapid mix, flocculation, clarification, 3J	20	Belt Filter Press, 6I	8
Secondary Treatment Subtotal$_3$	20	Plate & Frame Press, 6O	8
Advanced Waste Treatment / Tertiary Treatment (Maximum 20 points)		Vacuum Filters, 6P	8
Polishing pond, 4A	2	All other dewatering units, 6J	5
Microscreens, 4B	3	Land Application, 6K	5
Intermittent sand filter, 4C	3	Composting:	
Rapid sand filter, 4D	5	Invessel, 6L	10
Activated carbon columns or beds, 4E	5	Static Pile, 6M	5
Reverse osmosis, electrodialysis, ion exchange, 4F	5	Solids Reduction (incineration, wet oxidation), 6N	15
Nitrification required by permit (Ammonia, TKN, or UOD limit):		**Solids Handling/Disposal Subtotal$_6$**	13
by Activated Sludge, 4G	8	**Miscellaneous**	
Nitrification by other process, 4H	5	Nutrient addition (nitrogen and/or phosphorus), 7A	3
Denitrification required by permit (Nitrate or Total Nitrogen limit):		Carbon Regeneration (onsite), 7B	10
Nitrification by Activated Sludge and Denitrification, 4I	13	**Miscellaneous Subtotal$_7$**	0
Nitrification by other process and Denitrification, 4J	10	**Total Score (add subtotals 1 thru 7 plus Flow Points)**	58

Summary

Existing Plant Score -	49 points	
Alternative No. 2 or No. 3 Score -	58 points	=> 3A
With Composting -	63 points	=> 3A

Appendix M

Preliminary Manufacturer Design of SBR WWTP

DESIGN PROPOSAL

Sherman WWTP Project-Regional Sanitaire #28896-18a

ADWF*	MGD	0.22
Maximum 4.8 hr Flow	MGD	0.48
Maximum 3.6 hr Flow	MGD	0.89
		mg/l lb/day
BOD_5 (20°C)		322 583
Suspended Solids		356 645
TKN(Assume 1.5 (NH3-N) = TKN)		41 75
NH3-N		28 50
Total Phosphorus		9 17
Max Wastewater Temperature	°C	20
Min Wastewater Temperature	°C	10
Ambient Air Temperature	°F	20 - 90
Site Elevation	ft	1,550

*** - Maximum 30 day period mass flow**

Table B: ICEAS® EFFLUENT QUALITY (MONTHLY AVERAGE)

BOD_5 (20°C)	mg/l	5
Suspended Solids	mg/l	10
NH_3-N	mg/l	2
Total Phosphorus	mg/l	0.0

Table C: ICEAS PROCESS DESIGN CRITERIA

Operating Basins		2
Operating Top Water Level	ft	15.00
F / M	BOD5/DAY/MLSS	0.046
SVI (after 30 minutes settling)	ml/g	150
MLSS at Bottom Water Level	mg/l	4,975
Waste Sludge Produced (Approx.)	lb/day	476
Volume of Sludge Produced (Approx., 0.85% solids)	GPD	6,710
Normal Decant Rate	GPM	860
Peak Decant Rate	GPM	1,234
Hydraulic Retention Time	Days	1.53
Sludge Age	Days	25.6
Alkalinity	mg/l	150

Bold, italicized text indicate assumptions made by Sanitaire

Cycle Timing

		Max Month*	
		Normal	Min
Air-On	min	120	90
Settle	min	60	45
Decant	min	60	45
Total	min	240	180

Table D: KEY ICEAS DESIGN DETAILS

Top Water Level	ft	15.00
Basin Width (Inside)	ft	24.0
Basin Length (Inside)	ft	73.0
Bottom Water Level	ft	11.78

ICEAS EQUIPMENT(Base Design)					Motor HP	No. Req.
Decanter Mechanism	7.5	' Weir length				2
Decanter Drive Unit					1/4	2
ICEAS Blower	310	SCFM	7.1	PSIG	25	2
ICEAS Fine Bubble Aeration System		Disc Diffusers/Basin				2
Air Control Valve	6	"				2
Waste Sludge Pump	110	GPM			2.4	2
ICEAS Controls						1

