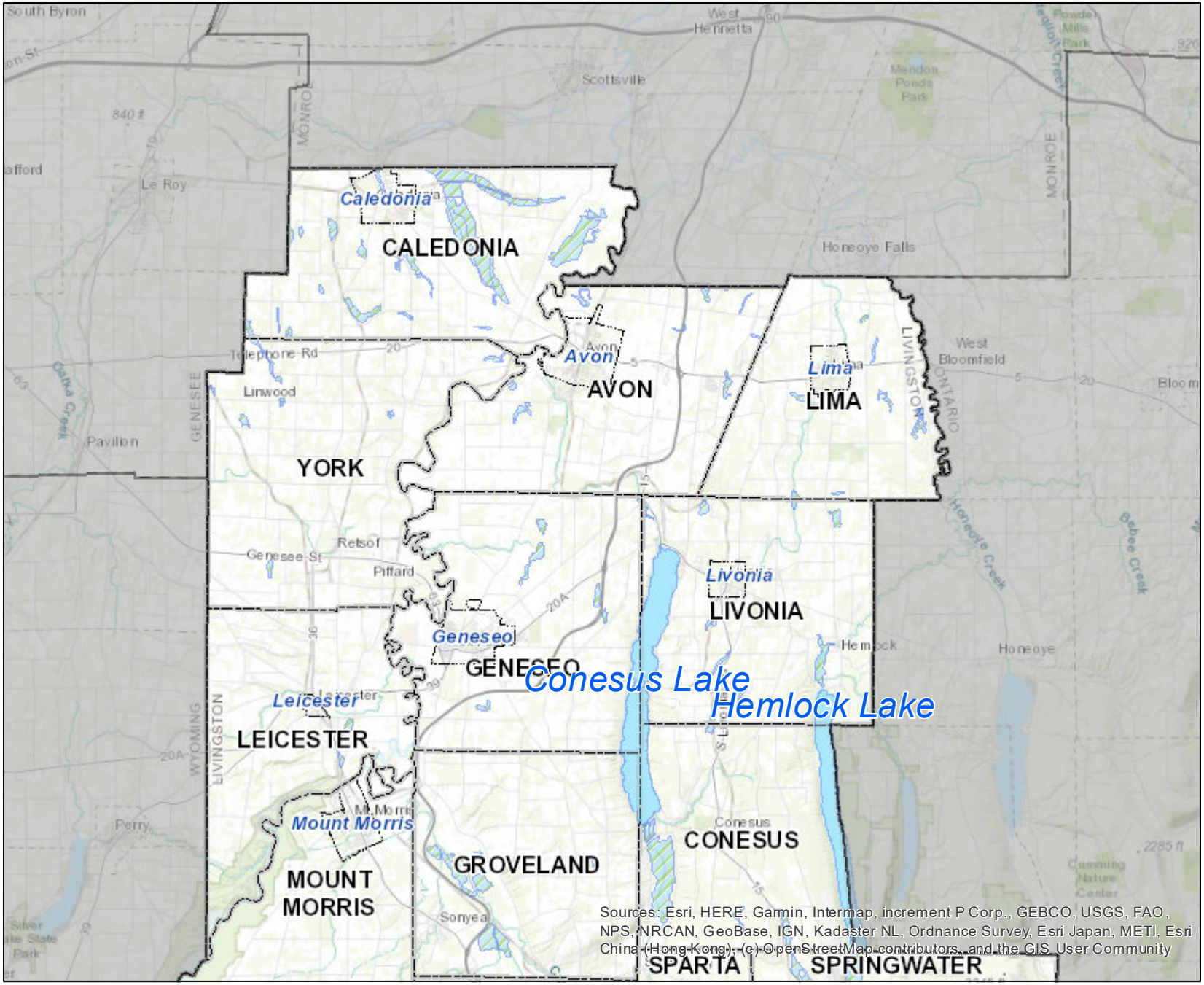
Appendix A

Environmental Maps

Livingston County NYSDEC Wetlands



Legend

- Lakes
- Towns
- Town Labels
- Villages
- Village Labels
- NYSDEC Wetlands

0 4.75 9.5 19 mi

N

For planning purposes only.
Not survey grade.

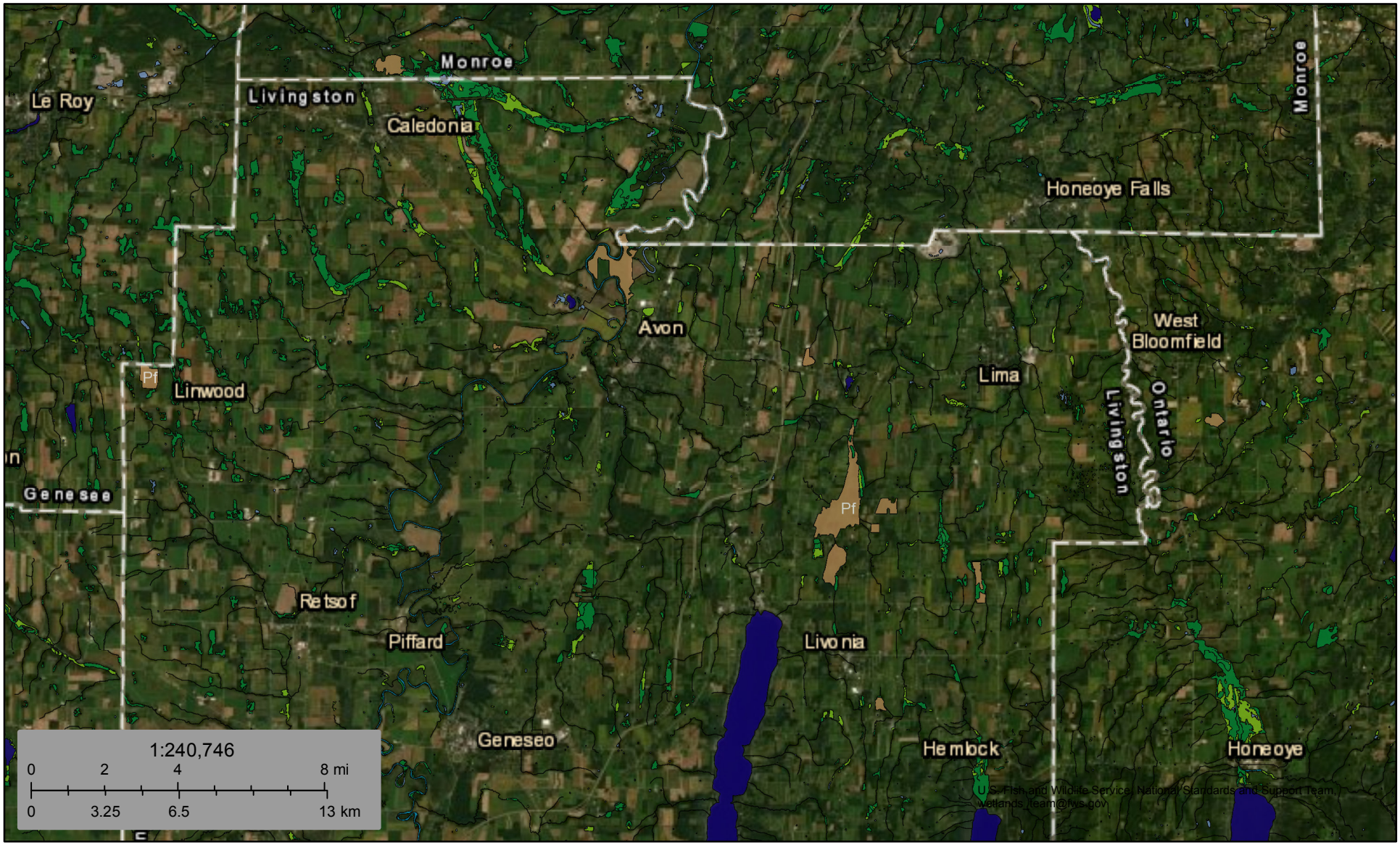
This map was created using the Livingston County Computer Image Mapping System. Livingston County makes no warranty, representation, or guarantee as to the content, sequence, accuracy, timeliness, or completeness of any of the data provided.

If FEMA floodplains are shown on this map, the following applies: The FEMA digital floodplain data shown on this map should not be used for official or legal purposes. This digital floodplain data cannot be used to determine absolute delineations of flood risk boundaries, but instead should be seen as portraying zones of uncertainty and possible risks associated with flood inundation. For official floodplain designations, go to the FEMA Flood Map Service Center at https://msc.fema.gov/portal.

U.S. Fish and Wildlife Service

National Wetlands Inventory

Livingston County North Federal Wetlands



July 5, 2022

Wetlands

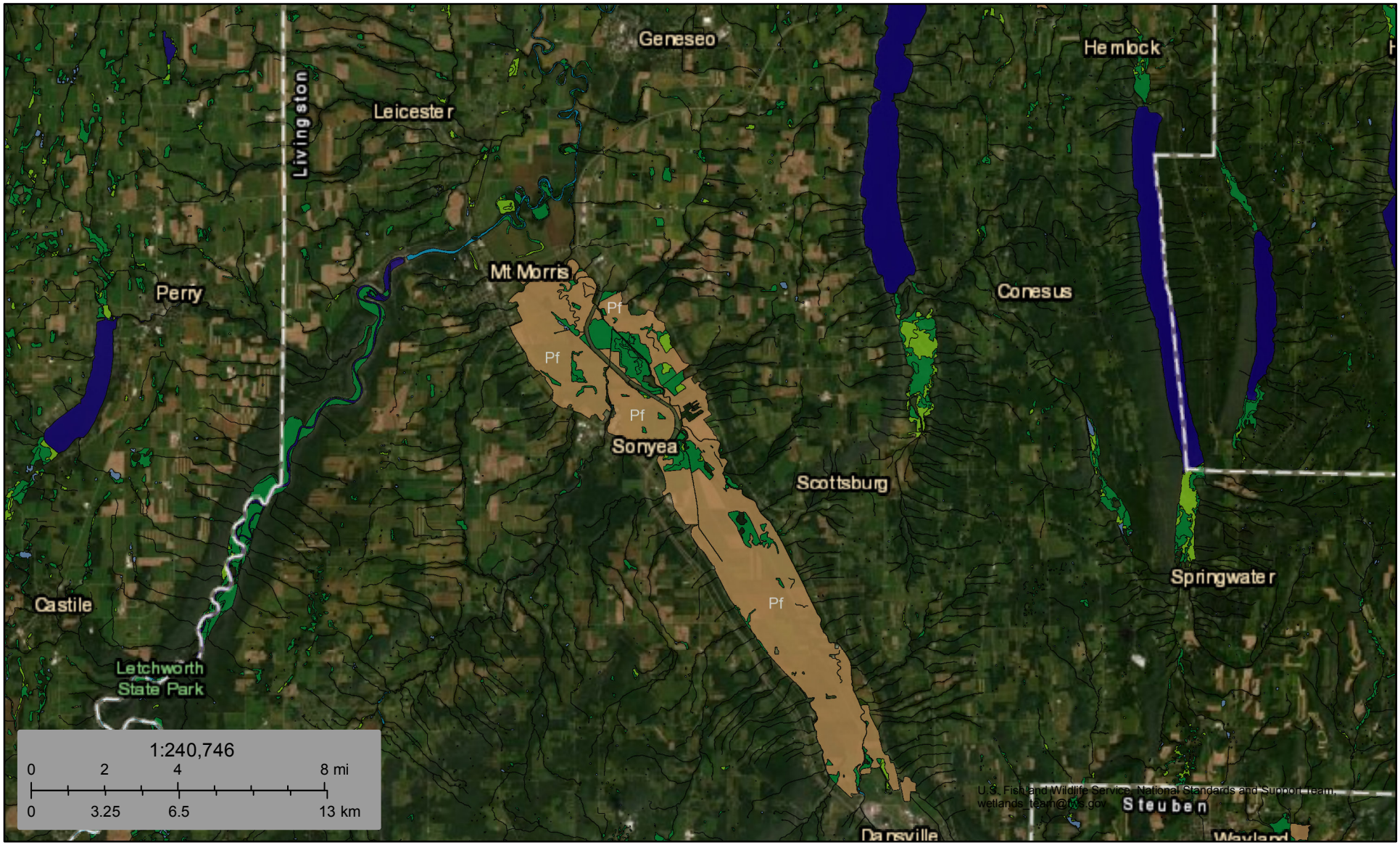
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

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.

U.S. Fish and Wildlife Service

National Wetlands Inventory

Livingston County South Federal Wetlands



July 5, 2022

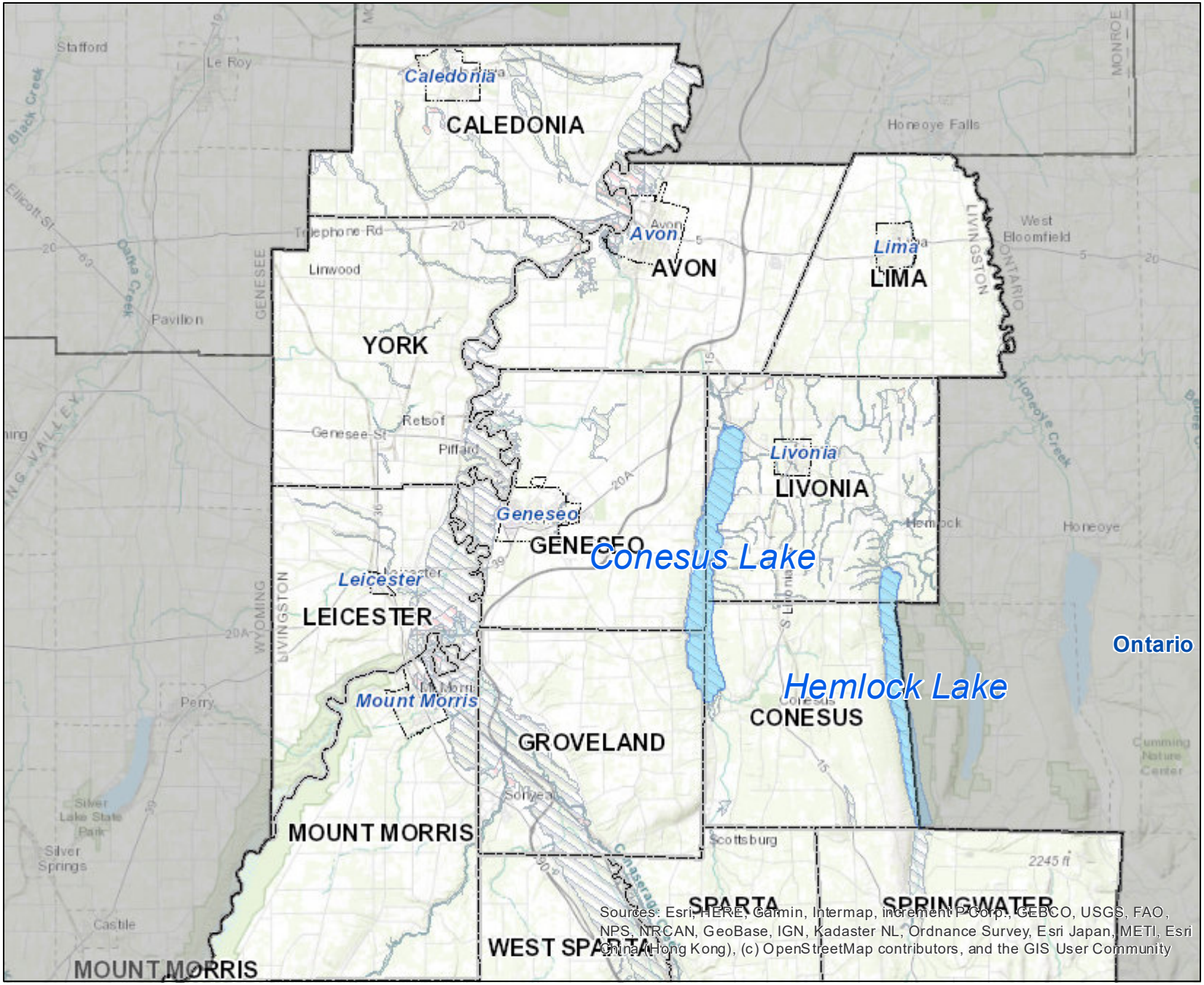
Wetlands

- 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

Livingston County Floodplains



Legend

- Lakes
- Towns
- Town Labels
- Villages
- Village Labels

Floodplains

- 100 Year Floodplain
- 500 Year Foodplain

0 4.75 9.5 19 mi

N

For planning purposes only.
Not survey grade.

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Appendix B

Existing Water Service Area Map

Monroe County
Genesee County
Ontario County
Wyoming County
Steuben County
Allegany County
Village of Caledonia
Town of Caledonia
Village of Avon
Town of Avon
Village of Lima
Town of Lima
Town of York
Village of Geneseo
Town of Geneseo
Village of Livonia
Town of Livonia
Conesus Lake
Village of Leicester
Town of Leicester
Village of Mount Morris
Town of Mount Morris
Town of Groveland
Town of Conesus
Hemlock Lake
Honeoye Lake
Canadice Lake
Silver Lake
Town of Sparta
Town of Springwater
Town of West Sparta
Village of Nunda
Town of Nunda
Town of Portage
Village of Dansville
Town of North Dansville
Town of Ossian
942D
21
84
61
5
20
67
14
23
36
22
26
65
66
58
35
58A
50
39
52
55
62
12
15A
19
47
63
20A
83
41
18
32
28
8
56
37
10
48
64
44
4
85
45
33
2
71
15
256
43
30
258
1
1A
42
36A
16
38
408
3
30A
72
59
51
60
29
25
20N
81
77
11
13
34
74
75
79
78
436
57
7
24A
70
80
69
9
27B
27
20S
54
49
24
17
Livingston County
MAP SHEET:
MAP 3-1
MAP TITLE:
Water Supply Service Areas (Generalized)
DATE PREPARED:
AUGUST 20, 2020
Legend
County Boundaries
Town Boundaries
Villages
Local Roads
County Roads
Interstate
State Routes
Major Streams
Minor Streams
Waterbodies
Chidsey Road Reservoir
Conesus Lake
Hemlock Lake
Kellogg Road Well
MCWA
Silver Lake
Mill Creek-Perkinsville Well
N
W
E
S
Miles
0 0.5 1 2
ARCHITECTURE
ENGINEERING
PLANNING
CPLteam.com
Document Path: S:\Projects\Livingston_Co\Wtr Study Update\D Design\Reports\CPL Maps\3-1 Water Service Areas.mxd | CPLTeam-JSteinbach | 8/27/2020

Appendix C

MRB Group LCWSA Water Supply and Storage Study
Villages of Avon, Mount Morris, Geneseo and Perry

September 7, 2022

Jason Molino, Executive Director
Livingston County Water and Sewer Authority (LCWSA)
1997 D'Angelo Drive
Lakeville, NY 14480

RE: LCWSA WATER SUPPLY AND STORAGE STUDY
MRB GROUP PROJECT NO. 3816.22001

Dear Jason:

The following letter report intends to summarize our findings for the Livingston County Water and Sewer Authority (LCWSA) Water Supply and Storage Study.

INTRODUCTION:

The water supply, water treatment systems, and water storage/distribution capacity was analyzed for the following communities:

- Village of Mount Morris
- Village of Avon
- Village of Geneseo
- Village of Perry

Each of these communities own and operate water treatment and/or storage and distribution facilities critical to the water infrastructure throughout Livingston County and provides municipal water service to its residents and areas beyond. The objective of this study was to provide LCWSA with the appropriate support and data to allow LCWSA to properly plan for future projects that help achieve a collaborative effort in improving the overall infrastructure dependency and resiliency within Livingston County. The needs and abilities of each associated community was included to properly plan for a comprehensive approach at supplying water to Livingston County, by enhancing the water supply, treatment, and storage within the County. A water system map for Livingston County is included in Appendix A.

This study included a review of each community's existing water treatment plant (WTP) design capacity, current average daily production, current maximum daily production, water withdrawal permitted amount, and intermunicipal agreements (IMA's) for water supply. Water production data for each community was based on the last three (3) full

years' worth of Water System Operation Report data submitted to the New York State Department of Health (NYS DOH) from 2019 through 2021. The water withdrawal permitted amounts and IMA's for water supply are based on the current agreements in place. An analysis of each WTP was made relative to the current design standards and current operating condition. The source water supply, raw water intake, pump stations, and transmission main conditions were also included in the analysis of each community's water system. A summary of the water data for each community can be found in Appendix B.

Following the review of each community's water system capacities and condition assessments in comparison to their water production, several capital improvement projects to expand water supply were identified and discussed from interest provided by LCWSA and the communities. Cost estimates were prepared for each of the capital improvement projects.

The following outline summarizes the findings for each community:

Village of Mount Morris

The current Village of Mount Morris WTP was put into service in 1990. The water system serves the Village of Mount Morris, Village of Leicester, and portions of the Town of Mount Morris and the Town of Leicester. The water supply for the Village's water system comes from Silver Lake, with a maximum water withdrawal permitted amount of 1.5 million gallons per day (MGD). The WTP uses two (2) multi-media filters for filtration. The Recommended Standards for Water Works (Ten States) recommends that typical filtration rates are from 2 to 4 gallons per minute (GPM) per square foot. The operators at the Village's WTP have found it is difficult to produce quality water at rates much higher than 2 GPM per square foot, limiting the filter and WTP capacity to 0.55 MGD. The current average day production of the Village's WTP is 0.487 MGD, with a maximum day production of 0.760 MGD. Based on this data, the Village's WTP is near its capacity during average day production and exceeds its capacity during its maximum daily production.

In order to increase the capacity of the Village of Mount Morris WTP, several of the WTP components would need to be added, while others have been identified as in need of repair and/or replacement.

The raw water intake for the WTP is located in the northeast corner of Silver Lake. The intake is 10-inches in diameter, located inside an expanded box, at a depth of approximately 16 feet. There is no screen for the intake pipe, but the expanded box, has some openings that act as a rough screen. It is recommended that an air scour system should be added at the intake to allow for periodic cleaning, without the need for sending a diver to the intake structure.

There is a 10" raw water transmission main approximately 50,000 feet long that runs from the raw water intake to the raw water reservoir at the WTP. The raw water transmission main includes portions that were installed in approximately 1913, 1950, and 1990 when the current WTP was built, along with several other periodic spot repairs along various sections of it. The majority of the existing raw water transmission line is from circa 1913. Part of the raw water transmission main is located in a chamber in the Mount Morris Dam in Letchworth State Park. It is recommended that consideration be given for the full length replacement of the raw water transmission line due to its critical nature in the water supply chain and the age and condition of the existing line. The total estimated project cost for replacing this transmission main is approximately $12.67 million. The cost estimates are included in Appendix C.

The raw water transmission main discharges into the raw water reservoir normally by gravity. When additional flow is needed, a valve in the gravity line is manually closed, and raw water can then be pumped to the reservoir. There are two (2) Goulds Model 3405 split-case horizontal pumps located in the pump house for this operation. The raw water pumps are normally only used in the summer months 2 or 3 days per week to recharge the raw water reservoir.

The raw water reservoir is an earthen impoundment with a concrete bottom and laid up stone walls. The reservoir is approximately 17' deep with a capacity of approximately 5.0 million gallons (MG). The reservoir serves to buffer any turbidity spikes that may be experienced in the lake, and provides some natural pre-sedimentation ahead of the treatment plant. It is recommended that the reservoir should be drained and cleaned. Improvements to the mixing and aeration system should also be implemented to improve raw water quality and improve treatment efficiency.