ICEAS POWER REQUIREMENTS	Max Month			**(At Average Aeration Depth)**			Kwh/Day
Decant Drive Unit	0.2	BHP	2 run	@	6	Hrs/day	1.8
ICEAS Air Blowers	18.1	BHP	1 run*	@	24	Hrs/day	323.9
Waste Sludge Pump	1.9	BHP	4 run	@	0.5	Hrs/day	2.9
						KWH/DAY	328.6
				AVERAGE		KWH/HR	13.69

* Shared ICEAS Blowers

Appendix N

Estimate of Probable Project Cost

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
	LOW PRESSURE SEWER COLLECTION SYSTEM				
1	Furnish and Install 6-Inch DR 11 HDPE Pressure Sewers	5,000	LF	$40	$200,000
2	Furnish and Install 4-Inch DR 11 HDPE Pressure Sewers	11,000	LF	$35	$385,000
3	Furnish and Install 3-Inch DR 11 HDPE Pressure Sewers	16,000	LF	$32	$512,000
4	Furnish and Install 2-Inch DR 11 HDPE Pressure Sewers	17,500	LF	$30	$525,000
5	Furnish and Install 1.25-Inch DR 11 HDPE Pressure Sewers	52,500	LF	$28	$1,470,000
6	Furnish and Install Residential Simplex Grinder Pump Stations	391	EA	$5,000	$1,955,000
7	Furnish and Install Commercial Grinder Pump Stations	31	EA	$10,000	$310,000
8	Furnish and Install Lateral Kits	422	EA	$1,000	$422,000
9	Furnish and Install Grinder Pump Sewer Service Connection	422	EA	$2,500	$1,055,000
10	Furnish and Install Grinder Pump Electrical Connection	422	EA	$2,500	$1,055,000
11	Furnish and Install 6-Inch Gate Valve and Valve Box	10	EA	$1,500	$15,000
12	Furnish and Install 4-Inch Gate Valve and Valve Box	22	EA	$1,400	$30,800
13	Furnish and Install 3-Inch Gate Valve and Valve Box	32	EA	$1,250	$40,000
14	Furnish and Install 2-Inch Gate Valve and Valve Box	40	EA	$1,000	$40,000
15	Furnish and Install Force Main Cleanout	75	EA	$2,250	$168,750
16	Furnish and Install Air/Vacuum Release Manhole	25	EA	$7,500	$187,500
17	Furnish and Install Major Drilled Crossings	5	EA	$25,000	$125,000
18	Furnish and Install Odor Control Stations	2	LS	$125,000	$250,000
19	Restoration (Based LF of Low Pressure Main)	49,500	LF	$10	$495,000

Subtotal:		*$9,242,000*
Mobilization/Demobilization/General Conditions:	5%	$463,000
Inflation to 2022 Dollars @	2%	$740,000
Subtotal Construction Costs:		**$10,445,000**
Engineering/Legal/Administrative Costs:	20%	$2,089,000
Construction Contingency:	20%	$2,089,000
TOTAL PROJECT COST		**$14,623,000**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
	CONVEYANCE TO VILLAGE OF SHERMAN				
1	Furnish and Install 8-Inch DR 18 C900 PVC Pipe	42,000	LF	$60	$2,520,000
2	Furnish and Install Bailey Hill and Main Street Pump Station	1	LS	$450,000	$450,000
3	Furnish and Install Route 430 Pump Station No. 1	1	LS	$450,000	$450,000
4	Furnish and Install Route 430 Pump Station No. 2	1	LS	$450,000	$450,000
5	Furnish and Install Air/Vacuum Release Manhole	35	ES	$7,500	$262,500
6	Furnish and Install I-86 Highway Crossing	1	LS	$200,000	$200,000
7	Furnish and Install Major Road or Stream Crossings	8	LS	$25,000	$200,000
8	Furnish and Install Connection to Village WWTP	1	LS	$15,000	$15,000
	ADDITIONAL SEWER USE ALONG CONVEYANCE ROUTE				
9	Furnish and Install 1.25-Inch DR 11 HDPE Pressure Sewers	9,500	LF	$28	$266,000
10	Furnish and Install Residential Simplex Grinder Pump Stations	42	EA	$5,000	$210,000
11	Furnish and Install Commercial Grinder Pump Stations	7	EA	$10,000	$70,000
11	Furnish and Install Lateral Kits	49	EA	$1,000	$49,000
12	Furnish and Install Grinder Pump Sewer Service Connection	49	EA	$2,500	$122,500
13	Furnish and Install Grinder Pump Electrical Connection	49	EA	$2,500	$122,500

Subtotal:		*$5,388,000*
Mobilization/Demobilization/General Conditions:	5%	$270,000
Inflation to 2022 Dollars @	2%	$432,000
Subtotal Construction Costs:		**$6,090,000**
Engineering/Legal/Administrative Costs:	20%	$1,218,000
Construction Contingency:	20%	$1,218,000
TOTAL PROJECT COST		**$8,526,000**

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
	DEMOLITION				
1	Remove Existing Flow Meter and Comminutor	1	LS	$10,000	$10,000
2	Remove Internals from Treatment Tanks	2	EA	$15,000	$30,000
3	Remove Gravity Sludge Thickener and Canopy	1	LS	$10,000	$10,000
4	Remove Solar Panels and Sludge Drying Beds Structure	1	LS	$10,000	$10,000
5	Remove Sludge Pump Station	1	LS	$10,000	$10,000
6	Remove Chlorine Contact Tank / Post Air Tank	1	LS	$20,000	$20,000
7	Remove Building Filters, Interior Piping, Blowers, Controls and Generator	1	LS	$25,000	$25,000
8	Remove Generator Underground Fuel Storage Tank	1	LS	$10,000	$10,000
	INFLUENT PUMP STATION AND HEADWORKS				
9	Upgrades to Influent Pump Station	1	LS	$100,000	$100,000
10	Concrete Work for Headworks Building	1	LS	$60,000	$60,000
11	Influent Screening/Grit Removal Equipment & Controls	1	LS	$200,000	$200,000
12	Flow Meter and Meter Manhole	1	LS	$25,000	$25,000
13	Metal Furnishings (Handrails, Channel Covers, Gates, etc.)	1	LS	$20,000	$20,000
14	Headworks Building	1	LS	$75,000	$75,000
	AERATION AND DIGESTER TANKS				
15	Rehab Existing Concrete Tanks into Digester Tanks	2	EA	$35,000	$70,000
16	Digester Blowers, Diffusers, and Controls	2	EA	$110,000	$220,000
17	New Concrete Treatment Tanks and Clarifiers	1	LS	$1,200,000	$1,200,000
18	New Larger Clarifiers	2	EA	$400,000	$800,000
19	Treatment Tank Equipment (Blowers and Diffusers)	2	EA	$450,000	$900,000
20	Metal Furnishings (Stairs, Handrails, Channel Covers, Gates, etc.)	1	LS	$200,000	$200,000
21	Disc Filter and Filter Piping	1	LS	$325,000	$325,000
22	Additional Process Piping and Valve Allowance	1	LS	$75,000	$75,000
	DISINFECTION AND POST AERATION				
23	Concrete Channel and Flume	1	LS	$75,000	$75,000
24	Disinfection Equipment and Controls (incl. install)	1	LS	$175,000	$175,000
25	Effluent Piping and Connection to Outfall	1	LS	$10,000	$10,000
26	Metal Furnishings (Stairs, Handrails, Channel Covers, Gates, etc.)	1	LS	$25,000	$25,000
27	New Post Aeration Tank	1	LS	$30,000	$30,000
28	Post Aeration Blowers, Piping, and Diffusers	1	LS	$75,000	$75,000
	SOLIDS DEWATERING				
29	Solids Handling Building	1	LS	$170,000	$170,000
30	Dewatering Equipment	1	LS	$370,000	$370,000
31	WAS / Filtrate Pump Station	1	LS	$100,000	$100,000
32	Flow Meter Vault and Equipment	1	LS	$150,000	$150,000
	CONTROL BUILDING				
33	WWTP Instrumentation and Control/System Integration	1	LS	$150,000	$150,000
34	Control Building Upgrades and Modifications	1	LS	$100,000	$100,000
35	Replace Backup Power Generator	1	LS	$100,000	$100,000
36	Replace Fuel Storage Tank	1	LS	$15,000	$15,000
	MISC SITE/CIVIL IMPROVEMENTS				
37	Miscellaneous Site Work	1	LS	$200,000	$200,000
38	Additional Site Piping	1	LS	$150,000	$150,000
	MISCELLANEOUS COST				
39	Bypass Pumping and Temporary Piping	1	LS	$25,000	$25,000
40	Sludge Hauling and Handling During Construction	1	LS	$20,000	$20,000
41	Miscellaneous Additional Improvements	1	LS	$150,000	$150,000
42	ELECTRICAL ALLOWANCE	1	LS	$350,000	$350,000
43	VILLAGE COLLECTION SYSTEM IMPROVEMENT ALLOWANCE	1	LS	$40,000	$40,000