The WTP has two (2) outdoor, in-ground, uncovered Spiraflo clarifiers, manufactured by Lakeside. Each clarifier has a diameter of 35' a side water depth of 15', a surface area of 962 square feet, and a volume of 108,000 gallons. Each clarifier is equipped with a 12' square, two-sided V-notch weir collection system suspended at the top of the tank. The weir length in each basin is 94' for a total weir length of 188'.

Before entering the clarifiers, water flows into a 7'-7" square by 7' deep splitter box, where flow is evenly split and then flows into each of the clarifiers through a 2' wide open channel.

Water enters the clarifier at the periphery of the tank and is directed along the outside diameter through a narrow raceway formed by a metal skirt and the outer clarifier wall. Water exits the raceway at the bottom of the tank and enters the main settling area, where it slowly rises to the top and is collected in a V-notch effluent weir at the surface in the center of the tank.

Air is introduced into the bottom of each clarifier along the length of each raceway to provide additional coagulant mixing and to aid in preventing algae growth. Each clarifier is equipped with a slow rotating mechanical scraper and sludge removal system.
The effluent from each clarifier flows to a common clarifier water header that feeds to a filter influent channel, and then on to the filters.

According to Ten States, plants designed to treat surface water shall have a minimum of two (2) units each for coagulation, flocculation, and solids removal. Clarifiers should be constructed to permit units to be taken out of service, without disrupting operation. Ten States recommends a detention time between two (2) and four (4) hours for suspended solids contact clarifiers treating surface water. The results at various demands are based on one (1) clarifier with one (1) clarifier out of service and are as follows:

Demand	Flow Rate (MGD)	DT (hr)	Meets Criteria
Average Day	0.487	5.32	Yes
Ex. WTP Capacity	0.550	4.71	Yes
Max. Day	0.760	3.41	Yes
Silver Lake Withdrawal	1.500	1.73	No

The intent of part of this study was to evaluate the opportunity to expand the water distribution system for each community to provide a water supply to LCWSA. For the Village of Mount Morris this evaluation was based on meeting their maximum day withdrawal of 1.5 MGD from Silver Lake. At this flow rate, the existing clarifier does not meet the Ten States criteria for detention time.

It is recommended a third clarifier be added to the WTP, to increase the capacity of the clarifiers to achieve the maximum day withdrawal from Silver Lake. It is assumed that the added clarifier would be designed to match the other two (2) existing clarifiers. The results at various demands are based on two (2) clarifiers with one (1) clarifier out of service and are as follows:

Demand	Flow Rate (MGD)	DT (hr)	Meets Criteria
Average Day	0.487	10.64	Yes
Ex. WTP Capacity	0.550	9.42	Yes
Max. Day	0.760	6.82	Yes
Silver Lake Withdrawal	1.500	3.45	Yes

Based on the results with the added clarifier, the Ten States criteria for detention time is met for all flow rates.

The surface overflow rate (SOR) is a standard design parameter, which can be determined from discrete particle settling analysis. The results at various demands are based on two (2) clarifiers with one (1) clarifier out of service and are as follows:

Demand	Flow Rate (MGD)	SOR (gpd/SF)
Average Day	0.487	253
Ex. WTP Capacity	0.550	286
Max. Day	0.760	395
Silver Lake Withdrawal	1.500	780

According to Ten States, clarifiers should be equipped with overflow weirs so that water at the surface of the unit does not travel over ten (10) feet horizontally to the collection trough. Each clarifier has a two-sided V-notch weir collection system suspended at the top of the tank. Since water can overflow into the trough from both sides, the overall weir length is doubled from 94' to 188' for each clarifier. Ten States recommends that the weir overflow rate (WOR) does not exceed 10 gpm/ft. The results at various demands are based on two (2) clarifiers with one (1) clarifier out of service and are as follows:

Demand	Flow Rate (MGD)	WOR (gpm/SF)	Meets Criteria
Average Day	0.487	9.43	Yes
Ex. WTP Capacity	0.550	10.64	Yes
Max. Day	0.760	6.82	Yes
Silver Lake Withdrawal	1.500	3.46	Yes

Based on the results, the Ten States criteria for WOR is met for all flow rates.

Unless supporting data is submitted to the reviewing authority to justify excessive rates, Ten States recommends the upflow rate shall not exceed 1.0 gpm/SF at the sludge separation line for units used for clarifiers. The results at various demands are based on two (2) clarifiers with one (1) clarifier out of service and are as follows:

Demand	Flow Rate (MGD)	Upflow (gpm/SF)	Meets Criteria
Average Day	0.487	0.18	Yes
Ex. WTP Capacity	0.550	0.20	Yes
Max. Day	0.760	0.27	Yes
Silver Lake Withdrawal	1.500	0.54	Yes

Based on the results, the Ten States criteria for WOR is met for all flow rates. The process calculations for the clarifiers at the Village of Mount Morris WTP can be found in Appendix D.

The WTP has two (2) multi-media filters, each measuring 16' x 12' with a filter area of 192 square feet. The total combined filter area is 284 square feet.

The design media gradation for each filter is as follows: 16.5" of anthracite, 9" of sand, and 4.5" of high density sand (30" of total media). Each filter also has 12" of support gravel and Leopold under drains.

According to Ten States, at least two (2) units shall be provided. Where more than two (2) filter units are provided, the filters shall be capable of meeting the plant design capacity at the approved filtration rate with one (1) filter removed from service. Ten States recommends a typical filtration rate for rapid gravity filters between 2 to 4 gpm/SF. Each filter is rated for a maximum flow rate of 768 gpm based on a filtration rate of 4 gpm/SF, which equates to 1.1 MGD. According to the WTP operators, high water quality is not achieved through the filters at rates much higher than 2 gpm/SF, which equates to 0.55 MGD for each filter. There are several factors limiting the filter capacity.

The surface wash system on the filters is inoperable. The wash system is designed to be 2-inches above the filter media, but is currently resting on top of the media. This prevents proper surface washing of the media, resulting in compacted media, the formation of mud balls, and insufficient filter cleaning. The above conditions can form "dead" areas in the bed, where water neither filters through in normal filtration or flows up during the backwash cycle. Compacted media in the filters should be physically broken up with a rake, surface wash system, or air/water wash system. The operators currently use a hand rake to break up the surface of the filters, but are not able to access all areas of the filters. The surface wash and sludge pump piping appear to have been modified, and the reduced diameter piping may be impacting pump performance. The surface wash system should be repaired and the pumps and piping should be evaluated further so they can be restored to their original design.

A comprehensive performance evaluation was completed previously by the NYS DOH. Their evaluation recommended cleaning and/or replacing the filter media. Their study

found depths of media that were not in accordance with the specifications and media that was not well stratified. Their evaluation also found that the anthracite media did not meet the recommended size and uniformity specifications. The sand media was found to not meet the size requirements and was found to be aged. Over time, the edges of the sand media can become rounded and worn down, reducing its effectiveness.

The current design of the filter influent pipe can create scouring of the media surface below the influent pipe. It is recommended a baffle is installed to distribute the influent flow more evenly in order to prevent or limit scouring.

The backwash pumps periodically lose their prime. This is due to a check valve located under water in the clearwell. This valve regularly fails to close, causing the pump to lose prime. It is recommended that a vacuum priming system is added, so that the check valve is no longer needed. To repair or replace the existing check valve, a diver would be required, since the clearwell cannot be easily taken out of service.

The WTP was designed and constructed with four (4) filter cells. Only two (2) of the four (4) filter cells were completed and made operational. The two (2) spare cells currently have no piping, control valves, under drain, media, or related appurtenances. The two (2) filters at the WTP are currently limiting the capacity of the WTP. Rehabilitating the existing filters and adding a third filter would provide additional capacity to the WTP.

Other repairs are needed to the WTP prior to any expansion to increase its capacity. The control valves used to isolate each filter for operation, maintenance, and inspection have significant leakage. The filter influent valve for Filter No. 2 does not close tight and the filter to waste valve is inoperable. It is recommended that all valves are either repaired or replaced.

Several improvements have been made to the control system for the WTP, but portions of the system are still not automated. Additional control system improvements are needed to improve and automate plant operations. It is recommended the system is integrated to provide remote access and control to the operators.

Currently, the chemicals are fed at a fixed rate regardless of flow. The chemical feed pumps should be flow paced so that the chemicals are fed continuously in amounts proportional to flow to ensure that targeted rates are applied consistently.

Much of the plant instrumentation needs repair and replacement, including headloss indicators and totalizer recorders. All plant flow meters, headloss indicators, chart recorders, and filter rate of flow controllers should be repaired/recalibrated as needed. The rate of flow recorder for Filter No. 1 is not working properly. The flow to this filter is set

at a constant rate, while the flow rate to Filter No. 2 is variable to maintain the level in the filter influent channel.

The current standard is a maximum of 0.3 NTU for combined filter effluent. It is recommended the combined filter effluent turbidity monitoring point is installed at the combined filter effluent header, prior to post filtration treatment, with a sample tap for TOP or other water quality monitoring.

The sludge pumping equipment for the decant tank is not functional, so the sludge is pumped with portable submersible mixers. The sludge pumping equipment needs replacement.

The sludge drying beds drain poorly. The collection piping has filled with fine sediment, reducing the drying efficiency. Repairs to the sludge drying beds and collection piping are recommended.

The existing clearwell has no baffles. Baffling is recommended to improve the contact time for disinfection prior to water entering the distribution system.

The total estimated project cost for the improvements to expand and repair the Mount Morris WTP is approximately $4.23 million. The cost estimates are included in Appendix C.

Village of Avon

The Village of Avon currently operates a WTP located in Geneseo, New York. The WTP provides water to the Village of Avon, Town of Avon, and Caledonia (Water District #3). The existing WTP was constructed in 1997. Only minor improvements and changes have been made since it was built. The water supply for the Village's water system comes from Conesus Lake, with a maximum water withdrawal permitted amount of 3.5 MGD. The intake pump station is located on Pebble Beach Road and supplies water to the WTP for treatment. Improvements to the Pebble Beach Road pump station are currently under construction. Much of the process piping and equipment for the for the WTP was designed to accommodate up to its withdrawal allowance of 3.5 MGD, if fully built out.

There are currently two (2) TR-420 Trident Package Treatment filter units at the WTP, each rated for 1.0 MGD. Due to the NYS DOH's requirement for redundancy, the capacity is based on one (1) filter in case the other filter needs to go offline. This limits the WTP capacity as it is to 1.0 MGD. The current average day production of the Village's WTP is 0.765 MGD, with a maximum daily production of 1.1 MGD. The Village's WTP Operator has noted that the WTP typically only goes over its 1.0 MGD capacity on days where there are water main breaks, they are flushing hydrants, or there is an

operational issue, such as adjusting tank levels as a correction, or when there is a known upcoming project that requires the WTP to be shut down for a given time.

The WTP has a 0.25 MG treated water storage tank and a 0.50 MG raw water storage tank on site. The Village owns an additional treated 2.0 MG water storage tank that is located on Reservoir Road. The Town of Avon owns and operates two (2) water storage tanks of their own that are 0.10 MG and 0.50 MG. Both of those tanks are supplied by the Village of Avon.

Since the Village of Avon WTP was designed and built to accommodate for future expansion, components of the building and process piping are in place to add a third filter. The north wall of the WTP building is a structural expansion wall that can be removed so the building can be expanded to house a third filter.

The two (2) existing filter units are Trident filters in relatively good condition considering their age. The filter units are showing visible signs of rust, corrosion, and other minor defects. The Village has attempted to mitigate problems by sanding and repainting the parts of the filter units, but these repairs have only worked as temporary fixes.

The filter media was last inspected by Westech in 2017. No issues were indicated, but it is recommended the media is replaced due to its age. A new filter media has been introduced since the existing filters were installed in 1997. The original filters were installed with Bead Only filter media. The current filter units have upgraded to Mixed Media Adsorption Clarifier (MMAC). MMAC is a combination of compressible fiber balls that are integrated with the traditional buoyant media. The addition of the fiber balls to the standard media creates more floc that can be captured along with the smaller floc captured by the bead media. This media combination increases production output due to an extended filter run time and a reduced number of flushes required in the adsorption clarifier. The media replacement requires a blower to be added to meet the additional air flow required for the MMAC media.

Another notable upgrade from the original filter units that were installed when the WTP was built in 1997, is the replacement of the Triton underdrains with the MULTIBLOCK underdrain. The MULTIBLOCK underdrains includes improved media retention, corrosion resistance, minimized depth requirements, and the elimination of support gravel. The MULTIBLOCK system includes a factory installed media-retaining Laser Shield plate constructed of 304 stainless steel. Rehabbing the existing filters to match the new filter unit links the filter run-time, hydraulics, and effluent water quality between all filters.

Adding a third TR-420 Trident Package Treatment filter would increase the WTP capacity from 1.0 MGD to 2.0 MGD by providing two (2) duty filters and one (1) redundant filter.

The raw water, backwash, filtered water, and waste lines all have the appropriate fittings in place to connect a proposed third filter. The influent piping to the filters consists of mainly 16" PVC pipe that contracts to 8" suction piping that ties directly into the filter units. The effluent piping from the filters consists of a 10" PVC discharge line that contracts to 8" elbows and then enlarges to 16" PVC piping that carries the treated water to the clearwells. There is a 10" discharge pipe that connects to the 12" backwash line that has previously failed and was repaired with alternate materials by the Village. This repair created a misalignment between the two existing filter headers. It is recommended that this section of piping be replaced to match its original design to avoid hydraulic issues or failure in the future. The WTP has one (1) flow meter to monitor flow out of the WTP. This flow meter is not capable of reading flows below 100 gpm. Installing a new flow meter is recommended. Water hammer in the backwash lines has caused some of the valves near the clarifier end of the filter units to continuously leak air. These valves need replacement.

Water flows from the filter units into two (2) clearwell tanks that are 39,500 gallons each. The Village has the ability to isolate each tank, if needed. The water from the clearwells is pumped to a 0.25 MG treated water storage tank by two (2) Gorman-Rupp T10 pumps. The Village only runs one (1) pump at a time, but the clearwell pumps are plumbed so that they can run together in parallel. The clearwell pumps are sized to handle the additional flows anticipated from a third filter unit. Adding Variable Frequency Drives (VFDs) to the clearwell pumps would provide several benefits. VFDs would mitigate water hammer in the backwash line, improve pump efficiency and energy usage, and prolong the projected pump life-span.

The 0.25 MG treated water storage tank is emptied, cleaned, and flushed annually. It was last inspected in 2017. The inspection concluded the tank is in good working condition, with only a few minor recommendations at the time. The anti-slip material installed on the tank roof used to safely allow access to the center vent is either loose or missing and is recommended that this be replaced. At the time of inspection, only minor corrosion had begun to appear on the surface. It is recommended that another tank inspection be completed to see if any other additional repairs are needed.

The total estimated project cost for the improvements to expand and repair the Village of Avon WTP is approximately $5.54 million. The cost estimates are included in Appendix C.

Chlorine concentration contact time (CT) calculations were performed at the WTP during peak operating flows to determine if the NYS Subpart 5-1.52 CT requirements were met based on the WTP operating conditions at its maximum and minimum water temperatures. It was determined that the CT requirements are normally met under current conditions and existing flow rates, however, they were not met during full build out capacity and peak flows at the maximum and minimum water temperature until

approximately 4,500' north of the Village of Avon's WTP along the existing 20" transmission main from the WTP. This is based on a minimum chlorine residual at the Village of Avon WTP after the clearwells of 1.3 mg/L. The chlorine contact concentrations for the Village of Avon can be found in Appendix H. Several customers are currently fed water off of this finished water transmission main and a 4" parallel water main that runs parallel to the raw water transmission to the south of the WTP. In order to meet the CT requirements in the future, new water main should be installed to connect the existing LCWSA water main from north of the intersection of West Lake Road with Route 20A northerly to the existing LCWSA water main at the intersection of West Lake Road with South Lima Road. A map of the proposed LCWSA connection is included in Appendix F. The customers tied into the Village's existing transmission main and 4" water main along this section would need their water services transferred over to the new LCWSA water main. The total estimated project cost for making this new LCWSA water main connection is approximately $1.61 million. The cost estimates are included in Appendix C.

Village of Geneseo

The Village of Geneseo's WTP is located in the Town of Geneseo. The most current version of the Village of Geneseo WTP went online with its new filtration system in January, 1995. The Village of Geneseo's water system serves water to the Village of Geneseo, Town of Geneseo, Town of York, Town of Leicester, Town of Covington, and the SUNY Geneseo institution. The water supply for the Village's water system comes from Conesus Lake, with a maximum water withdrawal permitted amount of 3.0 MGD. The design capacity of the Village's WTP is defined as 2.00 MGD. An additional 0.50 MGD is received from LCWSA, leading to a total combined capacity for the Village's water distribution system of 2.50 MGD. The current average day production of the WTP is 1.004 MGD, with a maximum daily production of 1.898 MGD. Based on this data, the Village's WTP has capacity based on its average day production, but is nearing its designed capacity during its maximum daily production.

The location of the Village's WTP is an inherent limitation due to the small size and topography of the site and its relative proximity to residential properties. The existing filter room layout at the WTP does not provide an opportunity for adding an additional filter unit without substantial changes to the existing facilities. The limitations for expanding the existing WTP and the fact that it is already near its designed capacity leads to the recommendation that the Village of Geneseo's WTP not be considered a viable option used to expand the water supply within Livingston County.

Village of Perry

The Village of Perry's WTP was originally constructed in 1954, but has received various upgrades over the last 70 years. The Village's WTP is located on the east side of Silver

Lake and currently supplies water to the Town of Castile, Perry Center, and Letchworth State Park. The water supply for the Village's water system comes from Silver Lake, with a maximum water withdrawal permitted amount of 2.0 MGD. The Village's WTP capacity is rated for 1.60 MGD. The current average day production of the Village's WTP is 0.344 MGD, with a maximum daily production of 0.759 MGD. This indicates some amount of remaining capacity is available at the Village of Perry WTP and it could be considered as a potential source in the future to feed potable water to the east into Livingston County. As water demand in Leicester increases, the Village of Perry system may be a supplemental source of supply as well as a potential inter-connection to improve the resiliency of the LCWSA system. Further discussion should be considered as water supply systems expand between the Village and LCWSA.

Sincerely,

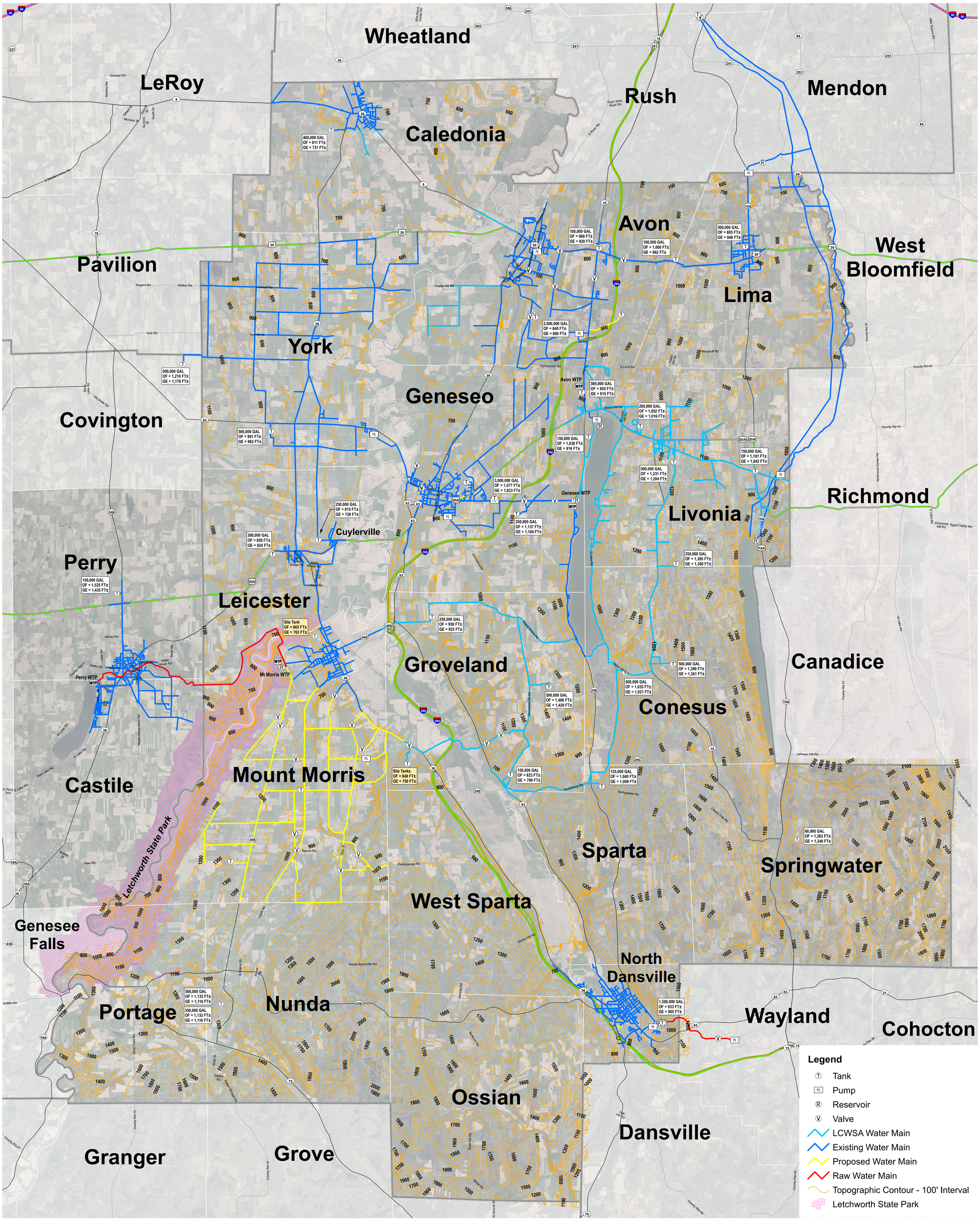
William Davis
Director of Water Resources Engineering

\\mrbgroup.prv\NewProjects\3816.22001.000\REPORTS\LCWSA Water Supply & Storage Study - Letter.docx

Attachment (Appendices)

APPENDIX A

LIVINGSTON COUNTY WATER MAP



Note: Tanks whose label has an orange background are system independent storage tanks, not system tanks.