Subtotal:		*$6,875,000*
Mobilization/Demobilization/General Conditions:	5%	$344,000
Inflation to 2022 Dollars @	2%	$550,000
Subtotal Construction Costs:		$7,769,000
Engineering/Legal/Administrative Costs:	20%	$1,554,000
Construction Contingency:	20%	$1,554,000
TOTAL PROJECT COST		$10,877,000

ITEM NO.	DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL
	DEMOLITION				
1	Remove Existing Flow Meter and Comminutor	1	LS	$10,000	$10,000
2	Remove Internals from Treatment Tanks	2	EA	$15,000	$30,000
3	Remove Gravity Sludge Thickener and Canopy	1	LS	$10,000	$10,000
4	Remove Solar Panels and Sludge Drying Beds Structure	1	LS	$10,000	$10,000
5	Remove Sludge Pump Station	1	LS	$10,000	$10,000
6	Remove Chlorine Contact Tank / Post Air Tank	1	LS	$20,000	$20,000
7	Remove Building Filters, Interior Piping, Blowers, Controls and Generator	1	LS	$25,000	$25,000
8	Remove Generator Underground Fuel Storage Tank	1	LS	$10,000	$10,000
	INFLUENT PUMP STATION AND HEADWORKS				
9	Upgrades to Influent Pump Station	1	LS	$100,000	$100,000
10	Concrete Work for Headworks Building	1	LS	$60,000	$60,000
11	Influent Screening/Grit Removal Equipment & Controls	1	LS	$200,000	$200,000
12	Flow Meter and Meter Manhole	1	LS	$25,000	$25,000
13	Metal Furnishings (Handrails, Channel Covers, Gates, etc.)	1	LS	$20,000	$20,000
14	Headworks Building	1	LS	$75,000	$75,000
	SBR's AND DIGESTER TANKS				
15	Rehab Existing Concrete Tanks into Digester Tanks	2	EA	$35,000	$70,000
16	Digester Blowers, Diffusers, and Controls	2	EA	$110,000	$220,000
14	SBR Concrete Tankage	1	LS	$1,000,000	$1,000,000
15	SBR Equipment and Installation	1	EA	$875,000	$875,000
19	Metal Furnishings (Stairs, Handrails, Channel Covers, Gates, etc.)	1	LS	$150,000	$150,000
21	Disc Filter and Filter Piping	1	LS	$325,000	$325,000
22	Additional Process Piping and Valve Allowance	1	LS	$75,000	$75,000
	DISINFECTION AND POST AERATION				
23	Concrete Channel and Flume	1	LS	$75,000	$75,000
24	Disinfection Equipment and Controls (incl. install)	1	LS	$175,000	$175,000
25	Effluent Piping and Connection to Outfall	1	LS	$10,000	$10,000
26	Metal Furnishings (Stairs, Handrails, Channel Covers, Gates, etc.)	1	LS	$25,000	$25,000
27	New Post Aeration Tank	1	LS	$30,000	$30,000
28	Post Aeration Blowers, Piping, and Diffusers	1	LS	$75,000	$75,000
	SOLIDS DEWATERING				
30	Solids Handling Building	1	LS	$170,000	$170,000
32	Dewatering Equipment	1	LS	$370,000	$370,000
33	Filtrate Pump Station	1	LS	$70,000	$70,000
	CONTROL BUILDING				
33	WWTP Instrumentation and Control/System Integration	1	LS	$150,000	$150,000
34	Control Building Upgrades and Modifications	1	LS	$100,000	$100,000
35	Replace Backup Power Generator	1	LS	$100,000	$100,000
36	Replace Fuel Storage Tank	1	LS	$15,000	$15,000
	MISC SITE/CIVIL IMPROVEMENTS				
38	Miscellaneous Site Work	1	LS	$250,000	$250,000
39	Additional Site Piping	1	LS	$200,000	$200,000
	MISCELLANEOUS COST				
40	Bypass Pumping and Temporary Piping	1	LS	$25,000	$25,000
41	Sludge Hauling and Handling During Construction	1	LS	$20,000	$20,000
42	Miscellaneous Additional Improvements	1	LS	$150,000	$150,000
43	**ELECTRICAL ALLOWANCE**	1	LS	$450,000	$450,000
44	**VILLAGE COLLECTION SYSTEM IMPROVEMENT ALLOWANCE**	1	LS	$40,000	$40,000

Subtotal:		*$5,820,000*
Mobilization/Demobilization/General Conditions:	5%	$291,000
Inflation to 2022 Dollars @	2%	$466,000
Subtotal Construction Costs:		**$6,577,000**
Engineering/Legal/Administrative Costs:	20%	$1,316,000
Construction Contingency:	20%	$1,316,000
TOTAL PROJECT COST		**$9,209,000**

Appendix O

O&M and Short Lived Assets Annual Cost Estimates

Annual O&M Costs	Conveyance Forcemain and Pump Station	LPS Collection System
Administrative Expenses	$1,000.00	$12,000.00
Administrative Salaries and Benefits	$2,000.00	$20,000.00
Operator, Hours/Week	8	35
Operator Hourly Wage and Benefits	$50.00	$50.00
Operator Annual Wages	$20,800.00	$91,000.00
General Expenses	$10,000.00	$10,000.00
Electricity - Power Cost Per Year Per Pump	$0.07	Paid by User
Number of Pumps	3.00	420
$/year (@24 hr/day, 365 day/yr)	$19,000.00	$0.00
Odor Control Station O&M		$7,500.00
Annual O&M Costs	$49,800	$101,000
Total Annual O&M Costs	$150,800	
Short Lived Assets (SLA)	Gravity Collection	LPS Collection System
Yearly Reserve for Replacement Pump (Replace 15 Years)	$15,000.00	
Yearly Reserve for Replacement Pump (Replace 10 Years)		$20,000.00
Yearly Reserve for Odor Control Station		$3,000.00
Total Annual SLA Costs	$38,000	
Total Annual O&M and SLA Costs	$188,800	

Annual O&M Costs*	Alternative No. 2	Alternative No. 3
General Sewer Expenses	$10,000.00	
Administration Salaries and Benefits	$5,000.00	
Administration Expense	$2,500.00	
Employee Salaries and Benefits	$180,000.00	
Treatment O&M (Chemicals, Utilities, Disposal, Lab, Repairs)	$130,000.00	
Total Annual O&M Costs	**$327,500**	

*** Annual O&M Costs do not include Village of Sherman Collection System or Billing**

Short Lived Assets (SLA)						
Item	QTY	ALTERNATIVE NO. 2 UNIT COST	ALTERNATIVE NO. 3 UNIT COST	Estimated Life (Years)	Alternative No. 2 Required Annual SLA Reserve Contribution	Alternative No. 2 Required Annual SLA Reserve Contribution
Influent Pumps and Controls	2	$25,000	$25,000	15	$3,333	$3,333
Blower Refurbishment	6	$6,000	$6,000	10	$3,600	$3,600
Diffuser Replacement	1	$20,000	$25,000	8	$2,500	$3,125
WWTP Pumps	1	$25,000	$40,000	15	$1,667	$2,667
UV Bulb Replacement	72	$60	$60	2	$2,160	$2,160
Flow Meter and Controls	1	$25,000	$20,000	20	$1,250	$1,000
Dewatering Equipment	1	$20,000	$20,000	10	$2,000	$2,000
Generator	1	$50,000	$50,000	25	$2,000	$2,000
I/C Allowance	1	$75,000	$75,000	10	$7,500	$7,500
Miscellaneous Allowance	1	$100,000	$100,000	10	$10,000	$10,000
Total Annual O&M Costs					**$36,010**	**$37,385**

	Alternative No. 2	Alternative No. 3
Total Annual O&M and SLA Costs	**$363,510**	**$364,885**