PROJECT	3816.22001
SHEET	1 of 1

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www.mrbgroup.com

Drawn By:	TJV
Scale:	1" = 1 Mile
Date:	APR 2022

N W E S

LCWSA - WATER SUPPLY AND STORAGE STUDY

LIVINGSTON COUNTY, NEW YORK

WATER SYSTEMS - SCHEMATIC

APPENDIX B

WATER DATA MASTER

Water Source	Water Plant Municipality	Water Withdrawal Permitted Amount (MGD)	Current Water Treatment Plant Capacity (MGD)	Current Avg. Daily Production[4] (MGD)	Current Max Daily Production[4] (MGD)	Current WTP Capacity minus Current Max Daily Production	Water Withdrawal minus Current Max Daily Production	Purchaser/District	Permitted Amount (MG's)	Per	Avg. Daily Permitted Amount (MGD)	Water Used [1] (Gallons Per Year)	Avg. Used Amount [1] (MGD)	Max Amount Used [1] (MGD)	Avg. Water Produced[4] (Gallons Per Year)
Silver Lake		3.50									**Per Current IMA**				
	Village of Perry	2.00	1.60	0.344	0.759	0.84	1.24	**Village of Perry**							130,169,250
								Castile - Gardeau	1.000	Month	0.033	9,579,000	0.026	0.050	
								Castile - Silver Lake Inst	1.200	Month	0.040	8,655,000	0.024	0.025	
								Perry Center	0.750	Month	0.025	6,999,000	0.019	0.050	
								Letchworth State Park	0.200	Day	0.200	7,836,000	0.021	0.150	
								TOTAL				**33,069,000**	**0.091**		
	Village of Mt. Morris	1.50	0.55	0.487	0.760	-0.21	0.74	Village of Mt Morris							177,847,300
								Village of Leicester	0.250	Day	0.250	30,449,000	0.083		
								LCWSA	0.030	Day	0.030	7,691,100	0.021		
								Town of Mt. Morris	0.045	Day	0.045	6,687,389	0.018		
								TOTAL				**44,827,489**	**0.123**		
Conesus Lake		6.50													
	Village of Avon	3.50	1.00	0.765	1.1	-0.10	2.40	Village of Avon							279,300,376
								Town of Avon	0.535	Day	0.535	97,464,986	0.267		
								Caledonia (W.D. #3)				4,389,807	0.012		
								TOTAL				**101,854,793**	**0.279**		
	Village of Geneseo	3.00	2.50	1.004	1.898	0.60	1.10	Village of Geneseo							366,922,000
								Town of Geneseo	0.385	Day	0.385	65,186,771	0.179		
								Town of York	0.800	Day	0.800	172,817,920	0.473		
								SUNY Geneseo				19,456,228	0.053		
								TOTAL				**257,460,919**	**0.705**		

Notes:

(1) Based on 2020 Reporting Year Water Withdrawal Reporting Form to NYSDEC
(2) Village of Avon WTP has the ability to modularly expand to 2 MGD
(3) Maximum Daily Production is not reflective of the maximum daily demand of the water system
(4) Based on Water System Operation Reports from 2019 - 2021.
(5) Village of Geneseo WTP capacity is 2 MGD, but an additional 0.5 MGD is provided by LCWSA
(6) Village of Geneseo WTP hit a max. daily production of 2.192 MGD in 2019, but that occurred while flushing hydrants and due to the WTP catching up on storage

APPENDIX C

COST ESTIMATES

PRELIMINARY COST ESTIMATE

VILLAGE OF MOUNT MORRIS RAW WATER TRANSMISSION MAIN IMPROVEMENTS

	Item Description	*Unit Price*	*Quantity*	*Units*	*Cost*
	Mobilization / Demobilization	$ 250,000.00	1	LS	$ 250,000.00
	Maintenance and Protection of Traffic	$ 75,000.00	1	LS	$ 75,000.00
	Replace circa 1913 12-inch in (V) Perry	$ 175.00	9,000	LF	$ 1,575,000.00
	Replace circa 1913 10-inch in (T) Perry	$ 120.00	18,000	LF	$ 2,160,000.00
	Replace circa 1950 10-inch in Letchworth SP	$ 120.00	22,000	LF	$ 2,640,000.00
	Replace circa 1950 10-inch through USACE Dam	$ 500.00	2,000	LF	$ 1,000,000.00
	12-inch Gate Valve & Box	$ 4,000.00	10	EA	$ 40,000.00
	10-inch Gate Valve & Box	$ 3,600.00	40	EA	$ 144,000.00
	Air Release Valves	$ 3,500.00	10	EA	$ 35,000.00
	Flushing Hydrants	$ 6,000.00	10	EA	$ 60,000.00
	Mount Morris Raw Water Pump Improvements	$ 100,000.00	1	LS	$ 100,000.00
	Erosion & Sediment Control	$ 25,000.00	1	LS	$ 25,000.00
	Lawn Restoration	$ 6.50	40,000	LF	$ 260,000.00
	Open Cut Road Restoration	$ 30.00	500	LF	$ 15,000.00
	Asphalt Driveway Restoration	$ 50.00	1,000	LF	$ 50,000.00
	Stone / Gravel Driveway Restoration	$ 20.00	1,000	LF	$ 20,000.00
	Subtotal			**$**	**8,449,000.00**
	Construction contingency (20%)			$	1,689,800.00
CONSTRUCTION COSTS				**$**	**10,138,800.00**
	Engineering (20%)			$	2,027,800.00
	Legal/Admin (5%)			$	506,900.00
TOTAL PROJECT COSTS				**$**	**12,673,500.00**

PRELIMINARY COST ESTIMATE

VILLAGE OF MOUNT MORRIS WTP IMPROVEMENTS

	Item Description	*Unit Price*	*Quantity*	*Units*	*Cost*
	Mobilization / Demobilization	$ 125,000.00	1	LS	$ 125,000.00
	Raw Water Reservoir Improvements	$ 150,000.00	1	LS	$ 150,000.00
	Filter Surface Wash Repairs	$ 50,000.00	2	EA	$ 100,000.00
	Filter Media Replacement (Two Existing)	$ 220.00	960	CF	$ 211,200.00
	Filter Influent Baffle	$ 20,000.00	2	EA	$ 40,000.00
	Filter No. 3 Construction and Controls	$ 500,000.00	1	EA	$ 500,000.00
	Additional Clarifier	$ 600,000.00	1	EA	$ 600,000.00
	Backwash Pump Vacuum Priming System	$ 60,000.00	1	LS	$ 60,000.00
	Control System Improvements	$ 250,000.00	1	LS	$ 250,000.00
	Control Valve Repairs	$ 8,000.00	5	EA	$ 40,000.00
	Control Valve Replacement	$ 12,000.00	5	EA	$ 60,000.00
	Decant Tank Sludge Pumping Replacement	$ 75,000.00	1	LS	$ 75,000.00
	Sludge Drying Bed Repairs	$ 30,000.00	1	LS	$ 30,000.00
	Clearwell Baffles	$ 50,000.00	1	LS	$ 50,000.00
	Miscellaneous Pump and Piping Modifications	$ 125,000.00	1	LS	$ 125,000.00
	Painting	$ 100,000.00	1	LS	$ 100,000.00
	Pipe Hangers, Supports, Misc. Appurtenances	$ 40,000.00	1	LS	$ 40,000.00
	Erosion & Sediment Control	$ 15,000.00	1	LS	$ 15,000.00
	Electrical Modifications	$ 250,000.00	1	LS	$ 250,000.00
	Subtotal			**$**	**2,821,200.00**
	Construction contingency (20%)			$	564,200.00
CONSTRUCTION COSTS				**$**	**3,385,400.00**
	Engineering (20%)			$	677,100.00
	Legal/Admin (5%)			$	169,300.00
TOTAL PROJECT COSTS				**$**	**4,231,800.00**

Notes:

- WTP Improvements would add a 3rd filter & increase the WTP capacity to 2.2 MGD at full capacity (1.1 MGD per filter assumed)
- The Silver Lake allocation for Mt. Morris would need to be increased above 1.5 MGD.
- An additional clarifier would be needed to keep detention time to a minimum 4 hours at 2.2 MGD.

PRELIMINARY COST ESTIMATE

VILLAGE OF AVON WTP IMPROVEMENTS

	Item Description	*Unit Price*	*Quantity*	*Units*	*Cost*
	Mobilization	$ 100,000.00	1	LS	$ 100,000.00
	Excavation, Grading, Finish Grading & Restoration	$ 40,000.00	1	LS	$ 40,000.00
	Structural Concrete Foundation (Structural Fill, Concrete Footers, Installation)	$ 1,500.00	200	CY	$ 300,000.00
	Metal Building Addition (Approx. 20'x55')	$ 400.00	2,000	SF	$ 800,000.00
	New Trident Filter Unit, Blower, & Installation	$ 800,000.00	1	EA	$ 800,000.00
	Erosion & Sediment Control	$ 7,500.00	1	EA	$ 7,500.00
	Process Piping & Fittings (Inside Building)	$ 400.00	300	LF	$ 120,000.00
	Miscellaneous Valve Replacement & Piping Upgrades	$ 50,000.00	1	LS	$ 50,000.00
	Existing Filter Rehab (Westech & painting, coatings, etc.)	$ 800,000.00	1	LS	$ 800,000.00
	Electromagnetic Flow Meter	$ 7,500.00	1	EA	$ 7,500.00
	Clearwell Pump VFDs	$ 150,000.00	2	EA	$ 300,000.00
	Asphalt Pavement	$ 12.00	15,000	SF	$ 180,000.00
	Electrical / Controls	$ 150,000.00	1	LS	$ 350,000.00
	Subtotal			**$**	**3,855,000.00**
	Construction contingency (20%)			$	578,300.00
CONSTRUCTION COSTS				**$**	**4,433,300.00**
	Engineering (20%)			$	886,700.00
	Legal/Admin (5%)			$	221,700.00
TOTAL PROJECT COSTS				**$**	**5,541,700.00**

	Subtotal (Expansion Only)			**$**	**2,705,000.00**
	Construction contingency (20%)			$	405,800.00
CONSTRUCTION COSTS				**$**	**3,110,800.00**
	Engineering (20%)			$	622,200.00
	Legal/Admin (5%)			$	155,500.00
TOTAL PROJECT COSTS (EXPANSION ONLY)				**$**	**3,888,500.00**

PRELIMINARY COST ESTIMATE

VILLAGE OF AVON WEST LAKE ROAD WATER MAIN

	Item Description	*Unit Price*	*Quantity*	*Units*	*Cost*
	Mobilization / Demobilization	$ 50,000.00	1	LS	$ 50,000.00
	Maintenance and Protection of Traffic	$ 25,000.00	1	LS	$ 25,000.00
	8" DR-18 PVC Watermain	$ 110.00	6,600	LF	$ 726,000.00
	8" Gate Valve and Box	$ 2,500.00	8	EA	$ 20,000.00
	Hydrant Unit	$ 7,000.00	14	EA	$ 98,000.00
	1" Sampling and Disinfection Tap	$ 1,000.00	10	EA	$ 10,000.00
	Water Service Transfer, Short Side	$ 1,750.00	12	EA	$ 21,000.00
	Water Service Transfer, Long Side	$ 2,500.00	12	EA	$ 30,000.00
	Connect to Existing Watermain	$ 6,500.00	2	EA	$ 13,000.00
	Erosion & Sediment Control	$ 7,500.00	1	LS	$ 7,500.00
	8" DR-11 HDPE Watermain, Directionally Drilled	$ 160.00	150	LF	$ 24,000.00
	Open Cut Road Restoration	$ 30.00	100	LF	$ 3,000.00
	Asphalt Driveway Restoration	$ 50.00	200	LF	$ 10,000.00
	Stone/Gravel Driveway Restoration	$ 20.00	150		$ 3,000.00
	Lawn Restoration	$ 6.50	5,500	LF	$ 35,750.00
	Subtotal			**$**	**1,076,250.00**
	Construction contingency (20%)			$	215,300.00
CONSTRUCTION COSTS				**$**	**1,291,550.00**
	Engineering (20%)			$	258,300.00
	Legal/Admin (5%)			$	64,600.00
TOTAL PROJECT COSTS				**$**	**1,614,450.00**

APPENDIX D

TREATMENT PROCESS CALCULATIONS

MRB | *group*

Project Title: Livingston County Water Supply & Storage Study
Project No.: 3816.22001
Date: June 17, 2022
Engineer: C. Hurley

Objective: Analysis of Water Treatment Plant clarifiers at the Village of Mount Morris WTP.

References: Recommended Standards for WaterWorks (Ten States)

Determine Surface Overflow Rate:

Surface Overflow Rate (SOR) =	Q/SA		
Radius =	17.5	ft	
Area =	962	SF	
Area for 2 clarifiers =	1,924	SF	
Average Day Flow =	0.487	MGD	
Ex. WTP Capacity =	0.550	MGD	
Max. Day Flow =	0.760	MGD	
Max. Silver Lake Withdrawal =	1.500	MGD	
Average Day SOR =	253	gpd/SF	
Ex. WTP Capacity Rating =	286	gpd/SF	
Max. Day SOR =	395	gpd/SF	
Max Withdrawal SOR =	780	gpd/SF	

Determine Weir Overflow Rate:

Weir Overflow Rate (WOR) =	Q/L		
Weir Length =	188	ft	
Weir Length for 2 clarifiers =	376		
Average Day Flow =	0.487	MGD	
Ex. WTP Capacity =	0.550	MGD	
Max. Day Flow =	0.760	MGD	
Max. Silver Lake Withdrawal =	1.500	MGD	
Average Day WOR =	0.90	gpm/ft	Ten States Typical: Less than 10 gpm/ft
Ex. WTP Capacity Rating =	1.02	gpm/ft	
Max. Day WOR =	1.40	gpm/ft	
Max Withdrawal WOR =	2.77	gpm/ft	

Determine Upflow Rate:

Upflow (rise) Rate =	Q/SA		
Radius =	17.5	ft	
Height =	15	ft	
Area =	962	SF	
Area for 2 clarifiers =	1,924	SF	
Average Day Flow =	0.487	MGD	
Ex. WTP Capacity =	0.550	MGD	
Max. Day Flow =	0.760	MGD	
Max. Silver Lake Withdrawal =	1.500	MGD	
Average Day Rate =	0.18	gpm/SF	Ten States Typical: 1.0 gpm/SF
Ex. WTP Capacity Rate =	0.20	gpm/SF	
Max. Day Rate =	0.27	gpm/SF	
Max Withdrawal Rate =	0.54	gpm/SF	

Determine Detention Time:

Ex. WTP (1 clarifier online)

Detention Time (DT) =	V/Q		
Diameter =	35	ft	
Radius =	17.5	ft	
Height =	15	ft	
Volume =	14,432	CF	
=	0.11	MG	
Average Day Flow =	0.487	MGD	
Ex. WTP Capacity =	0.550	MGD	
Max. Day Flow =	0.760	MGD	
Max. Silver Lake Withdrawal =	1.500	MGD	
Average Day DT =	5.32	hr	Ten States Typical: 2-4 hours
Ex. WTP Capacity DT =	4.71	hr	
Max Day DT =	3.41	hr	
Max Wihdrawal DT =	1.73	hr	

Determine Detention Time:

WTP w/ 1 clarifier added (2 online)

Detention Time (DT) =	V/Q		
Diameter =	35	ft	
Radius =	17.5	ft	
Height =	13.5	ft	
Volume =	12,989	CF	
Volume for 2 clarifiers =	25,977	CF	
=	0.19	MG	
Average Day Flow =	0.487	MGD	
Ex. WTP Capacity =	0.550	MGD	
Max. Day Flow =	0.760	MGD	
Max. Silver Lake Withdrawal =	1.500	MGD	
Average Day DT =	9.58	hr	Ten States Typical: 2-4 hours
Ex. WTP Capacity DT =	8.48	hr	
Max Day DT =	6.14	hr	
Max Wihdrawal DT =	3.11	hr	

APPENDIX E

CHLORINE CONTACT CALCULATIONS

Avon WTP - CT Calcs

INPUTS
OUTPUTS

16" Filtered Water to Clearwell Tanks		
Chlorine Residual =	1.3	mg/L
Flow =	1400	gpm
Pipe Volume=	428	gallons
Contact Time (T) =	0.31	min
CT =	0.40	mg-min/L

Clearwell Tanks		
Chlorine Residual =	1.3	mg/L
Flow =	2,700	gpm
Fluid Volume=	22,692	gallons
Contact Time (T) =	5.04	min
CT =	6.56	mg-min/L

Filtered Water to 0.25 MG Tank		
Chlorine Residual =	1.3	mg/L
Flow =	2,700	gpm
Pipe Volume=	1,601	gallons
Contact Time (T) =	0.59	min
CT =	0.77	mg-min/L

0.25 MG Tank		
Chlorine Residual =	1.3	mg/L
Flow =	2,150	gpm
Fluid Volume=	168,981	gallons
Contact Time (T) =	23.58	min
CT =	30.65	mg-min/L

Transmission Main to 2979 Lakeville Road		
Chlorine Residual =	1.3	mg/L
Flow =	2,150	gpm
Pipe Volume=	82,708	gallons
Contact Time (T) =	38.47	min
CT =	50.01	mg-min/L

Total CT		
Total CT =	**88.39**	mg-min/L
Required CT at Min. Water Temp. =	260.78	mg-min/L
Required CT at Max. Water Temp. =	43.14	mg-min/L

Needed CT for *Giardia* Inactivation		
Needed =	3.00	log
Direct Filter Credit =	2.00	log
Remaining Needed =	1.00	log
Inactivation Ratio (Winter) =	0.34	
3-log Inactivation =	**1.02**	log
Remaining Needed =	0.00	log
Inactivation Ratio (Summer) =	2.05	
3-log Inactivation =	**6.15**	log
Remaining Needed =	0.00	log

Virus Inactivation		
Needed =	4.00	log
Direct Filter Credit =	2.00	log
Remaining Needed =	2.00	log
Total CT =	88.39	mg-min/L
Required CT =	12.00	mg-min/L
Inactivation Ratio =	7.37	
4-log Inactivation =	**29.46**	log
Remaining Needed =	0.00	log

Avon WTP - CT Calcs

INPUTS
OUTPUTS

16" Filtered Water to Clear Well Tanks

Given:		
Max. Flow Rate Through Filters =	1,400	gpm
Chlorine Residual 'C'	1.3	mg/L
Pipe Diameter =	16	inches
Area =	201.06	si
	1.40	sf
Length =	41	LF
Pipe Volume =	57.25	CF
	428.26	gallons
TDT =	0.31	min
Baffling Factor (BF) =	1.00	
Contact Time (T) =	0.31	min
CT =	0.398	min-mg/L

Avon WTP - CT Calcs

INPUTS
OUTPUTS

Clear Well Tanks

Given:		
Max. Pumping Rate for 1 Pump =	2,700	gpm
Chlorine Residual 'C'	1.3	mg/L
Clearwell Pump Off =	899	ft
Clearwell F.F. EL. =	895	ft
Minimum Water Depth =	4	ft
Inside Tank Length =	35	ft
Inside Tank Width =	21.67	ft
Cross Sectional Area =	758.33	sf
Fluid Volume =	3,033.33	cf
	22,692.37	gallons
Number of Tanks =	2	
Total Fluid Volume =	45,384.73	gallons
TDT =	16.81	min
Baffling Factor (BF) =	0.30	
Contact Time (T) =	5.04	
CT =	6.556	min-mg/L

Avon WTP - CT Calcs

INPUTS
OUTPUTS

Filtered Water to 0.25 MG Tank

Given:		
Max. Flow Rate Through Clear Well Pump =	2,700	gpm
Chlorine Residual 'C'	1.3	mg/L
Pipe 1 Diameter =	12	inches
Area =	113.10	si
	0.79	sf
Length =	70	LF
Pipe Volume =	54.98	CF
	411.29	gallons
Pipe 2 Diameter =	10	inches
Area =	78.54	si
	0.55	sf
Length =	10	LF
Pipe Volume =	5.45	CF
	40.80	gallons
Pipe 3 Diameter =	16	inches
Area =	201.06	si
	1.40	sf
Length =	110	LF
Pipe Volume =	153.59	CF
	1149.00	gallons
Total Pipe Volume =	1601.09	gallons
TDT =	0.59	min
Baffling Factor (BF) =	1.00	
Contact Time (T) =	0.59	min
CT =	0.771	min-mg/L

Avon WTP - CT Calcs

INPUTS
OUTPUTS

0.25 MG Tanks		
Given:		
Peak Flow Rate from Model =	2,150	gpm
Chlorine Residual 'C'	1.3	mg/L
Clearwell Pump On =	940	ft
Tank F.F. EL. =	914.5	ft
Minimum Water Depth =	25.5	ft
Inside Tank Diameter =	33.58	ft
Cross Sectional Area =	885.80	sf
Fluid Volume =	22,587.99	cf
	168,980.78	gallons
Number of Tanks =	1	
Total Fluid Volume =	168,980.78	gallons
TDT =	78.60	min
Baffling Factor (BF) =	0.30	
Contact Time (T) =	23.58	min
CT =	30.652	min-mg/L

Avon WTP - CT Calcs

INPUTS
OUTPUTS

Transmission Main to 2979 Lakeville Road

Given:		
Peak Flow Rate from Model =	2,150	gpm
Chlorine Residual 'C'	1.3	mg/L
Pipe 1 Diameter =	16	inches
Area =	201.06	si
	1.40	sf
Length =	215	LF
Pipe Volume =	300.20	CF
	2,245.77	gallons
Pipe 2 Diameter =	20	inches
Area =	314.16	si
	2.18	sf
Length =	4930	LF
Pipe Volume =	10,755.59	CF
	80,462.58	gallons
Total Pipe Volume =	82,708.35	gallons
TDT =	38.47	min
Baffling Factor (BF) =	1.00	
Contact Time (T) =	38.47	min
CT =	50.010	min-mg/L

Avon WTP - CT Calcs

From V. of Avon WTP Data from 2019 - 2021

Winter

Min. Temp. (Deg F) = 33
Min. Temp. (Deg. C) 0.6
Max pH at Min. Temp.= 7.50
Chlorine Residual (mg/L) = 1.300 Set Value

Required CT: NYS Subpart 5-1.52, Table 14A, T ≤ 0.5 C.

Free Chlorine Residual (mg/L)	pH
	7.5
1.2	259
1.4	266

Required CT: NYS Subpart 5-1.52, Table 14B, T at 5 C.

Free Chlorine Residual (mg/L)	pH
	7.5
1.2	183
1.4	187

pH=7.5		
Free Chlorine Residual (mg/L)	Temperature (Deg. C)	
	0.5	5
1.2	259	183

Interpolate CT value based on T = 0.6 Deg. C. at Free Chlorine Residual 1.2 mg/L

x = Temperature
y = CT Value

x = 0.6
x_0 = 0.5
x_1 = 5
y = ?
y_0 = 259
y_1 = 183

y = 257.31 mg-min/L

pH=7.5		
Free Chlorine Residual (mg/L)	Temperature (Deg. C)	
	0.5	5
1.4	266	187

Interpolate CT value based on T = 0.6 Deg. C. at Free Chlorine Residual 1.4 mg/L

x = Temperature
y = CT Value

x = 0.6
x_0 = 0.5
x_1 = 5
y = ?
y_0 = 266
y_1 = 187

y = 264.24 mg-min/L

pH = 7.5		
Temperature (Deg. C.)	Free Chlorine Residual (mg/L)	
	1.2	1.4
0.6	257.31	264.24

Interpolate CT value based on T = 0.6 Deg. C. at Free Chlorine Residual 0.6 mg/L & = 0.8 mg/L

x = Free Chlorine Residual
y = CT Value

x = 1.300
x_0 = 1.2
x_1 = 1.4
y = ?
y_0 = 257.31
y_1 = 264.24

y = **260.78** mg-min/L

From V. of Avon WTP Data from 2019 - 2021

Summer

Max Temp. (Deg. F) = 80
Max Temp. (Deg. C) = 26.7
Max pH at Max. Temp. = 7.29
Min. Chlorine Residual (mg/L) = 1.300 Set Value

Required CT: NYS Subpart 5-1.52, Table 14F, T at 25 C.