Appendix P

Project Financing

Capital Cost	
Low Pressure Collection System	$14,623,000
Conveyance to Sherman	$8,526,000
WWTP Alternative No. 3	$9,209,000
	$32,358,000

EDU's	
Village of Sherman	360
Town of Mina	668
Town of Sherman	16
	1044

	Annualized Capital Debt Costs		
Rate	0%	0%	0%
Term Length	30	30	30
% of Grant	35%	25%	15%
Total Grant	$11,325,300	$8,089,500	$4,853,700
Low Pressure Collection System	$316,832	$365,575	$414,318
Conveyance to Sherman	$184,730	$213,150	$241,570
WWTP Alternative No. 3	$199,528	$230,225	$260,922
Total Annualized Project Cost	$701,090	$808,950	$916,810

	Annualized O&M and Short Lived Asset Costs		
	O&M	SLA	Total
Low Pressure Collection System	$101,000	$23,000	$124,000
Conveyance to Sherman	$49,800	$15,000	$64,800
WWTP Alternative No. 3	$327,500	$37,385	$364,885
Total Annualized O&M/SLA Cost	$478,300	$75,385	$553,685

Potential Cost Sharing Method - To be vetted by Involved Parties

Project Area	Cost Type	Responsibility
Low Pressure Collection and Conveyance to Sherman	Capital Debt and O&M	(T) Mina and (T) Sherman proportionately share based on EDU's
Sherman Wastewater Treatment Plant	Capital Debt	(V) Sherman pays 70% of upgrades; (T) Mina and (T) Sherman pay 30% of upgrades
Sherman Wastewater Treatment Plant	O&M	(V) Sherman, (T) Mina, and (T) Sherman proportionately share based on EDU's

	Financing	Village of Sherman	Town of Mina	Town of Sherman
Cost of Sewer Per User	0% 30 year loan, 35% grant	$737.48	$1,446.32	$1,446.32
	0% 30 year loan, 25% grant	$797.17	$1,572.60	$1,572.60
	0% 30 year loan, 15% grant	$856.85	$1,698.87	$1,698.87

Appendix Q

Smart Growth Assessment Form

NEW YORK STATE OF OPPORTUNITY. | Department of Health | Environmental Facilities Corporation

Smart Growth Assessment Form

This form should be completed by the applicant's project engineer or other design professional.[1]

Applicant Information

Applicant: Village of Sherman Project No.:

Project Name: Regional WWTP Alternative

Is project construction complete? ☐ Yes, date: ☑ No

Project Summary: (provide a short project summary in plain language including the location of the area the project serves)

Section 1 – Screening Questions

1. Prior Approvals

1A. Has the project been previously approved for EFC financial assistance? ☐ Yes ☑ No

1B. If so, what was the project number(s) for the prior approval(s)? Project No.:

Is the scope of the project substantially the same as that which was approved? ☐ Yes ☐ No

IF THE PROJECT WAS PREVIOUSLY APPROVED BY EFC'S BOARD AND THE SCOPE OF THE PROJECT HAS NOT MATERIALLY CHANGED, THE PROJECT IS **NOT** SUBJECT TO SMART GROWTH REVIEW. SKIP TO SIGNATURE BLOCK.

2. New or Expanded Infrastructure

2A. Does the project add new wastewater collection/new water mains or a new wastewater treatment system/water treatment plant? ☑ Yes ☐ No

Note: A new infrastructure project adds wastewater collection/water mains or a wastewater treatment/water treatment plant where none existed previously

2B. Will the project result in either: ☑ Yes ☐ No

An increase of the State Pollutant Discharge Elimination System (SPDES) permitted flow capacity for an existing treatment system;

OR

An increase such that a NYSDEC water withdrawal permit will need to be obtained or modified, or result in the NYSDOH approving an increase in the capacity of the water treatment plant?

Note: An expanded infrastructure project results in an increase of the SPDES permitted flow capacity for the wastewater treatment system, or an increase of the permitted water withdrawal or the permitted flow capacity for the water treatment system.

[1] If project construction is complete and the project was not previously financed through EFC, an authorized municipal representative may complete and sign this assessment.

IF THE ANSWER IS "NO" TO BOTH "2A" and "2B" ON THE PREVIOUS PAGE, THE PROJECT IS NOT SUBJECT TO FURTHER SMART GROWTH REVIEW. SKIP TO SIGNATURE BLOCK.

3. Court or Administrative Consent Orders

3A. Is the project expressly required by a court or administrative consent order? ☐ Yes ☑ No

3B. If so, have you previously submitted the order to NYS EFC or DOH? If not, please attach. ☐ Yes ☐ No

Section 2 – Additional Information Needed for Relevant Smart Growth Criteria

EFC has determined that the following smart growth criteria are relevant for EFC-funded projects and that projects must meet each of these criteria to the extent practicable:

1. Uses or Improves Existing Infrastructure

1A. Does the project use or improve existing infrastructure? ☑ Yes ☐ No

Please describe:

The project will utilize the Village of Sherman WWTP as a regional WWTP and expand sewer service around Findley Lake, a lake that is currently being significantly degraded by private onsite septic systems.

2. Serves a Municipal Center

Projects must serve an area in either 2A, 2B or 2C to the extent practicable.

2A. Does the project serve an area **limited** to one or more of the following municipal centers?

i. A City or incorporated Village ☐Yes ☑No

ii. A central business district ☐Yes ☑No

iii. A main street ☐Yes ☑No

iv. A downtown area ☐Yes ☑No

v. A Brownfield Opportunity Area ☐Yes ☑No
(for more information, go to www.dos.ny.gov & search "Brownfield")

vi. A downtown area of a Local Waterfront Revitalization Program Area ☐Yes ☑No
(for more information, go to www.dos.ny.gov and search "Waterfront Revitalization")

vii. An area of transit-oriented development ☐Yes ☑No

viii. An Environmental Justice Area ☐Yes ☑No
(for more information, go to www.dec.ny.gov/public/899.html)

ix. A Hardship/Poverty Area ☑Yes ☐No
Note: Projects that primarily serve census tracts and block numbering areas with a poverty rate of at least twenty percent according to the latest census data

Please describe all selections:

The purpose of the project is to provide sewer service to a densely populated area around Findley Lake, but due to the conveyance route from Findley Lake to the Village of Sherman, some rural areas will receive sewer service. However, the intent of this project is to generally service previously developed areas.

2B. If the project serves an area located outside of a municipal center, does it serve an area located adjacent to a municipal center which has clearly defined borders, designated for concentrated development in a municipal or regional comprehensive plan and exhibit strong land use, transportation, infrastructure and economic connections to an existing municipal center? ☑Yes ☐No

Please describe:

The area outside a municipal center is a State Route. Overall, the project is being designed to only handle flows from the developed areas. It is not be designed to account for any major development in undeveloped areas.

2C. If the project is not located in a municipal center as defined above, is the area designated by a comprehensive plan and identified in zoning ordinance as a future municipal center? ☐Yes ☐No

Please describe and reference applicable plans:

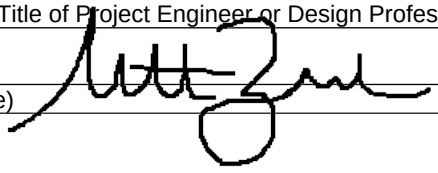
3. Resiliency Criteria

3A. Was there consideration of future physical climate risk due to sea-level rise, storm surge, and/or flooding during the planning of this project? ☑Yes ☐No

Please describe:

We reviewed flood plain mapping and will design components that may be effected by flooding appropriately.

Signature Block: By entering your name in the box below, you agree that you are authorized to act on behalf of the applicant and that the information contained in this Smart Growth Assessment is true, correct and complete to the best of your knowledge and belief.

Applicant: Village of Sherman	Phone Number:
(Name & Title of Project Engineer or Design Professional or Authorized Municipal Representative)	
	11/5/18
(Signature)	(Date)

Appendix R

EFC Engineering Report Certification Form

Engineering Report Certification

During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is being sought from the New York State Clean Water State Revolving Fund. In my professional opinion, I have recommended for selection, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of constructing the project or activity, the cost of operating and maintaining the project or activity over the life of the project or activity, and the cost of replacing the project and activity.

Title of Engineering Report:	Regional Wastewater Treatment Plant Alternative, Technical Memorandum
Date of Report:	January 2019
Professional Engineer's Name:	Kenneth M. Knutsen P.E.

Signature:

Date: 1/15/19