Free Chlorine Residual (mg/L)	pH	
	7.0	7.5
1.2	38	46
1.4	39	47

Interpolate CT value based on pH = 7.0 & pH = 7.5 at Free Chlorine Residual = 1.2 mg/L

x = pH
y = CT Value

x = 7.29
x_0 = 7.0
x_1 = 7.5
y = ?
y_0 = 38
y_1 = 46

y = 42.64 mg-min/L

Interpolate CT value based on pH = 7.0 & pH = 7.5 at Free Chlorine Residual = 1.4 mg/L

x = pH
y = CT Value

x = 7.29
x_0 = 7.0
x_1 = 7.5
y = ?
y_0 = 39
y_1 = 47

y = 43.64 mg-min/L

pH = 7.29	
Free Chlorine Residual (mg/L)	CT Value (mg-min/L)
1.2	42.64
1.4	43.64

Interpolate CT value based on pH = 7.29 at Free Chlorine Residual = 1.2 mg/L & = 1.4 mg/L

x = Free Chlorine Residual
y = CT Value

x = 1.300
x_0 = 1.2
x_1 = 1.4
y = ?
y_0 = 42.64
y_1 = 43.64

y = **43.14** mg-min/L

CT Values for 4-Log Inactivation of Viruses by Free Chlorine
From V. of Avon WTP Data from 2019 - 2021

Winter

Min. Temp. (Deg F) = 33
Min. Temp. (Deg. C) 0.6
Max pH at Min. Temp.= 7.50

Summer

Max Temp. (Deg. F) = 80
Max Temp. (Deg. C) = 26.7
Max pH at Max. Temp. = 7.29

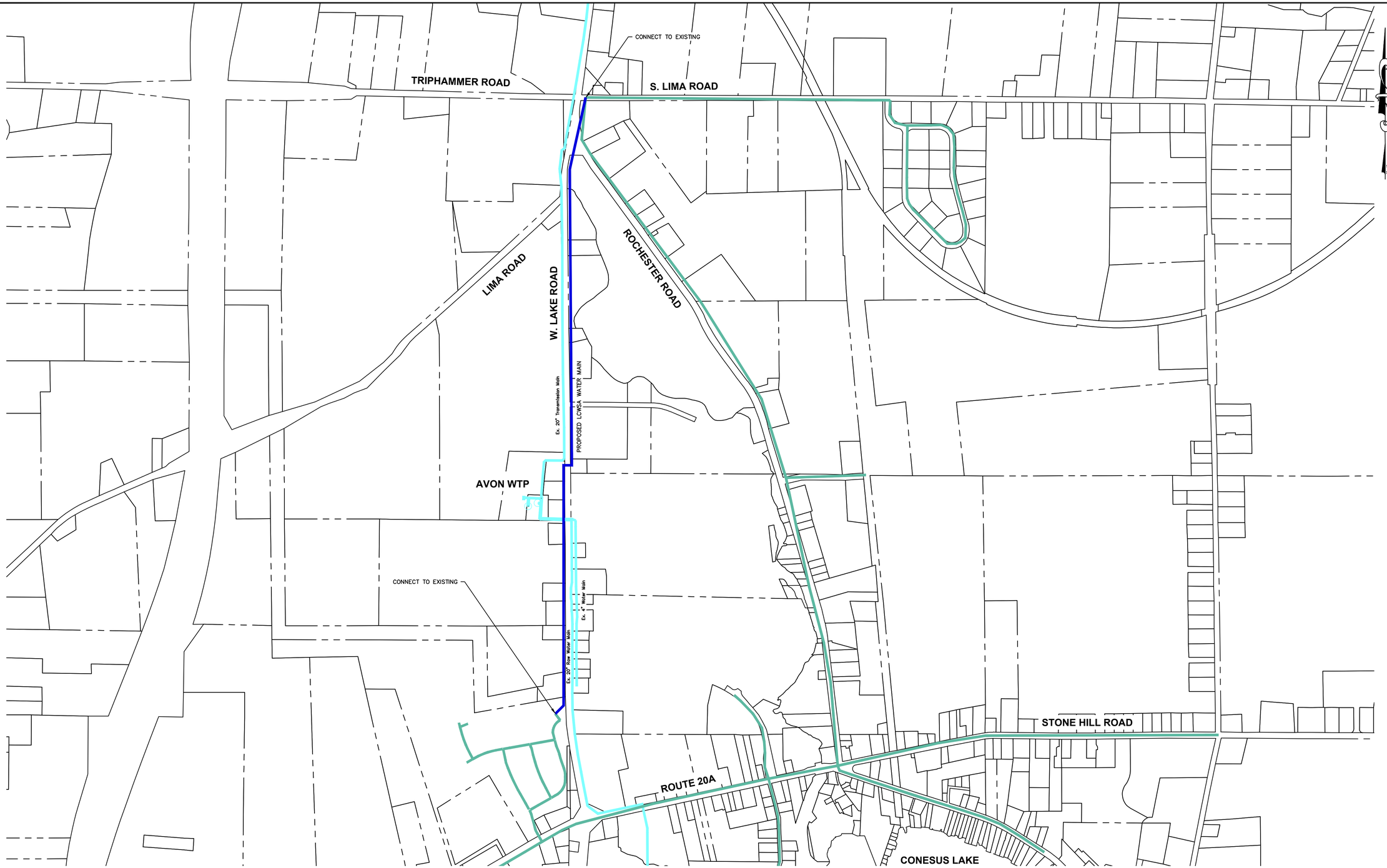
Required CT: EPA Guidance Manual, Table B-2

Temperature (Deg. C)	pH	
	6-9	10
0.5	12	90
5	8	60
10	6	45
15	4	30
20	3	22
25	2	15

Use Required CT = **12** mg-min/L

APPENDIX F

MAP OF PROPOSED LCWSA CONNECTION



DRAWING ALTERATION
THE FOLLOWING IS AN EXCERPT FROM THE NEW YORK EDUCATION LAW ARTICLE 145 SECTION 7209 AND APPLIES TO THIS DRAWING.
"IT IS A VIOLATION OF THIS LAW FOR ANY PERSON UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR TO ALTER AN ITEM IN ANY WAY. IF AN ITEM BEARING THE SEAL OF AN ENGINEER OR LAND SURVEYOR IS ALTERED, THE ALTERING ENGINEER OR LAND SURVEYOR SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION AND A SPECIFIC DESCRIPTION OF THE ALTERATION".

No.	Revisions and Descriptions	By	Date

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Project Title:
20" TRANSMISSION MAIN
VILLAGE OF AVON
LIVINGSTON COUNTY, NEW YORK

Drawing Title:
PROPOSED LCWSA CONNECTION

Drawn By: CAH
Checked By: WGD
Scale: 1" = 500'
Date: 6/2022

MRB group
Engineering, Architecture & Surveying, D.P.C.
The Culver Road Armory, 145 Culver Road, Suite 160, Rochester, New York 14620
Phone 585-381-9250
www.mrbgroup.com

Sheet No. **FIG. 1**
1 of 1

Project No. **3816.22001**

Appendix D

Existing Countywide Water System Map

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Monroe County

Uplands Supply Conduits

Genesee County

Ontario County

Wyoming County Water Resources Agency System

Wyoming County

Steuben County

Allegany County

Village of Caledonia

Town of Caledonia

Village of Avon

Town of Avon

Village of Lima

Town of Lima

Town of York

Village of Geneseo

Town of Geneseo

Village of Leicester

Town of Leicester

Village of Mount Morris

Town of Mount Morris

Town of Groveland

Village of Livonia

Town of Livonia

Town of Conesus

Town of Sparta

Town of Springwater

Town of West Sparta

Village of Nunda

Town of Nunda

Town of Portage

Village of Dansville

Town of North Dansville

Town of Ossian

Silver Lake

Conesus Lake

Hemlock Lake

Canadice Lake

Honeoye Lake

SPRING CREEK
MAXWELL CREEK
DUGAN CREEK
STREAM
FINGAR CREEK
WHITE CREEK
CHRISTIE CREEK
CONESUS CREEK
SPRING BROOK
HONEOYE CREEK
BIDWELL CREEK
BAIRDS CREEK
SALT CREEK
JAYCOX CREEK
BROWNS CREEK
SPEZZANO GULLY
ZAUNTON GULLY
LITTLE BEARDS CREEK
FALL BROOK
BEARDS CREEK
WILKINS CREEK
KINNEY CREEK
HEMLOCK OUTLET
CANADICE OUTLET
DAMONSVILLE CREEK
ALLENS CREEK
BUCK RUN CREEK
GENESEE RIVER
CANASERAGA CANAL
CONESUS INLET
TUSCARORA CREEK
TWO MILE CREEK
BRADNER CREEK
CANASERAGA CREEK
LIMEKILN CREEK
HONEOYE INLET
COHOCTON RIVER
CROOKED BROOK
KESHEQUA CREEK
NEWVILLE CREEK
MUD CREEK
STONY BROOK
MILL CREEK
BENNETT CREEK
BLACK CREEK
SUGAR CREEK

MAP SHEET:
MAP 3-6

MAP TITLE:
Regional Water Systems

DATE PREPARED:
NOVEMBER 19, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Watermains
- Under design/Construction

N W E S

0 0.5 1 2 Miles

ARCHITECTURE
ENGINEERING
PLANNING
CPLteam.com

Appendix E

Letchworth State Park Administrative Order

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

June 24, 2021

Via E-Mail to: Tom.Alworth@parks.ny.gov

Tom Alworth
Executive Deputy Commissioner
New York State Office of Parks, Recreation and Historic Preservation
625 Broadway
Albany, NY 12238

Re: In the Matter of: Letchworth State Park, Letchworth – North End Public Water Supply (PWS ID. No. NY2511826), Docket No. SDWA-02-2021-8012

Dear Mr. Alworth:

Enclosed you will find an executed copy of the Administrative Order on Consent ("Order") referenced above. As you are aware, the Order establishes a schedule for Letchworth – North End public water supply to comply with the Stage 2 Disinfectants and Disinfection By-Products Rule maximum contaminant level requirements for total trihalomethanes by completing capital improvements to achieve long-term, sustained compliance with MCL requirements of 40 C.F.R. Part 141 Subpart V and the SDWA.

While I fully anticipate you will comply, I must advise you that the violation of an Administrative Order may subject the violator to an administratively assessed civil penalty not to exceed $41,120, or a court-imposed penalty not to exceed $59,017 per day of violation.

Thank you for your prompt response and continued cooperation resolving this matter. If you have any questions about this matter, on how to respond to the Order or need technical assistance, please contact Nicole Foley Kraft, Chief, Safe Drinking Water Act Compliance Section at (212) 637-3093 or kraft.nicole@epa.gov.

Sincerely,

For Dore LaPosta, Director
Enforcement and Compliance Assurance Division

Enclosure

cc: John Honan, NYSOPHP (via email)
Tina Hunt, NYSDOH (via email)
Mark Grove, Livingston County Dept of Health (via email)
Jennifer Maglienti, NYSOPHP (via email)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
290 BROADWAY
NEW YORK, NY 10007-1866

IN THE MATTER OF:

New York State Office of Parks, Recreation and Historic Preservation
Letchworth – North End
1 Letchworth State Park
Castille, NY 14427

PWS ID No. NY2511826

Respondent.

Proceedings pursuant to Section 1414(g) of the Safe Drinking Water Act, 42 U.S.C. Section 300g-3(g)

ADMINISTRATIVE ORDER
ON CONSENT

Docket No.
SDWA-02-2021-8012

I. STATUTORY AUTHORITY

The following FINDINGS are made and ORDER issued under the authority vested in the Administrator of the United States Environmental Protection Agency ("USEPA") by Section 1414(g) of the Safe Drinking Water Act ("SDWA"), 42 U.S.C. Section 300g-3(g) ("the Act"), and duly delegated to the Director of the Enforcement and Compliance Assurance Division of Region 2.

II. INTRODUCTION

1. This Administrative Order on Consent ("ORDER" or "AOC") is issued upon consent of the New York State Office of Parks, Recreation and Historic Preservation (hereinafter "Respondent").

2. The USEPA alleges that Respondent failed to fully comply with the Act, and regulations promulgated pursuant thereto.

3. Respondent agrees not to contest the USEPA's jurisdiction or authority to enter into or enforce this ORDER. Respondent also agrees not to contest the validity of any terms and conditions of this ORDER in any administrative or judicial action to enforce, or in any administrative or judicial action arising from, this ORDER and specifically waives any such defenses.

III. FINDINGS

4. Respondent owns and/or operates the Letchworth - North End "public water system," within the meaning of Section 1401(4) of the SDWA, 42 U.S.C. §300f(4), and 40 C.F.R. §141.2, located in Castile, New York.

5. Respondent is a "supplier of water" within the meaning of Section 1401(5) of the SDWA, 42 U.S.C. §300f(5), and 40 C.F.R. §141.2.

6. Respondent is a "person" within the meaning of Section 1401(12) of the SDWA, 42 U.S.C. §300f(12), and is subject to an Administrative Order ("AO") issued under Section 1414(g)(1) of the SDWA, 42 U.S.C. §300g-3(g)(1).

7. Respondent provides piped water for human consumption and serves a population of at least 25 of the same people over six months per year, and is therefore a "non-transient non-community water system" ("NTNCWS") as defined by Section 1401(16) of the SDWA, 42 U.S.C. §300f(16), and 40 C.F.R. §141.2. Respondent is therefore, subject to the requirements of Part B of the SDWA, 42 U.S.C. §300g et seq., and its implementing regulations found at 40 C.F.R. Part 141.

8. The New York State Department of Health ("NYSDOH") administers the Public Water Supply Supervision Program in New York pursuant to Section 1413 of the SDWA. The approval of primary enforcement authority from EPA to the NYSDOH was effective as of September 9, 1977. However, the NYSDOH has not yet obtained primary enforcement responsibility for the Stage 2 DBPR. Therefore, as of the date of this Order, the USEPA has primary responsibility for enforcement of the Stage 2 DBPR.

9. On January 4, 2006, EPA promulgated the Stage 2 Disinfectants and Disinfection Byproducts Rule ("Stage 2 DBPR"), regulated under 40 C.F.R. Part 141, Subparts U and V, to provide for increased public health protection against the potential risks for cancer and reproductive developmental health effects associated with disinfection byproducts ("DBPs"). The Stage 2 DBPR introduces a new method for calculating compliance with the maximum contaminant levels ("MCL") for total trihalomethanes ("TTHM") and haloacetic acids ("HAA5"), referred to as the locational running annual average ("LRAA").

10. Based on information in the Safe Drinking Water Information System, Respondent utilizes purchased surface water and serves approximately 225 people, therefore, was required to begin complying with the compliance monitoring provisions of the Stage 2 DBPR beginning October 1, 2013.

11. Pursuant to 40 C.F.R. §141.621(a), Respondent is required to monitor for TTHM and HAA5. Specifically, the system is required to take individual TTHM and HAA5 samples at the locations with the highest TTHM and HAA5 concentrations, respectively, once per year. For systems serving fewer than 500 people, only one location with a dual sample set per monitoring period is needed if the highest TTHM and HAA5 concentrations occur at the same location and month.

12. Pursuant to 40 C.F.R. §141.625, systems required to routinely monitor annually must increase monitoring to dual sample sets once per quarter at all monitoring locations if a TTHM sample exceeds 0.080 mg/L or a HAA5 sample exceeds 0.060 mg/L at any location. A system may return to routine monitoring once the system has conducted increased monitoring for at least 4 consecutive quarters and the LRAA for every monitoring location is less than or equal to 0.060 mg/L for TTHM and less than or equal to 0.045 mg/L for HAA5.

13. Pursuant to 40 C.F.R. §§141.64(b)(2), 141.620(d) and 141.625(b), Respondent must calculate LRAAs for TTHM and HAA5 using monitoring results collected and determine whether each LRAA exceeds the MCL. If Respondent fails to complete four consecutive quarters of monitoring, Respondent must calculate compliance with the MCL based on the average of the available data from the most recent four quarters.

14. Pursuant to 40 C.F.R. §141.629(a), systems are required to report to the State within ten (10) days following the end of any quarter in which monitoring is required. The information to be reported includes the location, date and result of each sample taken during the monitoring period.

15. Based on information provided to EPA by NYSDOH, Respondent violated the MCL for TTHM during the 4th Quarter 2019, 1st Quarter 2020, 2nd Quarter 2020, and 3rd Quarter 2020 and is therefore in violation of 40 C.F.R. §141.64(b).

16. On March 25, 2021, Respondent submitted a Corrective Action Plan (CAP) (see Attachment A) to EPA outlining the short-term and long-term steps that will be taken in order to mitigate the elevated TTHM levels in the distribution system and achieve compliance with the MCL.

17. USEPA and Respondent are entering into this Administrative Order on Consent to establish an enforceable schedule for Respondent to implement its CAP and comply with the requirements of 40 C.F.R. Part 141 Subpart V and the SDWA.

IV. ORDER

Based on the foregoing FINDINGS, and pursuant to the authority of Section 1414(g) of the SDWA, 40 C.F.R. §141.64(b). EPA is issuing this ORDER to place the Respondent on an enforceable schedule to comply with 40 C.F.R. Part 141 Subpart V. EPA hereby ORDERS:

Short-Term Measures

18. Within 14 days of the effective date of the Order, Respondent shall submit a flushing, water sampling and data analysis plan to EPA, NYSDOH, and Livingston County Department of Health (LCDOH) for review and approval. Upon approval, Respondent shall implement the approved flushing plan until a long-term remedy is identified and implemented.

19. By October 30, 2021, Respondent must complete installation of the additional pressure gauges being installed to adequately cover the length of the distribution system, as described in the CAP.

20. By October 30, 2021, Respondent must complete modifications to chlorination systems at Highbanks chlorination Facility and Camping Chlorination Station, as described in CAP.

21. By November 30, 2021, Respondent must submit a report documenting the work performed under the short-term section of the CAP including the evaluation of the feasibility of potential Point-of-Use treatment systems, water sampling and data analysis evaluation, any proposed modifications to the short-term measures implemented, and a schedule and plan for mid-term and long-term activities. If Respondent determines that POU treatment is a feasible interim measure, pending Respondent's full evaluation on its long-term compliance options, then the report shall also include a schedule for the implementation including obtaining necessary state and local approvals. Any resulting schedule for installation of POU treatment will be incorporated by reference into this AOC.

22. By October 30, 2022, Respondent must submit a report documenting the work performed under the Mid-Term section of the CAP including the evaluation of the pipe material and lining and costs of a cleaning and lining program, a new source of supply from the Village of Mount Morris, the potential utilization of individual bedrock sources of supply, potential changes to the reservoir, utilization of an aeration system, and additional alternative treatment options. Additionally, the report should include recommendations for a long-term solution to fully address the TTHM exceedances.

Routine Monitoring, Reporting and Public Notification

23. Respondent shall conduct monitoring for TTHM and HAA5 in accordance with 40 C.F.R. §141.621(a) and its approved monitoring plan. Samples shall be analyzed in accordance with 40 C.F.R. §141.621(b). Respondent must calculate the LRAAs for TTHM and HAA5 using monitoring results collected, in accordance with 40 C.F.R. §141.620(d). Specifically, Respondent must calculate compliance with the MCL based on the available data from the most recent four quarters.

24. In addition to routine reporting to the Livingston County Department of Health, Respondent shall submit to EPA the results of the TTHM and HAA5 monitoring required by Paragraph 23 by the 10th of the month following the end of the calendar quarter in which samples were collected in accordance with 40 C.F.R. §141.629. Respondent shall report quarterly to EPA until directed otherwise.

25. In the event of any future LRAA MCL exceedances, Respondent must submit documentation that all public notice requirements specified under 40 C.F.R. Part 141, Subpart Q have been completed on a quarterly basis until the exceedance has been resolved. Respondent shall provide said documentation as part of its Periodic Progress Reports submitted pursuant to Paragraph 27.

26. Respondent shall remain in compliance with all applicable requirements of the Stage 2 DBPR, including the TTHM and HAA5 monitoring requirements (40 C.F.R. §141.621), compliance determination requirements (40 C.F.R. §141.620), and reporting requirements (40 C.F.R. §141.629).

27. Periodic Progress Reports: Respondent must prepare and submit Progress Reports and certifications to EPA, NYSDOH, and LCDOH, describing all activities taken place in the previous six months and those activities anticipated for the upcoming six months. The reports should include a description of any delays that occurred with the work proposed in the previous six months, and any delays that are anticipated to affect work in the following six months as well as a statement of any corrective action taken or to be taken to address or minimize the delay. The reports outlined in Paragraph 21 & 22 of this ORDER may be incorporated into the Periodic Report if the deadlines coincide. The first Progress Report shall be submitted six (6) months after the effective date of the Order and every six (6) months thereafter until Respondent achieves full compliance with the ORDER.

V. GENERAL PROVISIONS

28. All notices, reports, or other submissions by Respondent shall contain the following certification:

"I certify, under penalty of law, that the information contained in or accompanying this submission is true, accurate and complete based upon representations as to accuracy and completeness made to me either orally or through submission of documentation by appropriate personnel with responsibility for the matters contained herein."

29. All submissions and communication related to this Order shall be sent to the following:

Nicole Foley Kraft, Chief
Safe Drinking Water Act Compliance Section
U.S. Environmental Protection Agency
kraft.nicole@epa.gov

and

June 17, 2021
Tina Hunt, Assistant Director
Bureau of Water Supply Protection
Center for Environmental Health
New York State Department of Health
bpwsp@health.ny.gov

and

Mark Grove, Director of Environmental Health
Livingston County Department of Health
mgrove@co.livingston.ny.us

30. Notwithstanding Respondent's compliance with any requirement of this Order, Respondent's failure to comply with all of the requirements of the Act and Part 141 may subject Respondent to additional enforcement action, including but not limited to judicial, administrative and equitable actions.

31. This Administrative Order on Consent shall not prohibit, prevent, or otherwise preclude EPA from taking whatever action it deems appropriate to enforce the Act in any manner and shall not prohibit, prevent, or otherwise preclude EPA from using this Order in subsequent administrative or judicial proceedings. Nothing in this Order shall constitute a waiver, suspension or modification of the requirements of the Act, or the rules and regulations promulgated there under which remain in full force and effect. Issuance of this Order is not an election by EPA to forgo any civil or criminal action otherwise authorized under the Law.

32. The Respondent may be subject to an administrative civil penalty of up to $41,120 pursuant to Section 1414(g)(3)(B) of the Act, 42 U.S.C. §300g-3(g)(3)(B) or a civil penalty assessed by an appropriate United States District Court that exceeds $41,120pursuant to Section 1414(g)(3)(C) of the Act, 42 U.S.C. §300g-3(g)(3)(C). A violation of any term of this Order may also subject the Respondent to a judicial civil penalty of up to $59,017 per day of violation pursuant to Section 1414(b) of the Act, 42 U.S.C. §300g-3(b).

33. Respondent waives its right to seek federal judicial review of the Order pursuant to Section 1448(a) of the Act, 42 U.S.C. §300j-7(a).

34. This Order does not relieve Respondent of any responsibilities or liabilities established pursuant to any applicable federal, State, or local law.

35. This Order on Consent shall take effect upon the signature of the Director, Enforcement and Compliance Assurance Division.

For Respondent:

Date: June 17, 2021

Tom Alworth
New York State Parks, Recreation & Historic Preservation

For USEPA:

For _____ June 24, 2021

Dore LaPosta, Director
Enforcement and Compliance Assurance Division
EPA Region 2

Attachment A: Corrective Action Plan

March 25, 2021

Ms. Nicole Foley Kraft
Chief
Safe Drinking Water Act Compliance Section
U.S. Environmental Protection Agency

Mr. John Honan, P.E.
Western Capital District Manager
New York State Office of Parks
Recreation & Historic Preservation
De Veaux Woods State Park
3160 De Veaux Woods Drive
Niagara Falls, NY 14305

Via Electronic Transmission

RE: Draft Corrective Action Plan
New York State Office of Parks, Recreation and Historic Preservation
Letchworth State Park –
North End Water-Supply System
1 Letchworth State Park, Castile, New York
Docket: SDWA-02-2021-8012
PWSID: NY2511826

Dear Ms. Kraft and Mr. Honan:

WSP USA (WSP), was contracted by the New York State Parks, Recreation and Historic Preservation (NYSOPRHP) to assist with the preparation of a Corrective Action Plan (CAP) to address the Administrative Order On Consent (AOC) that was issued to the NYSOPRHP Letchworth State Park – North End Public Water System (Letchworth NES) for exceedances of the maximum contaminant level (MCL) for total trihalomethanes (TTHM) in the North End water-supply system under Section 1414(g) of the Safe Drinking Water Act (SDWA). Based on information provided to the United States Environmental Protection Agency (USEPA) by the New York State Department of Health (NYSDOH) for the fourth quarter of 2019 through the third quarter of 2020, the DRAFT AOC alleges that the NYSOPRHP violated the maximum contaminant level (MCL) for total trihalomethanes (TTHM) of 0.080 mg/l (milligram per liter) at the Letchworth State Park – North End public water system. Table 1 presents a summary of TTHM results for the four quarters that correspond to the issuance of the DRAFT AOC.

TABLE 1

Summary of Total Trihalomethanes
(mg/l)

Fourth Quarter 2019	First Quarter 2020	Second Quarter 2020	Third Quarter 2020
0.0996	0.0776	0.0969	0.0804

Add four quarters
Source: XXXXXX

WSP USA
4 Research Drive, Suite 204
Shelton, CT 06484

Phone: +1 (203) 929-8555
Fax: +1 (203) 925-9140
wsp.com

BACKGROUND AND SYSTEM DESCRIPTION

Letchworth NES is a non-transient, non-community water-supply system that serves a population greater than 25 of the same people over a six-month period per year, as defined by the USEPA. The population served consists mainly of campers, park employees and visitors to the park, in addition to a single residential household that is provided water service year-round. The Letchworth NES is subdivided into two areas of the park, the North-Side and South-Side. The North-Side portion includes the residence, the park employee maintenance and breakroom facility (known as the Quonset), two public swimming pools, a restaurant and comfort stations (restrooms). The South-Side primarily consists of comfort stations, camping sites and cabins/houses available for rental to the public. The Quonset has been designated as the sampling point for TTHM monitoring.

The sole source of supply to Letchworth NES is the interconnection to the Village of Perry (Perry) distribution system on Water Street near the Perry wastewater treatment plant and Letchworth NES is, therefore, a consecutive water-supply system. The source of supply for Perry is surface water obtained from Silver Lake. Perry reportedly uses a five-step treatment process that consists of the injection of sodium hypochlorite, an up-flow clarifier, coagulation and flocculation, filtration, and injection of sodium hypochlorite for disinfection. The Perry distribution system includes a 750,000-gallon atmospheric storage tank.

The location and key features of the Letchworth NES water system are shown on Plate 1. The connection to the Perry distribution system consists of a below-grade metering facility with a 6-inch diameter meter. The meter within the pit is a direct read and totalizing flow meter which has been assumed to be a turbine flow meter. Pressure at the metering facility is not currently measured, but the gradient in the Perry system is reportedly at elevation 1,490 feet above mean sea level (ft msl), equivalent to a pressure of approximately 106 psi (pounds per square inch) at the metering facility. From the metering facility, water flows through approximately 4,164 linear feet of 6-inch diameter main along Water Street to a pressure reducing valve (PRV) located in an underground chamber on Rider Road. The pressure at the Rider Road PRV is not measured, but the PRV reportedly reduces the downstream gradient to approximate elevation 1,192 ft msl. From the Rider Road PRV, water flows through approximately 6,622 linear feet of 6-inch cast iron main to a 260,000-gallon capacity below-grade concrete storage tank, located west of the intersection of County Line and Crapsey Roads. The reservoir is not operated at full capacity; the reservoir is filled through operation of a 4-inch ClaVal PRV that is designed to open when water level in the reservoir drops to 5.5 feet, and to shut when water level rises to 6 feet, corresponding to an approximate range in stored volume of 115,000 gallons to 125,000 gallons. The fill valve and controls for the reservoir are maintained in an above-ground building that formerly housed circulation pumps to promote mixing, although the pumps have since been removed.

From the reservoir, water flows by gravity through approximately 8,600 linear feet of 10-inch cast iron water main to the Highbanks Chlorination Facility, where sodium hypochlorite is injected into the water main to boost the residual chlorine concentrations. Within the Highbanks Chlorination Facility, the incoming water main is split into two separate water mains with each leg incorporating a flow paced sodium hypochlorite injection system utilizing magnetic flow meters which transmit a 4-20 milliamp (mA) signal to chemical metering pumps to proportionally inject sodium hypochlorite into each leg based on the measured flow. One leg of the water main is directed towards the North-Side of the park and the other leg is directed to the South-Side of the park. The water main for the North-Side primarily consists of 6-inch water main and 8-inch water main. The South-Side water main consists primarily of 6-inch cast iron water main, with a small portion near the end of the distribution system being 4-inch water main. For the purpose of this evaluation, the entire length has been considered to be 6-inch water main. There is one additional chlorination station located on the South-Side of the distribution system. This chlorination station is called the Camping Chlorination Station, and this station also incorporates a flow-paced sodium hypochlorite injection system, utilizing a turbine flow meter to proportionally inject sodium hypochlorite

based on a pulsed output from the flow meter. The distribution system for the North-Side and South-Side includes fire hydrants for fire protection.

A pressure reducing facility is located approximately 6,000 linear feet to the north of the Highbanks Chlorination Facility on the North-Side main, and a similar PRV facility is located approximately 8,000 feet to the south of the Highbanks Chlorination Facility on the South-Side main. The pressure settings are not known, however, according to 1956 plans of the North-Side main, the northern PRV reduces the downstream gradient to approximate elevation 998 ft msl. No similar information could be found for the South-Side PRV.

At the Maplewood rental lodge, located at the end of the South-End system, plumbing and fixtures have been installed to discharge a continuous low flow (0.75 gpm (gallons per minute)) of water to waste to assist with maintaining water quality in the Camping Area of the system.

Based on review of plans and other available information, the hydraulic grade line through the North End water system is assumed to be as follows:

Perry Surface Water Treatment Plant: 1,490 ft msl

Rider Road PRV downstream setting: 1,192 ft msl

Reservoir Fill PRV: 1,130 ft msl

North Side PRV: 998 ft msl

South Side PRV: 998 ft msl

The water demand for Letchworth NES varies from season to season with the peak demand occurring during the summer and the minimum demand occurring during the winter. Based on 2018 operational data supplied by NYSOPRHP, the average day demand (ADD), maximum day demand (MDD) and the minimum day demand (MIN) for each leg of the distribution system and the volume recorded at the Perry Meter Pit are displayed in Table 2, shown in units of gallons per day (gpd). Data for 2018 was used because it was the most recent and complete compilation of flow data that was available for this evaluation.

TABLE 2

Summary of 2018 Water Demand

Location	Minimum Day Demand (gpd)	Average Day Demand (gpd)	Maximum Day Demand (gpd)
South-Side	139	9,504	57,052
North-Side	52	4,531	74,853
Meter Pit	955	14,076	91,889

The peak demand occurred during June (presumably during pool filling activities); however, there is the craft fair that occurs during October that was reported as a high demand event. As indicated above, the distribution system consists of 4-inch, 6-inch, 8-inch and 10-inch cast iron piping. The length of each segment, excluding the 4-inch water main, and the volume of water contained within the distribution system is identified in Table 3. In addition, the volume of the reservoir is included to identify the total volume of water stored within the distribution system.

TABLE 3

Summary of Volume within the Distribution System

Pipe Segment	Approx. Length (feet)	Approx. Volume (gallons)
Meter Pit to Reservoir (6-inch)	10,786	15,841
Reservoir	Not Applicable	125,000
Reservoir to Highbanks Re-Chlorination Station (10-inch)	8,602	35,094
Highbanks Chlorination Facility to end of North-Side (6 & 8-inch)	16,703	27,627
Highbanks Chlorination Facility to end of South-Side (6inch)	21,868	32,117
TOTAL	46,647 feet (6-inch) 2,710 feet (8-inch) 8,602 feet (10-inch)	68,515 (6-inch) 7,076 (8-inch) 35,094 (10-inch) 125,000 (Reservoir) 235,685 (Total)

Based on an average daily demand of 14,076 gpd, the average retention time within the distribution systems would be approximately 17 days, of which 9 days would be retained within the reservoir.

FINDINGS

WSP conducted a site visit on February 25, 2021 to inspect the water distribution system and review current operation and procedures. In addition, WSP reviewed plans and specifications and operational reports for the consecutive water-supply system to understand how the water system functions. The site inspection identified possible issues with re-chlorination of the treated water from Perry and excessive age of the water within the water main which could be contributing to the formation of TTHM. During the site inspection, it was identified that the chlorine residual maintained in the distribution system was very low (0.27 ppm (part per million)) at the Reservoir, and dropped significantly between the Reservoir and the Highbanks Chlorination Facility, and from the Highbanks Chlorination Facility to the Camping Chlorination Station. In addition, inconsistent flow pacing of the chlorine injection pumps was observed, which could lead to under chlorination or over chlorination of the water supplied to the distribution system. NYSOPRHP had used a flow-based dosing configuration at the Highbanks Chlorination station previously, but this was damaged by lighting in 2020; these are currently in the process of being replaced. For the Camping Chlorination Station, NYSOPRHP has initiated a process to investigate and correct the cause of the flow pacing sodium hypochlorite injection systems. Other items of note include that there is no current formal flushing program due in part to the system's outdated mode of pressure reduction (i.e. the original 1960s-era design utilized a by-pass configuration for pressure reduction; a setup that makes effective flushing difficult to achieve). In March 2021, NYSOPRHP completed an upgrade to the north side PRV assembly that replaced the original bypass PRV configuration with an in-line PRV, a configuration that allowed for more effective flushing of this branch.

During our site visit, NYSOPRHP staff were in the process of installing a replacement North-Side PRV which allowed WSP to inspect a cut-out section from the existing water main. The cutout section consisted of 6-inch cement lined cast iron pipe and appeared to be in good condition with no evidence of sediment build-up or biofilm on the interior walls of the pipe. It was also reported by NYSOPRHP staff that when the Reservoir was last drained, there was little accumulation of sediment in the reservoir, a possible indication that the water mains on site are in relatively good condition. Subsequent to the site visit, NYSOPRHP, staff have reported that other parts of the main in the vicinity of the North-Side PRV were unlined cast iron pipe, and also noted that pipe at the Highbanks Chlorination Facility was unlined cast iron pipe.

The inspection of the South-Side PRV facility identified an undersized 2-inch PRV, which appears inadequately sized for fire flow downstream of the PRV. NYSOPRHP plans to replace the existing PRV with a suitably sized replacement PRV that will not restrict fire flows.

Other general findings from the inspection include:

There are limited sample taps and pressure gauges along the pipeline and chlorine dosing and residual levels appeared highly variable, and these changes will help assure that proper dosing is maintained and can be adjusted if needed.

CORRECTIVE ACTION PLAN

The formation of TTHM in drinking water is a function of the organic content in the water, the concentration of chlorine, and the time that the organics are in contact with the water. TTHM formation may also be influenced by other factors including the temperature of the water. Corrective actions to reduce TTHM concentrations may involve modifications to the system or system operations to affect changes to any or all of the above-noted factors.

This Corrective Action Plan (CAP) identifies short-term, mid-term and long-term actions and additional analysis to be performed by WSP, in coordination with NYSOPRHP, to reduce TTHM concentrations in the Letchworth NES. Short-term actions are proposed to reduce TTHM concentrations through system flushing and point-of-use treatment. These short-term measures will allow time for additional sampling, evaluation and cost-benefit analysis of various longer-term options for reducing TTHM concentrations. A description of the actions proposed to be taken under the CAP is provided below.

This CAP is based on review of the best information available as of the date of this report. It is anticipated that additional information developed or obtained during implementation of the CAP may lead to modifying the Short-Term, Mid-Term or Long-Term actions described below. Any proposed modifications to the CAP would be presented to the USEPA, prior to implementation, for review and approval.

Short Term - 0 to 6 months

The evaluation and the potential corrective actions that will be implemented over the short term will include the following:

- Flushing the distribution system;
- Improvements to Chlorination
- Improvements to Pressure Monitoring
- Water sampling and data analysis; and
- Point-of-Use (POU) treatment systems.

Flushing

The purpose of flushing the distribution system is to reduce the amount of time that the water remains in the distribution system. Ideally, as recommended by the American Water Works Association, flushing of each segment of the water main would be conducted at a minimum flow rate based on the diameter of the water main and a minimum velocity of 3.0 feet per second required to achieve scouring of the pipe and resuspension of any deposited sediment. The total volume of each flushing activity should be three times the volume of the piping being flushed. This minimum velocity translates to a flowrate of 260 gpm for the 6-inch water main, 470 gpm for the 8-inch water main and 730 gpm for the 10-inch water main. Flow should be measured using an appropriate flow measuring diffuser mounted on the flushing hydrant.

As part of development of this CAP, WSP developed a preliminary hydraulic model of the distribution system using Innovyze software, to evaluate the ability of the system to meet the ideal flushing requirements. The model was built based on the above-noted lengths and diameters, elevations obtained from system mapping and Google Earth. A Hazen Williams equation coefficient of friction or "C-factor" of 100 was used for all piping; the exact C-factor of the piping would need to be verified through pressure monitoring described below. The preliminary model confirmed that flushing velocities of 3 feet per second can likely be achieved in all parts of the system, with the exception of the extreme end of the South-End system, where velocities of 2 feet per second can be obtained.

Flushing should occur in stages starting with flushing of the main from the Perry meter pit to the Reservoir, and proceeding downstream through the system. Flows should be measured at the discharge points and additional hydrants opened to attempt to achieve the flow rates noted above. The exact flushing procedures and details would be refined based on a review of data collected.

Table 4 below presents the volume of water needed for flushing and the estimated duration of these flushing activities at the minimum flowrate based on the diameter of the water main. Staff should note the color of discharged water initially and at the end of the flushing duration noted below. If still discolored at the end of the period, flow should be maintained until the water appears to run clear.

TABLE 4

Summary of Flushing Requirements

Pipe Segment	Volume (gallons)	Flushing Volume (gallons)	Flushing Duration (hours)
Meter Pit to Reservoir (6-inch)	15,841	47,523	3.05
Reservoir to Highbanks Chlorination Facility (10-inch)	35,094	105,282	2.40
Highbanks Chlorination Facility to end of North-Side (8-inch)	7,076	21,228	0.75
Highbanks Chlorination Facility to end of North-Side (6 -inch)	20,553	61,659	4.0
Highbanks Chlorination Facility to end of South-Side (6-inch)	32,117	96,351	6.18

In addition, WSP will evaluate the potential for the installation of automatic flushing hydrants that will automatically flush the distribution system on a to be determined frequency under specific protocols.

Initial flushing should be performed in conjunction with sampling and data analysis described below. Samples should be taken before and after initial flushing, in addition to the proposed schedule described below.

The frequency of flushing will be determined based on results of the water quality sampling described below.

Improvements to Chlorination

In the short term, modification would be made to the chlorination stations to improve the consistency of the injection of sodium hypochlorite. The modifications will include addressing the performance of the existing flow pacing meters in the Highbanks Chlorination Facility and the Camping Chlorination Station. The modifications could also include the installation of continuous chlorine analyzers before and after the point of injection of the sodium hypochlorite at each re-chlorination station to better track the chlorine concentrations entering and leaving each re-chlorination station.

A sample tap would be installed in the Perry meter pit or nearby, and the existing sample taps at the Highbanks Chlorination Facility would be moved to at least 3 feet downstream of the chlorine injection points.

Improvements to Pressure Monitoring

Additional pressure gauges would be installed along the entire system, ideally starting at the Perry meter pit and extending to each end of the distribution system to allow for greater understanding of the hydraulic gradient throughout the water supply system. Understanding the changes in pressure along the pipeline under various flow conditions will allow for a better determination on whether corrosion, sediment or biofilm exist in the pipeline, and also help to pinpoint the affected area(s). The pressure gauges that are installed should be read under a variety of flow conditions and on a frequency that would be sufficient to provide the necessary data to evaluate the condition of the water main and better estimate the C-Factor of the water main. A record should be maintained of the pressures, time of reading and corresponding flows.

Water Sampling and Data Analysis

WSP, in coordination with NYSOPRHP and a New York State certified laboratory, will collect water samples starting at the Perry meter pit and ending at the Quonset on the North-Side and the Camping Chlorination Station on the South-Side. NYSOPRHP will also initiate discussion with the Village of Perry and, if acceptable, samples would also be collected from the Village of Perry surface water treatment plant. The water samples will be analyzed at a State-certified laboratory for TTHM concentration, temperature, chlorine residual concentration and DBP formation potential. As noted above, water samples would be collected prior to and after flushing activities to evaluate the effect that flushing the water main has on the water quality.

The data generated from the water sample analysis will be used to initially evaluate the effect that flushing has on the water quality and refine the flushing program to estimate the duration between flushing events. Data will also be used during the medium-term action plan to evaluate various system and treatment improvements.

Point-of-Use Treatment System

WSP, in coordination with NYSOPRHP, will evaluate the feasibility of installing POU treatment systems to remove TTHM at the point of water consumption. Generally speaking, these types of systems would be granular activated carbon (GAC) or reverse osmosis (RO) units. As it pertains to a GAC system, the evaluation would account for the need of redundancy in treatment systems and GAC consumption rates to estimate the lifespan of the GAC POU treatment system. For RO systems, the evaluation would account for the need for any pretreatment equipment based on the current water quality, the operating cost for the equipment and estimated lifespan of the RO membrane/unit. In addition, we would investigate other potential POU treatment systems that may be viable. In all cases, confirmation water-quality sampling would be conducted to confirm the POU treatment system is functioning properly.

Cost Benefit Analysis

WSP, in coordination with NYSOPRHP, will evaluate the cost of the flushing activities and POU treatment systems to determine if either could be a long-term solution so that the TTHM remain below the MCL. The Cost-Benefit Analysis for flushing will include the cost of the water used for flushing, the labor cost and the laboratory charges associated with monitoring the water quality in the distribution system. In addition, the analysis will include consideration of the possible capital and operational cost associated with installing automatic flushing hydrants, if required. With regard to the POU treatment systems, the analysis will account for the capital, labor and operations cost to install, monitor and eventually replace the POU treatment systems.

Reporting

WSP, in conjunction with NYSOPRHP, will issue a report documenting the work performed under the short-term plan, including any recommendations for changes to the short-term activities and the proposed mid-term and long-term plan activities described below.

Mid-Term (6 months to 18 months)

WSP, in coordination with NYSOPRHP, will evaluate the effectiveness of short-term actions and the potential impacts on any mid-term options. In addition, other options will be evaluated over the Mid-Term which would be directed at achieving compliance with the TTHM MCL over the long-term. The alternatives that will be considered include the following:

- Continuation of short-term activities;
- Verification of pipe material and lining;
- Evaluation of potential changes for the Perry surface water treatment system;
- Evaluation of a new source of supply from the Village of Mount Morris;
- Utilizing individual bedrock water supply wells for the Letchworth NES facilities;
- Evaluation of the Reservoir to determine if changes in operation would be beneficial, including possible seasonal operation, or elimination (if feasible);
- Evaluation of an aeration system (positioned within the reservoir) to remove TTHM; and
- Evaluation of treatment options (ultraviolet light (UV), GAC and RO) to reduce or remove the TTHM concentration.

It is possible that flushing could be the most cost-effective solution to addressing the TTHM and if it is, some of the activities identified below could be unnecessary to complete.

Verification of Pipe Material and Lining

The pressure and flow data that was collected during the short-term evaluation period would be reviewed to estimate the C-Factor of the water main throughout the Letchworth NES. Depending on the results, samples of the water main would be collected from low C-Factor areas to verify the pipe condition. The cost effectiveness of a cleaning and lining program would also be evaluated.

Village of Perry

Potential modifications to the Perry water treatment system would be evaluated to determine if the TTHM concentration, and the potential to form these disinfection byproducts, in the water supplied to Letchworth NES can be reduced. The evaluation would utilize the water sampling data collected, as described under the short-term plan, to understand the quality of the water supplied to Letchworth NES. WSP and NYSOPRHP staff would then present the findings of the water sampling to Perry to evaluate if changes to the water treatment system are feasible.

Mount Morris

The Village of Mount Morris is adjacent to Letchworth NES. It could potentially replace or supplement the supply from the Village of Perry as the source of potable water for Letchworth NES as an alternative. Mount Morris utilizes Silver Lake as its source water (the same source as Perry) and a surface water treatment plant to provide potable water to the residents of Mount Morris. However, the current water quality is unknown as it pertains to TTHM and DBP formation potential. Therefore, coordination with Mount Morris would be needed to gain better understanding on the water quality. In addition, it is our understanding that a water main from Mount Morris crosses the main entrance to Letchworth NES Park along Mount Morris Road. Based on a preliminary evaluation, it appears that Letchworth NES would need to construct a booster pumping station because the elevation change from Mount Morris Road to the high point in the Letchworth NES distribution system would require boosting the water pressure to adequately supply Letchworth NES. Following discussions with the Village of Mount Morris to verify that the supply of water to Letchworth NES is feasible, the hydraulic modeling analysis would be performed to further evaluate this alternative.

Utilizing Individual Bedrock Sources of Supply for the Facilities

This option would consist of construction of one or more bedrock wells to supplement the supply from the Village of Perry and dilute the concentration of TTHM, or possibly replacing the Perry supply entirely. The feasibility of replacing the existing water-supply system or diluting the water supply from Perry with individual bedrock sources of supply would depend on the potential yield of the bedrock aquifer. If the yield of one well is insufficient, additional wells would need to be drilled and all the bedrock wells that would be part of the water-supply system would be subjected to New York State (NYS) water quality and quantity testing. If NYS water-quality testing indicates water-quality concerns, then treatment equipment may be needed to treat the groundwater to bring the water supply into compliance NYS standards. Infrastructure upgrades such as an atmospheric storage tank may also be needed, in the event that the yield of the bedrock well(s) is less than the peak instantaneous demand of the end users. Potentially the existing Reservoir could be maintained as a source of fire protection in combination with sufficient dilution of TTHM from the new groundwater source(s). Other factors that would need to be considered would be the extension of any raw water and treated water transmission piping to supply the Letchworth NES facilities.

Changes to the Reservoir

Changes in the operation for the Reservoir would be evaluated using hydraulic modeling to determine if the Letchworth NES system can be adequately supplied with potable water. The changes could include bypassing the Reservoir, replacing the Reservoir with a fire pump, altering the water level in the reservoir and seasonal use of the reservoir if the Reservoir is needed to meet peak demands. The focus would be to reduce the overall volume of water that is stored within the distribution system thereby potentially reducing the age of the water and the TTHM concentration.

Aeration

Utilizing an aeration system would be evaluated to determine if the TTHM concentration in the water supplied to Letchworth NES can be reduced or removed. The most appropriate location for an aeration system would be the Reservoir and the evaluation would be completed utilizing the water sampling data generated as part of the short-term evaluation. Specifically, the DBP formation potential would be evaluated to determine the potential for the formation of TTHM of the water stored within the reservoir. If the results of the DBP formation analysis indicate a low potential for formation, then aeration may be feasible. However, if the DBP formation potential is high, then aeration of the water within the reservoir may not result in a lower TTHM concentration in the water supplied to Letchworth NES because the TTHM may regenerate. Use of an aeration system at the Reservoir would also likely involve installation of chlorination facilities at the Reservoir, possibly replacing the Highbanks and/or Camping Chlorination Stations.

Evaluation of Treatment Options

There are several different treatment options that are effective at reducing or eliminating TTHM from a water supply. These options include UV, GAC and RO and each treatment option presents its own unique challenges. One challenge would be that all the options presented would remove any residual chlorine from the water supply while removing the TTHM; therefore, re-chlorination of the water supply would be needed to maintain a minimum chlorine residual in the distribution system. Factors affecting the feasibility of the treatment options identified would include the potential need for new structures to house the treatment equipment, the need for pretreatment, the capital and operations cost and the ability of NYSOPRHP staff to maintain the treatment equipment.

Cost Benefit Analysis

The engineering, capital and operations cost of each mid-term option would be evaluated in conjunction with any administrative issues, such as staffing, and any potential short-term solutions to select the most appropriate long-term remedy to the TTHM water-quality concern.

Reporting

WSP, with approval of NYSOPRHP, will issue a report documenting the work performed under the mid-term plan and our recommendations for long-term solutions.

Long-Term Solution – Greater than 18 Months

During this evaluation period, the long-term solution would be implemented and this would account for the conclusions that were determined during the short-term and mid-term evaluations. Therefore, depending on these conclusions, there may be one or several means implemented to fully address the TTHM exceedance. Depending on the ultimate solution, there may also be the need to

prepare construction plans and technical specifications for regulatory approval, project bidding and construction of the preferred solution(s) that would reliably address TTHM in the water supply.

As with the short-term and mid-term, a cost-benefit analysis would be conducted to determine the most cost-effective solution to the TTHM water-quality concern.

Reporting

WSP, with approval of NYSOPRHP, will issue a report at the conclusion of the long-term period documenting the work performed and effectiveness of the Plan.

Please feel free to contact Michael Shortell directly at (475) 882-1720 with any questions or comments.

Kind regards,

WSP USA

Michael J. Shortell
Lead Environmental Engineer

Reviewed by:

Stephen K. Rupar, P.E.
Water Practice Leader

MJS:cmm
Enclosure
cc: Ms. Tina Hunt, NYSDOJ
Mr. Mark Grove, LCDOH
H:\Letchworth State Park\CAP Ltr -Final Draft.docx

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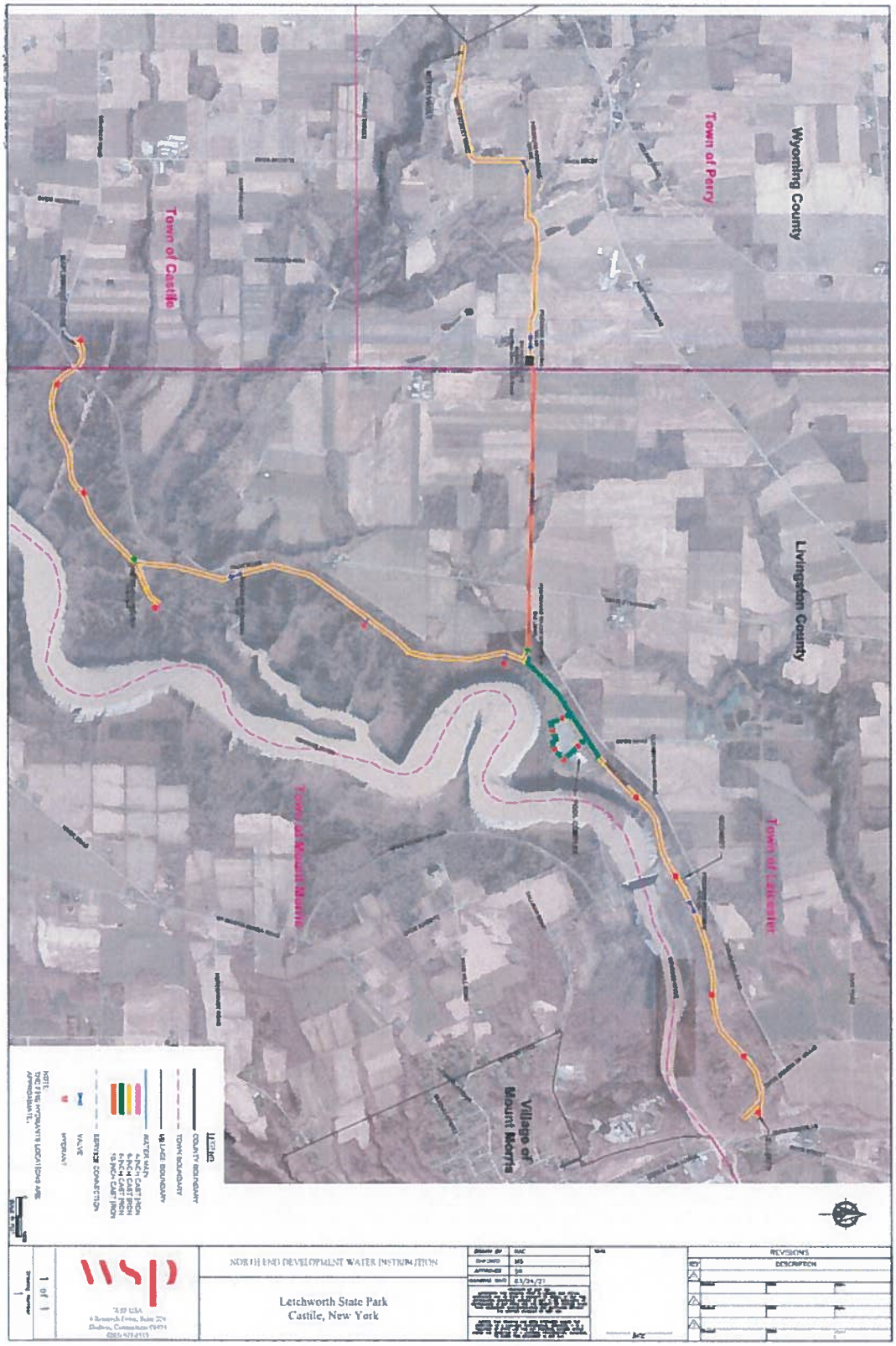
PLATE

WSP USA


Town of Castile
Town of Perry
Wyoming County
Livingston County
Town of Mount Morris
Village of Mount Morris
Town of Leicester
LEGEND
COUNTY BOUNDARY
TOWN BOUNDARY
VILLAGE BOUNDARY
WATER MAIN
6-INCH CAST IRON
8-INCH CAST IRON
10-INCH CAST IRON
12-INCH CAST IRON
SERVICE CONNECTION
VALVE
HYDRANT
NOTE:
THE PIPELINE ALIGNMENT IS LOCATIONS ARE APPROXIMATE!
NORTH END DEVELOPMENT WATER INSTALLATION
Letchworth State Park
Castile, New York
REVISIONS
DESCRIPTION
1 of 1

Appendix F

Town of Leicester Water Supply Sanitary Survey

LIVINGSTON COUNTY
DEPARTMENT OF HEALTH
2 Murray Hill Drive
Mt. Morris, New York 14510-1691

Jennifer Rodriguez, M.S.
Public Health Director

Phone (585) 243-7270
Fax (585) 243-7287
dept-of-health@co.livingston.ny.us
www.livingstoncounty.us/doh.htm

Mark Grove, P.E., Director
Center for Environmental Health
(585) 243-7280/(585) 335-1717 Fax: (585) 243-6793
Dog Control: (585) 243-6740/(585) 335-1720/ Fax: (585) 243-6751

"IMPROVED QUALITY OF LIFE TODAY, FOR A HEALTHIER TOMORROW"

October 17, 2017

Mr. David Fanaro, Supervisor
Town of Leicester
132 Main Street
Leicester, New York 14481

Subject: 2017 Town of Leicester Public Water Supply Sanitary Survey Inspection Report
NYS Public Water Supply Identification Numbers:
Town of Leicester: NY2501014 Population: 562
York-Leicester: NY2501026 4 Population: 45

Dear Mr. Fanaro:

In order to determine that the Town of Leicester Public Water Supply Systems are operating in compliance with the requirements of New York State Sanitary Code Subpart 5-1 "Public Water Systems", the Livingston County Department of Health (LCDOH) conducted a sanitary survey on September 26, 2017. This review was performed with the assistance of Water Operator Edward Hauslauer. The survey of the water supply system is conducted to ensure that there are no existing public health hazard violations at the time of inspection. The condition and operation of the water system are in good order. Mr. Hauslauer and the associated operators do a fine job operating the system and preparing the required reports.

Based on our records and the findings of the inspection, the following comments are offered:

Overview
The Town of Leicester Public Water Supply purchases Village of Mt. Morris water from the Village of Leicester through a service main on Route 36. Water is pumped through the distribution system to a finished water storage tank. The Town's water tank, located in Cuylerville, gravity feeds the hamlet of Cuylerville. The Leicester-York Public Water Supply purchases water from the Town of York. The distribution system provides water to eighteen homes on Caledonia Road.

Observations

- In the summer of 2017 the water transmission main between Starr Park and the Caledonia Road water storage tank broke. The integrity of the water line was compromised when stream bank erosion occurred exposing the pipe. When the pipe was repaired it was placed further back from the stream bank to avoid further erosion issues. Stream restoration was completed to restore the natural state and reduce bank erosion. It was stated at the sanitary survey that a request for funding has been submitted so stream bank armoring can be completed. The LCDOH strongly recommends armoring of the stream bank to protect the transmission main from further erosion.

- The LCDOH received the Sample Siting Plan for Total Coliform Bacteria for the York-Leicester public water supply on October 3, 2016. This was a requirement from the 2016 sanitary survey.

Thank you for continued care and diligence in the operation and maintenance of the water supply system.

Violation

- The finished water storage tank was inspected in 2013 and a report on the condition of the tank was reportedly completed but never received by the Town. It was discussed that the Town's Engineer has the video of the inspection and plans on submitting a report to the Town. **This deficiency has been noted in the past several sanitary surveys and must be addressed by December 31, 2017. A compliance agreement between the Town of Leicester and the LCDOH will be required if corrective action is not taken.**

Requirements

- Secondary containment is required for the chlorine day tank at the Caledonia Road water storage tank. **This requirement must be completed by the 2018 sanitary survey.**

- As stated in the New York State Sanitary Code, section 5-1.31, cross-connection control is the responsibility of the water supplier and the water customer. The Town of Leicester has been proactive with maintaining its cross connection control program and the LCDOH typically receives the required reports in a timely manor. Please complete the "Cross Connection Compliance" form (enclosed) and submit to the LCDOH by **January 31, 2018**.

- The enclosed updated "Reporting Emergencies" form must be posted conspicuously at the water treatment plant or at the highway facility.

- The small hole located in the finished water storage tank was repaired in 2014. A previous hole in the water storage tank was repaired in 2008. Any repeat occurrence of holes forming in the tank would raise concerns that the structural integrity of the tank is in question, which may warrant restoration or replacement of the tank.

Recommendations

- The LCDOH recommends that the Town of Leicester coordinate a flushing schedule with the Village of Mt. Morris and the Village of Leicester for the Town of Leicester public water supply, and with the town of York for the York Leicester public water supply. Flushing should take place at least twice a year **and immediately after the Village of Mt Morris and the Town of York have completed flushing their systems.** Dead ends must be flushed more frequently to avoid bacterial growth in stagnant pipes. An adequate flushing program can help to reduce disinfection by-product levels and protect the water system from bacterial growth.

- It is recommended that all valves in the distribution system be exercised regularly. Proper functioning valves are necessary in an event that causes a section of the water distribution system to need to be isolated, such as water supply contamination or main break. A well maintained distribution system would last longer and cost less over its life. It is important that valves be opened and closed periodically to determine their level of functionality. This may prove difficult with units that have not been moved recently. However, determining which valves are seized will ultimately result with a more efficient distribution system, as malfunctioning valves could be replaced over time with functional units. When new valves are added or old valves are replaced their location should be mapped to reduce the amount of time spent locating valves for repairs.

- Public water facility security is always a concern. Please ensure all gates, valve vaults, tank hatches, access ladders, and other areas continue to remain locked at all times except when access is necessary.

Enclosed is a copy of the DOH 4234 "Water System Field Compliance Report". Please review this form and take note of the comments. Please contact me at 243-7280 if you have any questions.

Sincerely,

Barbara Rogers

Barbara Rogers
Sr. Public Health Sanitarian

cc: Hyland Hartsough, P.E., NYSDOH, Rochester
April Kellerhouse, NYDDOH, Buffalo
Ed Hauslauer, Village of Leicester

Enclosures

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection

Water System Field Compliance Report: A Review of Compliance with Subpart 5-1 of the New York State Sanitary Code

Public Water System Name	Street Address
Leicester-York PWS	132 main St
Town, Village, or City	**County**
Leicester	Livingston

PWS ID Number: N Y 2 5 0 1 0 2 6

PWS Type ☒ C ☐ NC ☐ NTNC ☐ NP

Source Type ☒ Surface ☐ Ground ☐ GWUDI

Date of Service: 09 (M M) / 26 (D D) / 17 (Y Y)

Begin Time: (H H : M M)

End Time: (H H : M M)

Disinfection Waiver Issued? ☐ Yes ☒ No

4-Log Virus Treatment? ☒ Yes ☐ No

Field Visit Type ☐ Pre-operational ☐ Complaint ☐ Incident ☐ Illness ☐ Reinspection ☒ Sanitary Survey ☐ Inspection

Public Health Hazard Types

Part 5 Subsection	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.12(a)	Appropriate actions are taken in response to deteriorating source water quality or diminished effectiveness of treatment with potential for MCL violation.	SA	1
5-1.22(a)	Obtain health department approval prior to the construction or modification of a water system.	SB	1
5-1.23(a)	Obtain health department approval prior to use of an emergency water supply or alteration of a treatment process necessary to protect public health.	SD	1
5-1.27	Maintain minimum distribution system pressure of 20 psi at ground level.	SH	1
5-1.30	Bypass of any stage of treatment.	SJ	1
5-1.30	Disinfection of a groundwater source, surface water source or groundwater source influenced by surface water.	ND 41	1
5-1.30(b)	Filtration of surface source and groundwater influenced by surface water unless avoidance criteria is met.	42	1
5-1.30(b)(2)	Free chlorine residual disinfection concentration in the water entering the distribution system must be at least 0.2 mg/l and may not be less than the minimum concentration for compliance for more than four hours. Systems using other chemical disinfectants shall maintain residual disinfection levels entering the distribution system comparable to requirements for systems using chlorination.	41	3
5-1.30(g)	Maintain free chlorine residual at representative points in the distribution system.	NR	1
5-1.31	Protect the water distribution system from the creation of cross connections of sufficient hazard to adversely affect the health of water consumers.	SJ	1
5-1.71(a)	Exercise due care and diligence in the maintenance and supervision of all sources of the public water to prevent so far as possible, their pollution and depletion.	SN	1
5-1.71(b)	Exercise due care and diligence in the operation and maintenance of a water treatment plant and distribution system.	SO	1

Have all outstanding violations been resolved? ☐ Yes ☐ No

Explain _____

Part 5 Requirements

Part 5 Subsection	Deficiency	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.23(c)	M	Conspicuous posting of Sanitary Code Section 5-1.23, "Reporting Emergencies," at office	SF	1
5-1.29	S M	Finished (treated) water used for priming pumps.		4
5-1.30	S M	Redundant disinfection equipment provided.	ND	4
5-1.30 (e)	S	Complies with disinfection waiver provision.	ND	4
5-1.31(a)(3)	S M	Cross connection control program is implemented by supplier of water, including records of all device testing.	SJ	4
5-1.72(c)	S M	Complete daily records of operation of a water system.	09 10	1
5-1.72(d)	S M	Maintain records (e.g., sample results, reports, filter backwash recycle flow information).	09	1
5-1.72(b)	S	System is in compliance with Subpart 5-4. The correct number and level of operator(s) are available during plant operation. System has designated operators of appropriate grade level in responsible charge.	SQ SY 12	1
5-1.73	S M	Provide or have available test kit.		1
App.5-A 3.2.1	S M	Developed well sources sufficient to meet maximum day demand with the largest well out of service.		4
App.5-A 6.1	S	Pumps are accessible for maintenance and 3 feet above the 100 year flood plain.		4
App.5-A.7.0.3	S M	Water tanks, hatches, roofing, and access ways are watertight, vermin proof, and secure.		4
App.5-A.7.0.7	S M	Tank overflow terminates 12"-24" above grade with proper screen on outlet.		4
App.5-B.2(d)	S M	Finished grade of well is mounded to divert surface water.		4
App.5-B.5(g)	S	Vented, water tight, vermin proof sanitary seal well cap.	SO	4
App.5-D.3(b)	S M	Well casing in good condition and more than 18" above grade.		4

Chlorine Residual 0.00 mg/l Sample Collection Time 10 : 25

Point of Collection Caledonia Rd - Richard Neumann f.

Chlorine Residual _____ mg/l Sample Collection Time _____ : _____

Point of Collection _____

Comments No Public Health hazards at the time of inspection.

Completed by Barbara Reyer Date 9 / 26 / 17

Received by Sent to Ed Hausladen Date ____ / ____ / ____

Status Codes: 1. No violation observed 2. All or parts of an item in violation 3. Item was not reviewed 4. Item not applicable 5. Item(s) corrected during inspection

Deficiency Codes: S: Significant Deficiency M: Minor Deficiency R: Recommendation

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection

Water System Field Compliance Report: A Review of Compliance with Subpart 5-1 of the New York State Sanitary Code

Public Water System Name	Street Address
Town of Leicester	132 Main St
Town, Village, or City	**County**
Leicester	Livingston

PWS ID Number: N Y 2 5 0 1 0 1 4

PWS Type ☒ C ☐ NC ☐ NTNC ☐ NP

Source Type ☒ Surface ☐ Ground ☐ GWUDI

Date of Service: 09 / 26 / 17 (M M / D D / Y Y)

Begin Time: : (H H : M M)

End Time: : (H H : M M)

Disinfection Waiver Issued? ☐ Yes ☒ No **4-Log Virus Treatment?** ☒ Yes ☐ No

Field Visit Type ☐ Pre-operational ☐ Complaint ☐ Incident ☐ Illness ☐ Reinspection ☒ Sanitary Survey ☐ Inspection

Public Health Hazard Types

Part 5 Subsection	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.12(a)	Appropriate actions are taken in response to deteriorating source water quality or diminished effectiveness of treatment with potential for MCL violation.	SA	1
5-1.22(a)	Obtain health department approval prior to the construction or modification of a water system.	SB	1
5-1.23(a)	Obtain health department approval prior to use of an emergency water supply or alteration of a treatment process necessary to protect public health.	SD	1
5-1.27	Maintain minimum distribution system pressure of 20 psi at ground level.	SH	1
5-1.30	Bypass of any stage of treatment.	SJ	4
5-1.30	Disinfection of a groundwater source, surface water source or groundwater source influenced by surface water.	ND 41	1
5-1.30(b)	Filtration of surface source and groundwater influenced by surface water unless avoidance criteria is met.	42	1
5-1.30(b)(2)	Free chlorine residual disinfection concentration in the water entering the distribution system must be at least 0.2 mg/l and may not be less than the minimum concentration for compliance for more than four hours. Systems using other chemical disinfectants shall maintain residual disinfection levels entering the distribution system comparable to requirements for systems using chlorination.	41	1
5-1.30(g)	Maintain free chlorine residual at representative points in the distribution system.	NR	1
5-1.31	Protect the water distribution system from the creation of cross connections of sufficient hazard to adversely affect the health of water consumers.	SJ	1
5-1.71(a)	Exercise due care and diligence in the maintenance and supervision of all sources of the public water to prevent so far as possible, their pollution and depletion.	SN	1
5-1.71(b)	Exercise due care and diligence in the operation and maintenance of a water treatment plant and distribution system.	SO	1

Have all outstanding violations been resolved? ☐ Yes ☒ No

Explain: The finished water storage tank inspection report has not been received as requested

Part 5 Requirements

Part 5 Subsection	Deficiency	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.23(c)	M	Conspicuous posting of Sanitary Code Section 5-1.23, "Reporting Emergencies."	SF	1
5-1.29	S M	Finished (treated) water used for priming pumps.		4
5-1.30	S M	Redundant disinfection equipment provided.	ND	1
5-1.30 (e)	S	Complies with disinfection waiver provision.	ND	4
5-1.31(a)(3)	S M	Cross connection control program is implemented by supplier of water, including records of all device testing.	SJ	1
5-1.72(c)	S M	Complete daily records of operation of a water system.	09 10	1
5-1.72(d)	S M	Maintain records (e.g., sample results, reports, filter backwash recycle flow information).	09	1
5-1.72(b)	S	System is in compliance with Subpart 5-4. The correct number and level of operator(s) are available during plant operation. System has designated operators of appropriate grade level in responsible charge.	SQ SY 12	1
5-1.73	S M	Provide or have available test kit.		1
App.5-A 3.2.1	S M	Developed well sources sufficient to meet maximum day demand with the largest well out of service.		4
App.5-A 6.1	S	Pumps are accessible for maintenance and 3 feet above the 100 year flood plain.		4
App.5-A.7.0.3	S M	Water tanks, hatches, roofing, and access ways are watertight, vermin proof, and secure.		1
App.5-A.7.0.7	S M	Tank overflow terminates 12"-24" above grade with proper screen on outlet.		1
App.5-B.2(d)	S M	Finished grade of well is mounded to divert surface water.		4
App.5-B.5(g)	S	Vented, water tight, vermin proof sanitary seal well cap.	SO	4
App.5-D.3(b)	S M	Well casing in good condition and more than 18" above grade.		4

Chlorine Residual .21 mg/l Sample Collection Time 10 : 10

Point of Collection Tank

Chlorine Residual _____ mg/l Sample Collection Time _____ : _____

Point of Collection _____

Comments: No Public health hazards at the time of inspection. - Secondary Containment needed for the day chemical tank. - Tank inspection report must be submitted or tank re-inspected.

Completed by Barbara Rogers Date 9 / 26 / 17

Received by Edward J. Kleiman Date ____ / ____ / ____

Status Codes: 1. No violation observed 2. All or parts of an item in violation 3. Item was not reviewed 4. Item not applicable 5. Item(s) corrected during inspection
Deficiency Codes: S: Significant Deficiency M: Minor Deficiency R: Recommendation

LIVINGSTON COUNTY
DEPARTMENT OF HEALTH
2 Murray Hill Drive
Mt. Morris, New York 14510-1691

Jennifer Rodriguez, M.S.
Public Health Director

Phone (585) 243-7270
Fax (585) 243-7287
dept-of-health@co.livingston.ny.us
www.livingstoncounty.us/doh.htm

Mark Grove, P.E., Director
Center for Environmental Health
(585) 243-7280/(585) 335-1717 Fax: (585) 243-6793
Dog Control: (585) 243-6740/(585) 335-1720/ Fax: (585) 243-6751

"COMMITMENT TO LEADING THE COMMUNITY FOR A HEALTHIER AND SAFER TOMORROW"

December 20, 2018

Mr. David Fanaro, Supervisor
Town of Leicester
132 Main Street
Leicester, New York 14481

Subject: Town of Leicester Public Water Supply 2018 Sanitary Survey Inspection Report
NYS Public Water Supply Identification Numbers:
Town of Leicester: NY2501014 Population: 562
York-Leicester: NY2501026 Population: 45

Dear Mr. Fanaro:

In order to determine that the Town of Leicester Public Water Supply Systems are operating in compliance with the requirements of New York State Sanitary Code Subpart 5-1 "Public Water Systems", the Livingston County Department of Health (LCDOH) conducted a sanitary survey on November 27, 2018. This review was performed with the assistance of Water Operator Edward Hauslauer. The survey of the water supply system is conducted to ensure that there are no existing public health hazard violations at the time of inspection. The condition and operation of the water system are in good order. Mr. Hauslauer and the associated operators do a fine job operating the system and preparing the required reports.

Based on our records and the findings of the inspection, the following comments are offered:

Overview

The Town of Leicester Public Water Supply purchases Village of Mt. Morris water from the Village of Leicester through a service main on Route 36. Water is pumped through the distribution system to a finished water storage tank. The Town's water tank, located in Cuylerville, gravity feeds the hamlet of Cuylerville. The Leicester-York Public Water Supply purchases water from the Town of York. The distribution system provides water to eighteen homes on Caledonia Road.

Observations

- Two automatic flushers were purchased and installed at dead ends in the distribution system. One unit was installed on upper River Rd and one unit was installed on lower River Road and will be moved as needed in the distribution system.

- As stated in the New York State Sanitary Code, section 5-1.31, cross-connection control is the responsibility of the water supplier and the water customer. The Town of Leicester has been proactive with maintaining its cross connection control program and the LCDOH typically receives the required reports in a timely manor. The "Cross Connection Compliance" form was submitted to the LCDOH at the time of the inspection.

- The "Reporting Emergencies" form is posted conspicuously at the highway facility. This was a requirement from the 2017 sanitary survey.

Thank you for continued care and diligence in the operation and maintenance of the water supply system.

Requirements

- The finished water storage tank was inspected in July, 2017. The LCDOH received a report on the condition of the tank on November 28, 2018 from Clark Paterson Lee. Receipt of the report was a deficiency noted at the 2017 sanitary survey. Deficiencies noted in the report should be addressed. While not identified in the tank report, Eric Wies from Clark Paterson Lee stated that there is not much that can be done with the inner panels that fell from the side walls and recommends re-evaluating in 5 years. **The hole in the side of the tank at the 20' water level must be repaired.**

- Secondary containment must be installed under the day tank at the booster house. In the event of a leak or a spill, the chlorine solution will be contained.

Compliance for the above requirements will be determined at the 2019 sanitary survey.

Recommendations

- In the summer of 2017 the water transmission main between Starr Park and the Caledonia Road water storage tank broke. The integrity of the water line was compromised when stream bank erosion occurred exposing the pipe. When the pipe was repaired it was placed further back from the stream bank to avoid further erosion issues. Stream restoration was completed to restore the natural state and reduce bank erosion. It was stated at the 2017 sanitary survey that a request for funding has been submitted so stream bank armoring can be completed. At the time of the sanitary survey it was reported that the grant had not yet been received. The LCDOH strongly recommends armoring of the stream bank to protect the transmission main from further erosion.

- The LCDOH recommends that the Town of Leicester coordinate a flushing schedule with the Village of Mt. Morris and the Village of Leicester for the Town of Leicester public water supply, and with the town of York for the York Leicester public water supply. Flushing should take place at least twice a year **and immediately after the Village of Mt Morris and the Town of York have completed flushing their systems.** Dead ends must be flushed more frequently to avoid bacterial growth in stagnant pipes. An adequate flushing program can help to reduce disinfection by-product levels and protect the water system from bacterial growth.

- It is recommended that all valves in the distribution system be exercised regularly. Proper functioning valves are necessary in an event that causes a section of the water distribution system to need to be isolated, such as water supply contamination or main break. A well maintained distribution system would last longer and cost less over its life. It is important that valves be opened and closed periodically to determine their level of functionality. This may prove difficult with units that have not been moved

recently. However, determining which valves are seized will ultimately result with a more efficient distribution system, as malfunctioning valves could be replaced over time with functional units. When new valves are added or old valves are replaced their location should be mapped to reduce the amount of time spent locating valves for repairs.

- Public water facility security is always a concern. Please ensure all gates, valve vaults, tank hatches, access ladders, and other areas continue to remain locked at all times except when access is necessary.

Enclosed is a copy of the DOH 4234 "Water System Field Compliance Report". Please review this form and take note of the comments. Please contact me at 243-7280 if you have any questions.

Sincerely,

Cathy Higgins
Sr. Public Health Sanitarian

cc: Hyland Hartsough, P.E., NYSDOH, Rochester
April Kellerhouse, NYDDOH, Buffalo
Ed Hauslauer, Village of Leicester

Enclosures

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection

Water System Field Compliance Report: A Review of Compliance with Subpart 5-1 of the New York State Sanitary Code

Public Water System Name	Street Address
Leicester - York PWS	132 Main St.
Town, Village, or City	**County**
	Livingston

PWS ID Number: NY2501026

PWS Type [X] C [ ] NC [ ] NTNC [ ] NP

Source Type [X] Surface [ ] Ground [ ] GWUDI

Date of Service: 11 / 27 / 18 (M M / D D / Y Y)

Begin Time: 10:00 (H H : M M)

End Time: 11:45 (H H : M M)

Disinfection Waiver Issued? [ ] Yes [X] No

4-Log Virus Treatment? [X] Yes [ ] No

Field Visit Type [ ] Pre-operational [ ] Complaint [ ] Incident [ ] Illness [ ] Reinspection [X] Sanitary Survey [ ] Inspection

Public Health Hazard Types

Part 5 Subsection	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.12(a)	Appropriate actions are taken in response to deteriorating source water quality or diminished effectiveness of treatment with potential for MCL violation.	SA	1
5-1.22(a)	Obtain health department approval prior to the construction or modification of a water system.	SB	1
5-1.23(a)	Obtain health department approval prior to use of an emergency water supply or alteration of a treatment process necessary to protect public health.	SD	1
5-1.27	Maintain minimum distribution system pressure of 20 psi at ground level.	SH	1
5-1.30	Bypass of any stage of treatment.	SJ	1
5-1.30	Disinfection of a groundwater source, surface water source or groundwater source influenced by surface water.	ND 41	1
5-1.30(b)	Filtration of surface source and groundwater influenced by surface water unless avoidance criteria is met.	42	1
5-1.30(b)(2)	Free chlorine residual disinfection concentration in the water entering the distribution system must be at least 0.2 mg/l and may not be less than the minimum concentration for compliance for more than four hours. Systems using other chemical disinfectants shall maintain residual disinfection levels entering the distribution system comparable to requirements for systems using chlorination.	41	1
5-1.30(g)	Maintain free chlorine residual at representative points in the distribution system.	NR	1
5-1.31	Protect the water distribution system from the creation of cross connections of sufficient hazard to adversely affect the health of water consumers.	SJ	1
5-1.71(a)	Exercise due care and diligence in the maintenance and supervision of all sources of the public water to prevent so far as possible, their pollution and depletion.	SN	1
5-1.71(b)	Exercise due care and diligence in the operation and maintenance of a water treatment plant and distribution system.	SO	1

Have all outstanding violations been resolved? [ ] Yes [ ] No N/A

Explain _____

Part 5 Requirements

Part 5 Subsection	Deficiency (Circle)	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.23(c)	M	Conspicuous posting of Sanitary Code Section 5-1.23, "Reporting Emergencies."	SF	1
5-1.29	S M	Finished (treated) water used for priming pumps.		4
5-1.30	S M	Redundant disinfection equipment provided.	ND	4
5-1.30 (e)	S	Complies with disinfection waiver provision.	ND	4
5-1.31(a)(3)	S M	Cross connection control program is implemented by supplier of water, including records of all device testing.	SJ	1
5-1.72(c)	S M	Complete daily records of operation of a water system.	09 10	1
5-1.72(d)	S M	Maintain records (e.g., sample results, reports, filter backwash recycle flow information).	09	1
5-1.72(b)	S	System is in compliance with Subpart 5-4. The correct number and level of operator(s) are available during plant operation. System has designated operators of appropriate grade level in responsible charge.	SQ SY 12	1
5-1.73	S M	Provide or have available test kit.		1
App.5-A 3.2.1	S M	Developed well sources sufficient to meet maximum day demand with the largest well out of service.		4
App.5-A 6.1	S	Pumps are accessible for maintenance and 3 feet above the 100 year flood plain.		4
App.5-A.7.0.3	S M	Water tanks, hatches, roofing, and access ways are watertight, vermin proof, and secure.		4
App.5-A.7.0.7	S M	Tank overflow terminates 12"-24" above grade with proper screen on outlet.		4
App.5-B.2(d)	S M	Finished grade of well is mounded to divert surface water.		4
App.5-B.5(g)	S	Vented, water tight, vermin proof sanitary seal well cap.	SO	4
App.5-D.3(b)	S M	Well casing in good condition and more than 18" above grade.		4

Chlorine Residual 0.07 mg/l Sample Collection Time 11 : 20

Point of Collection Pump house

Chlorine Residual _____ mg/l Sample Collection Time _____ : _____

Point of Collection _____

Comments No Public Health Hazards noted at time of inspection. Vacuum breaker need on hoses in pump house.

Completed by Cathy Hogan Date 11 / 27 / 18

Received by Edward A Mulcahy Date 11 / 27 / 18

Status Codes: 1. No violation observed 2. All or parts of an item in violation 3. Item was not reviewed 4. Item not applicable 5. Item(s) corrected during inspection
Deficiency Codes: S: Significant Deficiency M: Minor Deficiency R: Recommendation

Appendix G

Town of Leicester Administrative Order

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2
290 BROADWAY
NEW YORK, NY 10007-1866

April 21, 2021

Via Electronic Mail To: Supervisor@townofleicester.org

David Fanaro, Supervisor
Town of Leicester
132 Main Street
Leicester, New York 10988

Re: In the Matter of: Town of Leicester, (PWS ID No.: NY2501014)
Administrative Order, Docket No. SDWA-02-2021-8022

Dear Supervisor Fanaro:

Enclosed you will find an Administrative Order ("AO") incorporating the modified compliance schedule as requested by the Town of Leicester on April 15, 2021. The enclosed AO supersedes the previously issued AO, Docket Number SDWA-02-2021-8010.

While I fully anticipate you will comply, I must advise you that the violation of an AO may subject the violator to an administratively assessed civil penalty not to exceed $41,120, or a court-imposed penalty not to exceed $59,017 per day of violation.

If you have any questions regarding this matter, please contact Nicole Foley Kraft, Chief, Safe Drinking Water Act Compliance Section at (212) 637-3093 or kraft.nicole@epa.gov.

Sincerely,

Anderson, Kate
Digitally signed by Anderson,Kate
Date: 2021.04.21 14:39:48 -04'00'

For Dore LaPosta, Director
Enforcement and Compliance Assurance Division

Enclosure

cc: Jennifer Rodriguez, Livingston County Department of Health
Tina Hunt, NYSDOH
Eric Wies, CPL

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
290 BROADWAY
NEW YORK, NY 10007-1866

IN THE MATTER OF:	ADMINISTRATIVE ORDER
Town of Leicester 132 Main Street Leicester, New York 10988 PWS ID: NY2501014 Respondent. Proceedings pursuant to Section 1414(g) of the Safe Drinking Water Act, 42 U.S.C. Section 300g-3(g)	Docket No. SDWA-02-2021-8022

I. STATUTORY AUTHORITY

The following findings are made and Order issued under the authority vested in the Administrator of the United States Environmental Protection Agency ("USEPA" or "EPA") by Section 1414(g) of the Safe Drinking Water Act ("SDWA"), 42 U.S.C. Section 300g-3(g) ("the Act"), and duly delegated to the Director of the Enforcement and Compliance Assurance Division of Region 2.

II. FINDINGS

1. The Town of Leicester (hereinafter "Respondent") owns and/or operates the Leicester "public water system," within the meaning of Section 1401(4) of the SDWA, 42 U.S.C. §300f(4), and 40 C.F.R. §141.2, located in Leicester, New York.

2. Respondent is a "supplier of water" within the meaning of Section 1401(5) of the SDWA, 42 U.S.C. §300f(5), and 40 C.F.R. §141.2.

3. Respondent is a "person" within the meaning of Section 1401(12) of the SDWA, 42 U.S.C. §300f(12), and is subject to an Administrative Order ("AO") issued under Section 1414(g)(1) of the SDWA, 42 U.S.C. §300g-3(g)(1).

4. Respondent provides piped water for human consumption and regularly serves a population of at least 25 individuals year-round, and is therefore a "community water system" as defined by Section 1401(15) of the SDWA, 42 U.S.C. §300f(15), and 40 C.F.R. §141.2. Respondent is therefore, subject to the requirements of Part B of the SDWA, 42 U.S.C. §300g et seq., and its implementing regulations found at 40 C.F.R. Part 141.

5. On January 4, 2006, EPA promulgated the Stage 2 Disinfectants and Disinfection Byproducts Rule ("Stage 2 DBPR"), regulated under 40 C.F.R. Part 141, Subparts U and V, to provide for increased public health protection against the potential risks for cancer and reproductive developmental health effects associated with disinfection byproducts ("DBPs"). The Stage 2 DBPR introduced a new method for calculating compliance with the maximum contaminant levels ("MCL") for total trihalomethanes ("TTHM") and haloacetic acids ("HAA5"), referred to as the locational running annual average ("LRAA").

6. The New York State Department of Health ("NYSDOH") administers the Public Water Supply Supervision Program in New York pursuant to Section 1413 of the SDWA. The approval of primary enforcement authority from EPA to the NYSDOH was effective as of September 9, 1977. However, the NYSDOH has not yet obtained primary enforcement responsibility for the Stage 2 DBPR. Therefore, as of the date of this Order, the USEPA has primary responsibility for enforcement of the Stage 2 DBPR.

7. Respondent serves less than 10,000 persons, therefore, was required to begin complying with the compliance monitoring provisions of the Stage 2 DBPR beginning October 1, 2013.

8. Pursuant to 40 C.F.R. §141.621(a), Respondent is required to monitor for TTHM and HAA5. Specifically, the system is required to take individual TTHM and HAA5 samples at the locations with the highest TTHM and HAA5 concentrations, respectively, once per quarter. Pursuant to 40 C.F.R. §§141.605 and 141.622, respectively, Respondent must identify sampling locations in its Initial Distribution System Evaluation Report and/or Subpart V Monitoring Plan.

9. Pursuant to 40 C.F.R. §§141.64(b)(2) and 141.620(d), Respondent must calculate LRAAs for TTHM and HAA5 using monitoring results collected and determine whether each LRAA exceeds the MCL. If Respondent fails to complete four consecutive quarters of monitoring, Respondent must calculate compliance with the MCL based on the average of the available data from the most recent four quarters.

10. Pursuant to 40 C.F.R. §141.629(a), systems are required to report to the State within ten (10) days following the end of any quarter in which monitoring is required. The information to be reported includes the location, date and result of each sample taken during the monitoring period.

11. Based on information provided by NYSDOH, Respondent failed to comply with the MCL for TTHM during the 1st, 2nd, 3rd and 4th Quarters of 2017, and 1st Quarter 2018, in violation of 40 C.F.R. §141.64(b)(2).

12. On May 29, 2018, EPA issued an Administrative Order ("AO"), Docket No. SDWA-02-2018-8051 to Respondent requiring submittal of a corrective action plan ("CAP") to achieve compliance with the MCLs for TTHM and HAA5.

13. On July 5, 2018, Respondent submitted a CAP which included development and implementation of a flushing program, installation of two automatic flushing devices within the distribution system, and performance of a distribution system study to develop recommendations for operational and capital improvements to address the TTHM violations.

14. Based on information provided by Respondent, increased flushing frequency had been implemented in the distribution system and automatic flushing devices were installed as of February 2019.

15. Based on sample results submitted in response to the AO, Respondent again failed to comply with the MCL for TTHM during the third calendar quarter of 2020, in violation of 40 C.F.R. §141.64(b)(2).

16. On November 10, 2020, EPA issued AO Docket No. SDWA-02-2021-8002 to Respondent requiring submittal of a revised CAP to achieve compliance with the MCLs for TTHM and HAA5.

17. On December 14, 2020, Respondent submitted a revised CAP which included installation of a TTHM removal system by May 1, 2021.

18. On February 16, 2021, EPA issued AO on Consent Docket No. SDWA-02-2021-8010 to Respondent requiring implementation of the above-mentioned revised CAP.

19. On April 15, 2021, Respondent requested a time extension to comply with the requirements of AOC Docket No. SDWA-02-2021-8010 due to supplier delays.

20. EPA is issuing this AO to place the Respondent on a revised enforceable schedule to comply with the monitoring, reporting and MCL requirements of 40 C.F.R. Part 141, Subpart V and the SDWA.

III. ORDER

Based on the foregoing FINDINGS, and pursuant to the authority of Section 1414(g) of the SDWA, EPA hereby ORDERS:

21. By June 1, 2021, Respondent shall complete the installation of a TTHM removal system at its water storage tank and reconfiguration of the piping at the tank site to ensure that all water is treated with the new removal system. By July 1, 2021, Respondent shall complete the modification of the chlorine feed system at the tank site in order to only chlorinate the water leaving the water storage tank.

22. By August 1, 2021 Respondent shall submit a signed and dated certification to EPA, NYSDOH and Livingston County Department of Health stating that all work related to Respondent's CAP has been completed and that the TTHM removal system is in operation.

23. Respondent shall conduct monitoring for TTHM and HAA5 in accordance with 40 C.F.R. §141.621(a) and its approved monitoring plan. Samples shall be analyzed in accordance with 40 C.F.R. §141.621(b). Respondent must calculate the LRAAs for TTHM and HAA5 using monitoring results collected, in accordance with 40 C.F.R. §141.620(d). Specifically, Respondent must calculate compliance with the MCL based on the available data from the most recent four quarters.

24. Respondent shall submit to EPA, in addition to routine reporting to Livingston County Department of Health, the results of the TTHM and HAA5 monitoring required by Paragraph 23 by the 10th of the month following the end of the calendar quarter within which the samples were collected in accordance with 40 C.F.R. §141.629. Respondent shall report quarterly to EPA until directed otherwise.

25. Respondent shall comply with all public notice requirements specified in 40 C.F.R. Part 141, Subpart Q and continue to repeat quarterly until the violation has been resolved, which includes advising consumers of Respondent's failure to comply with the MCL for TTHM.

26. Respondent shall remain in compliance with all applicable requirements of the Stage 2 DBPR, including the TTHM and HAA5 monitoring requirements (40 C.F.R. §141.621), compliance determination requirements (40 C.F.R. §141.620), and reporting requirements (40 C.F.R. §141.629).

27. All notices, reports, or other submissions by Respondent shall contain the following certification:

"I certify, under penalty of law, that the information contained in or accompanying this submission is true, accurate and complete based upon representations as to accuracy and completeness made to me either orally or through submission of documentation by appropriate personnel with responsibility for the matters contained herein."

28. All submissions and communication related to this Order shall be sent to the following:

Nicole Foley Kraft, Chief
Safe Drinking Water Act Compliance Section
U.S. Environmental Protection Agency
kraft.nicole@epa.gov

and

Tina Hunt, Assistant Director
Bureau of Water Supply Protection
Center for Environmental Health
New York State Department of Health
bpwsp@health.ny.gov

and

Jennifer Rodriguez, M.S., Public Health Director
Livingston County Department of Health
jrodriguez@co.livingston.ny.us

IV. GENERAL PROVISIONS

29. Notwithstanding Respondent's compliance with any requirement of this Order, Respondent's failure to comply with all of the requirements of the Act and Part 141 may subject Respondent

to additional enforcement action, including but not limited to judicial, administrative and equitable actions.

30. This Administrative Order shall not prohibit, prevent, or otherwise preclude EPA from taking whatever action it deems appropriate to enforce the Act in any manner and shall not prohibit, prevent, or otherwise preclude EPA from using this Order in subsequent administrative or judicial proceedings. Nothing in this Order shall constitute a waiver, suspension or modification of the requirements of the Act, or the rules and regulations promulgated there under which remain in full force and effect. Issuance of this Order is not an election by EPA to forgo any civil or criminal action otherwise authorized under the Law.

31. The Respondent may be subject to an administrative civil penalty of up to $41,120 pursuant to Section 1414(g)(3)(B) of the Act, 42 U.S.C. §300g-3(g)(3)(B) or a civil penalty assessed by an appropriate United States District Court that exceeds $41,120 pursuant to Section 1414(g)(3)(C) of the Act, 42 U.S.C. §300g-3(g)(3)(C). A violation of any term of this Order may also subject the Respondent to a judicial civil penalty of up to $59,017 per day of violation pursuant to Section 1414(b) of the Act, 42 U.S.C. §300g-3(b).

32. Respondent may seek federal judicial review of the Order pursuant to Section 1448(a) of the Act, 42 U.S.C. §300j-7(a).

33. This Order does not relieve Respondent of any responsibilities or liabilities established pursuant to any applicable federal, State or local law.

34. This Administrative Order shall take effect upon the signature of the Director, Enforcement and Compliance Assurance Division.

ORDERED, this 21st day of April, 2021.

Anderson, Kate

Digitally signed by Anderson,Kate
Date: 2021.04.21 14:41:19 -04'00'

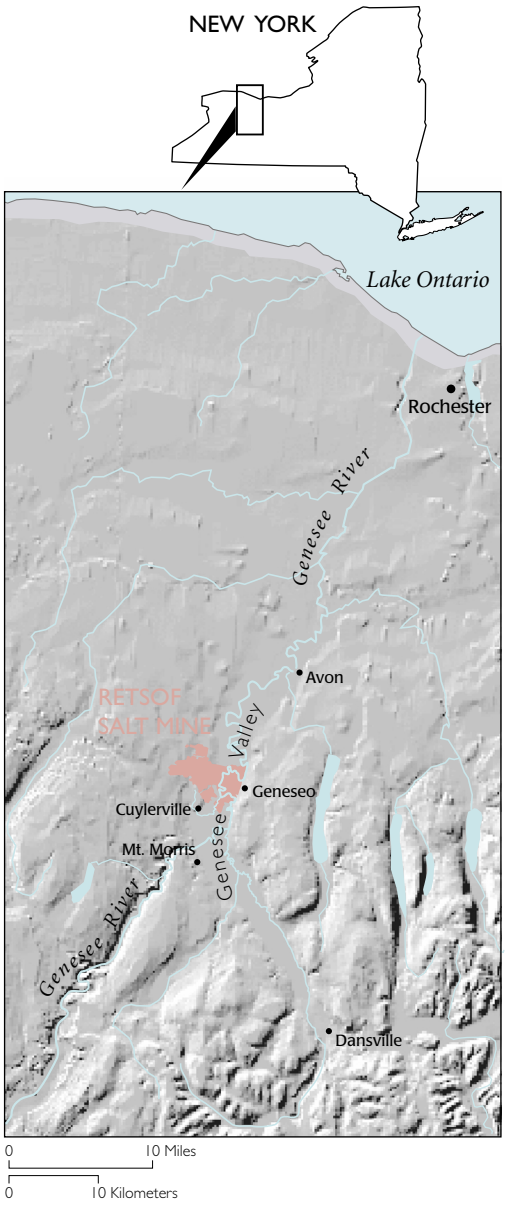
For Dore LaPosta, Director
Enforcement and Compliance Assurance Division

Appendix H

Retsof Salt Mine Collapse Report

The Retsof Salt Mine Collapse

Widespread subsidence occurred after a mine collapse in the Genesee Valley, New York

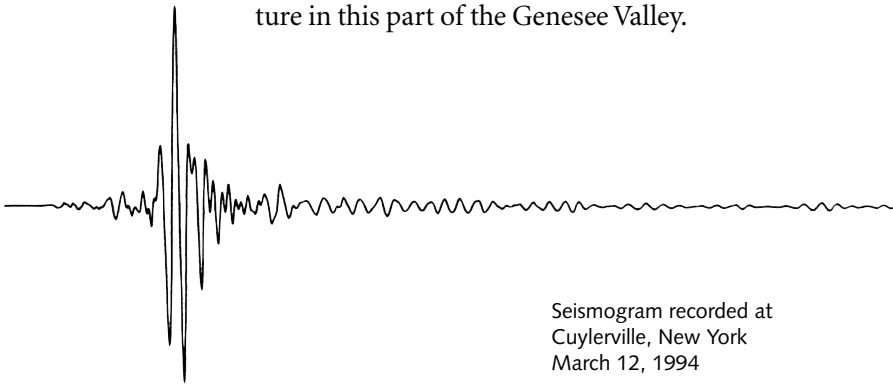


William M. Kappel, Richard M. Yager, and Todd S. Miller
U.S. Geological Survey, Ithaca, New York

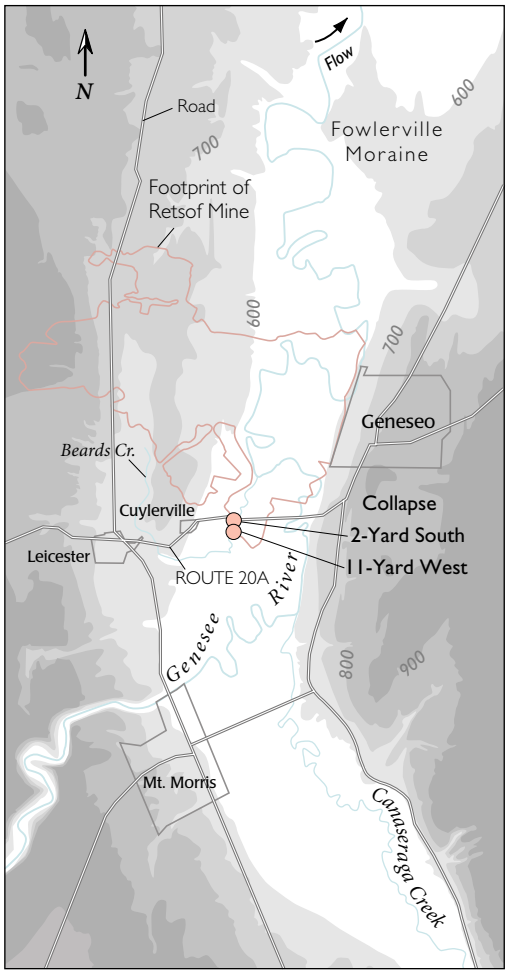
On March 12, 1994, at 5:43 a.m. (local time), an apparent earthquake of magnitude 3.6 centered near Cuylerville, New York, woke residents and registered on seismographs 300 miles away. Prompted by a call placed from a local resident, the USGS National Earthquake Information Center confirmed that a seismic event had occurred near Cuylerville and immediately notified State emergency services offices in New York who, in turn, notified the Livingston County Sheriff's Department. The Sheriff's Department contacted the Retsof Mine, which, except for some limited subsurface maintenance activity, had suspended active mining that weekend.

Mine officials discovered that a 500- by 500-foot section of shale roof rock some 1,200 feet below land surface had collapsed in a part of the mine known as room 2-Yard South. Mine officials detected methane and hydrogen sulfide gases, and ground water was flowing into the mine from the roof collapse area at nearly 5,000 gallons per minute.

This collapse began a series of events that would eventually lead to the further collapse and complete flooding of the mine, large declines in local ground-water levels, degradation of potable ground-water supplies, land subsidence, release of natural gases (methane and hydrogen sulfide) to the atmosphere, and other detrimental effects on the cultural resources and infrastructure in this part of the Genesee Valley.



Seismogram recorded at Cuylerville, New York March 12, 1994



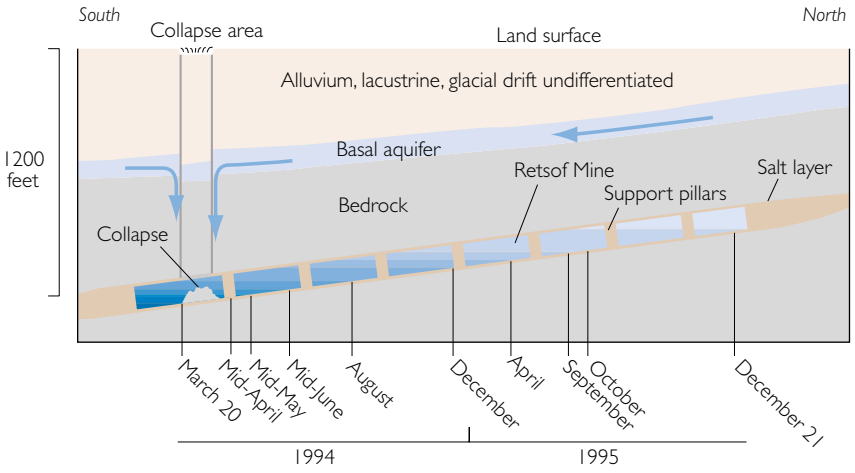
SALT MINING HAS A LONG HISTORY IN THE GENESEE VALLEY

Salt mining (both salt-solution and rock-salt mining) began in the Genesee Valley in the early 1880s, and in 1884 the Empire Salt Company excavated a shaft to extract rock salt from seams 900 feet below land surface. In 1885 the Empire Salt Company was renamed the Retsof Mine Company and the Village of Retsof was founded near the mine shaft. During the next 110 years, the mine grew to become the largest salt-producing mine in the United States and the second largest in the world. Before the initial collapse in March 1994, the mine encompassed an underground area of more than 6,000 acres, and the mine footprint (outer edge of mined area) extended over an area of nearly 10 square miles.

At the time of the collapse, the Retsof Mine was owned by Akzo-Nobel Salt Incorporated (ANSI), and, during the winter of 1993–94, operated at full capacity to meet demands for road salt throughout the northeastern United States. Prior to its closure, the Retsof Mine played a major role in the Livingston County economy, providing more than 325 jobs with an annual payroll in excess of $11 million and estimated annual gross sales of more than $70 million (NYSDEC, 1997). During the 17 months following the collapse, mining operations shifted to the northern, high end of the mine in a race to salvage mineable salt before the mine flooded. The Retsof Mine ceased operations on September 2, 1995, and by December, 21 months after the initial collapse, the mine was completely flooded.

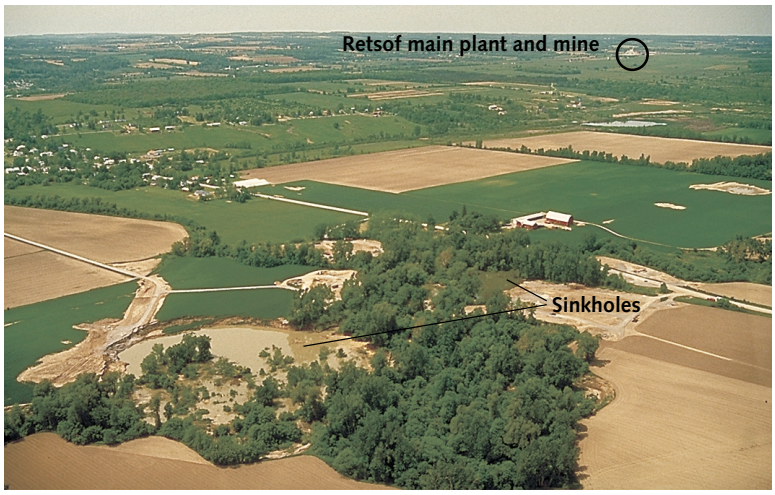
THE COLLAPSE TRIGGERED A SERIES OF LOCAL EVENTS

Four months before the collapse, in November 1993, room 2-Yard South was abandoned because of concerns over large and increasing rates of "convergence" or reduction of the opening between the floor and ceiling of the room. (A new mining technique, "yielding pillar," was used in this area in response to floor buckling and roof collapse, which was occurring with greater frequency in the south-



This cross-sectional schematic shows how water from the basal aquifer entered the mine through the collapsed area. After 21 months the salt mine was completely flooded.

This northwest aerial view shows sinkholes above room 11-Yard West (left foreground) and room 2-Yard South (right center, partially obscured by trees). Circle indicates location of the Retsof main plant area, some 4 miles northwest of the sinkholes.



(Ron Pretzer, LUXE, May 1994)

A sinkhole developed above room 11-Yard West and filled with water from Beards Creek.

(Richard Young, Geological Sciences, SUNY Geneseo, June 1994)

The roadbed of Route 20A was fractured on the east side of the collapsed bridge over Beards Creek. This view is above the room 2-Yard South collapse area looking west, toward the former Hamilton farm house (subsequently purchased by ANSI).

(Richard Young, Geological Sciences, SUNY Geneseo, April 12, 1994)

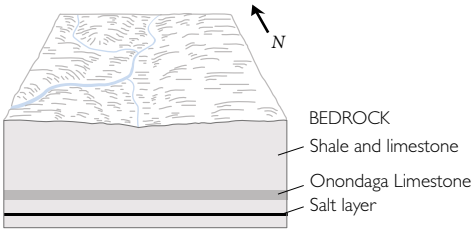
ern end of the mine.) After the March 12, 1994, collapse of room 2-Yard South, ground water flowed into the previously dry mine at a rate of about 7 million gallons per day, dissolving residual rock salt and filling the lowest, downdip levels of the mine with saturated brine. ANSI monitored the concentration of hazardous gases and the encroaching water level in the mine as the shoreline in the mine steadily moved northward.

Local governmental officials had posted warning signs at the Route 20A bridge over Beards Creek the day before the collapse because of small bumps in the pavement on the bridge approach sections. There is some anecdotal evidence that, several days earlier, local travelers had noticed a change in the smoothness of the roadbed near the bridge, suggesting a surface expression of the underground convergence that led to abandonment of room 2-Yard South several months earlier.

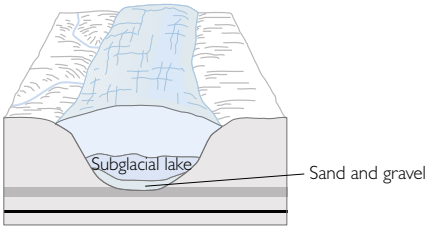
Within days of the collapse, impacts on the glacial and bedrock aquifer systems and on the land surface were reported on an expanding scale. Some homes had sustained structural damage due to the initial earth tremors and, within 1 week of the collapse, residents along Wheelock Road, south of Cuylerville and southwest of the mine, reported that several water wells had gone dry (NYSDEC, 1997). The USGS and the Livingston County Health Department began monitoring ground-water levels and streamflow in the area.

On April 6, a 200-foot diameter by 20-foot deep, cone-shaped sinkhole appeared along the channel of Beards Creek, immediately above the room 2-Yard South collapse zone, just south of the Route 20A bridge. And 2 weeks later, accompanied by additional earth tremors, this sinkhole expanded to about 600 feet in diameter.

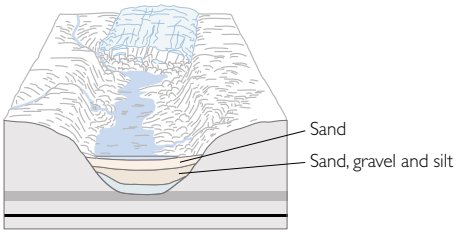
On April 8, seismic events indicated a roof collapse in mine room 11-Yard West, south of and adjacent to room 2-Yard South. Following this collapse, ground-water inflow to the mine increased to about 22 million gallons per day. An expanding sinkhole developed over 11-Yard West on May 25, 1994. The sinkhole was about 50 feet



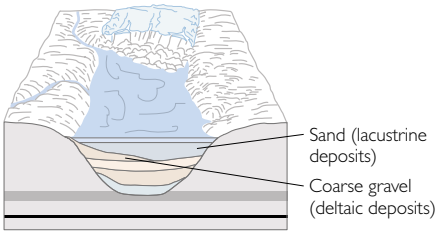
The ancient Genesee River crossed sedimentary rocks.



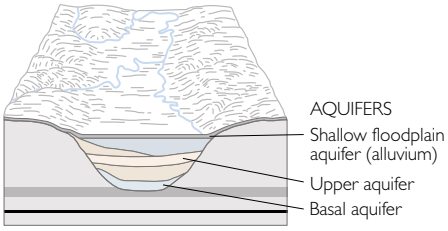
Glaciers scoured the bedrock, leaving a wide, deep valley that did not always follow the course of the Genesee River. At times the glaciers covered the entire area. During periods of glacial retreat, subglacial lakes formed and sediment was deposited.



The periodic retreat and advance of glaciers left behind mounds of debris (moraines) and thick glacial deposits (drift).



During deglaciation a series of proglacial lakes formed that deposited lake (lacustrine) sediments on the valley floor.



After glaciation alluvial (floodplain) gravel, sand, and silt were deposited on top of the glacial sediments.

deep, about 200 feet in diameter, and immediately filled with water captured from Beards Creek. Over time this sinkhole grew to about 800 feet in diameter.

THE NATURAL HISTORY OF THE GENESEE VALLEY SET THE STAGE FOR WIDESPREAD DAMAGE AFTER THE COLLAPSE

Current knowledge of the occurrence and flow of ground water and the complex stratigraphy of the glacial aquifer system in Genesee Valley is sparse. Prior to the collapse, the hydrogeologic framework of the valley-fill materials had not been investigated in detail. Since the mine collapse, several studies have addressed the hydrogeologic framework (Nittany Geoscience, 1995; Alpha Geoscience, 1996), but insufficient data exist to thoroughly characterize the interconnections among glacial units and bedrock aquifer zones.

The Genesee Valley from Dansville to Avon, New York, includes the Canaseraga Creek Valley and, from Mt. Morris northward, the Genesee River Valley. The valley formed as a result of several geologic processes including the ancestral uplift and stream erosion of gently dipping Paleozoic sedimentary rocks, followed by periods of glaciation in which ice scoured and modified the bedrock topography, leaving behind unconsolidated sediments. Recently, stream erosion and deposition added about 50 feet of alluvium (gravel, sand, and silt) to the glacial sediments.

The unconsolidated glacial sediments that fill the Genesee Valley were deposited during cycles of glacial advances and retreats. Glaciers several thousands of feet thick deepened and widened the valley. About 12,000 years ago the most recent glacier retreated from the valley, leaving behind thick glacial deposits. Where the glaciers paused and the ice melted, mounds of glacial debris, called end moraines, were deposited at the frontal (southern) ice margin. The melting ice produced large volumes of water that transported, sorted, and deposited boulders, gravel, cobbles, sand, silt, and clay and carried these sediments in meltwater streams to the south. Proglacial lakes existed in the glacially-deepened valley between the valley walls and the receding glacier during most of the glacial period.

During deglaciation, outlets low enough to drain the proglacial lakes did not exist until the ice margin was 10 to 12 miles north of Geneseo. During this period, the present Genesee River and Canaseraga Creek watersheds drained to the north, toward the glacier, into a series of progressively lower proglacial lakes. The final and lowest proglacial lake formed when the ice deposited the Fowlerville moraine, which extends from about 4.5- to 8-miles north of the collapse area. Water ponded in the Genesee Valley south of the Fowlerville moraine, depositing lake sediments on the valley floor. Eventually the lake drained as the Genesee River cut a channel in the Fowlerville moraine (Young, 1975). As much as 700 feet of glacially derived gravel, sand, silt, and clay were deposited in a subglacial and glaciolacustrine (glacial lake) environment.

This view shows the Upper Genesee Valley looking east.

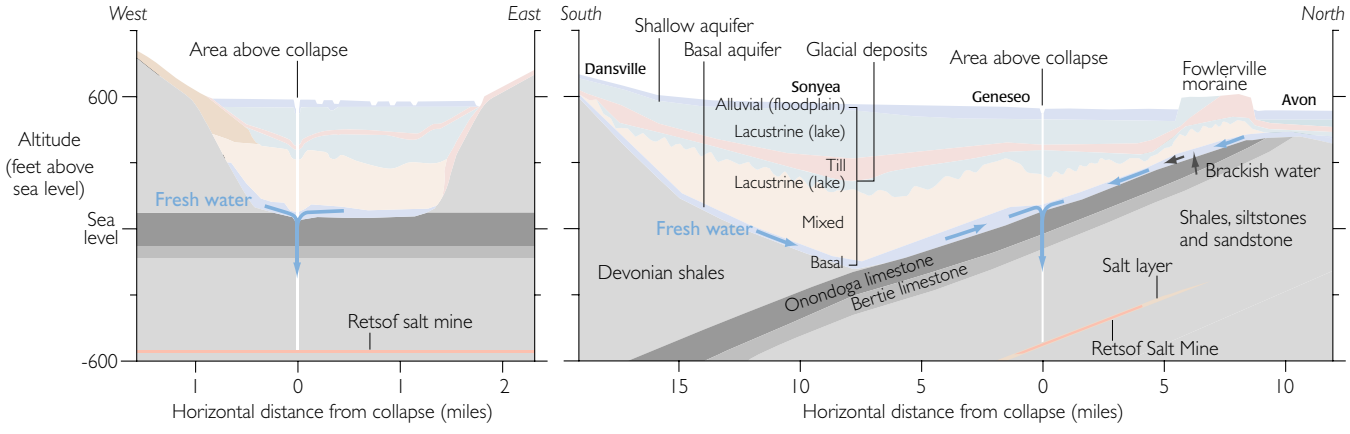
(Richard Young, Geological Sciences, SUNY Geneseo)

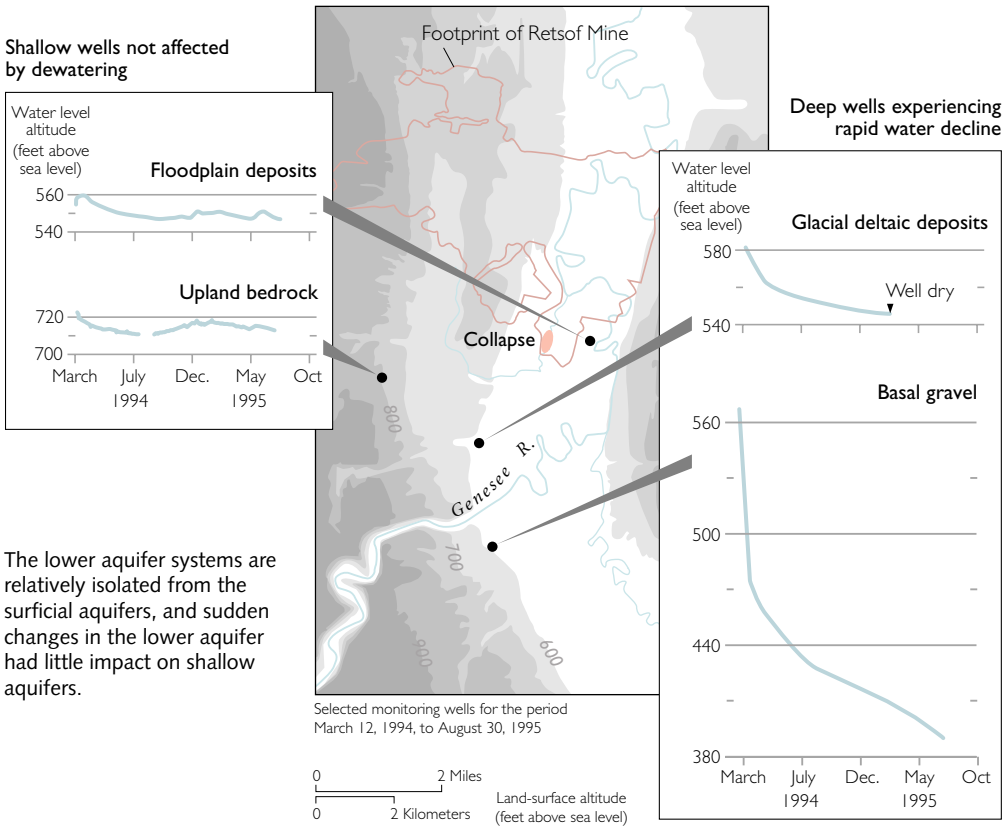
The buried bedrock surface follows the slope of the resistant sedimentary carbonate beds of the Onondaga Limestone, dipping approximately 42 feet per mile to the south. Overlying the bedrock surface is a thickening wedge of glacial valley-fill sediments that ranges from a few hundred feet thick on the north, near the Fowlerville Moraine, to about 750 feet thick in the deepest part of the valley near Sonyea. South of Sonyea, the valley fill thins. Ground water in the glacial deposits and portions of the underlying carbonate bedrock has been the primary source for the inflows to the flooded Retsof Mine. The fine-grained lake silt and clay closer to the land surface form a barrier between the alluvial and deeper glacial aquifers.

Water-bearing zones are found within the fractures and bedding planes near the top of the Onondaga Limestone at the base of the valley fill. Another water-bearing zone is found at the contact between the Onondaga Limestone and the underlying Bertie Limestone. Few valley wells tap bedrock, and the most productive wells completed in the Onondaga and Bertie Limestones seldom produce more than several tens of gallons per minute (Dunn, 1992). The Bertie Limestone subcrops beneath the valley floor north of the Fowlerville moraine, under several hundred feet of glacial sediment, and is generally considered a divide between fresher water above and a more mineralized water below.

The principal aquifer in the valley appears to occur at the base of the valley fill. The relatively thin basal aquifer is composed of sand and gravel deposited on top of the Onondaga Limestone in the central and northern parts of the valley and on top of the low-permeability Devonian shales to the south. The hydraulic connection between the basal aquifer and the underlying bedrock units throughout the valley is poorly understood, but the connection is generally assumed to be better in the northern half of the valley, where the aquifer is in direct contact with the weathered and fractured top of the Onondaga Limestone. Under natural conditions ground water flows upward from the Onondaga to the basal aquifer. Though the basal aquifer is generally overlain by lower-permeability

Water from the basal aquifer entered the mine through the collapsed area.





The lower aquifer systems are relatively isolated from the surficial aquifers, and sudden changes in the lower aquifer had little impact on shallow aquifers.

glacial drift, in some areas north of the mine more permeable layers have been reported within the glacial deposits.

Some wells in the valley are completed within the glacial deposits, and some wells completed in the deeper basal aquifer are also screened in the glacial deposits, an indication that there is locally enhanced permeability at intermediate depths. There appears to be a vertical hydraulic connection between the basal aquifer and the permeable zones in the glacial deposits, based upon recent data from ground-water monitoring wells, but the areal extent of these vertically connected zones is unknown.

Shallow ground water occurs in the alluvial deposits found to a depth of 50 feet below the valley floor. The water table in the alluvium is generally less than 15 feet below land surface, and is in hydraulic connection with the Genesee River, Canaseraga Creek, and other tributaries on the valley floor. Other shallow ground water occurs in the Fowlerville Moraine deposits. Most recharge and discharge of the Genesee Valley aquifer system occurs between the Genesee River, its tributaries, and the shallow water-table aquifer in the alluvium (Nittany Geoscience, 1995). Water levels in wells completed in the alluvium were not affected by the mine collapse.

After the mine collapse, most of the inflows to the mine probably came from storage in the basal aquifer and the glacial deposits through the collapse areas above rooms 2-Yard South and 11-Yard

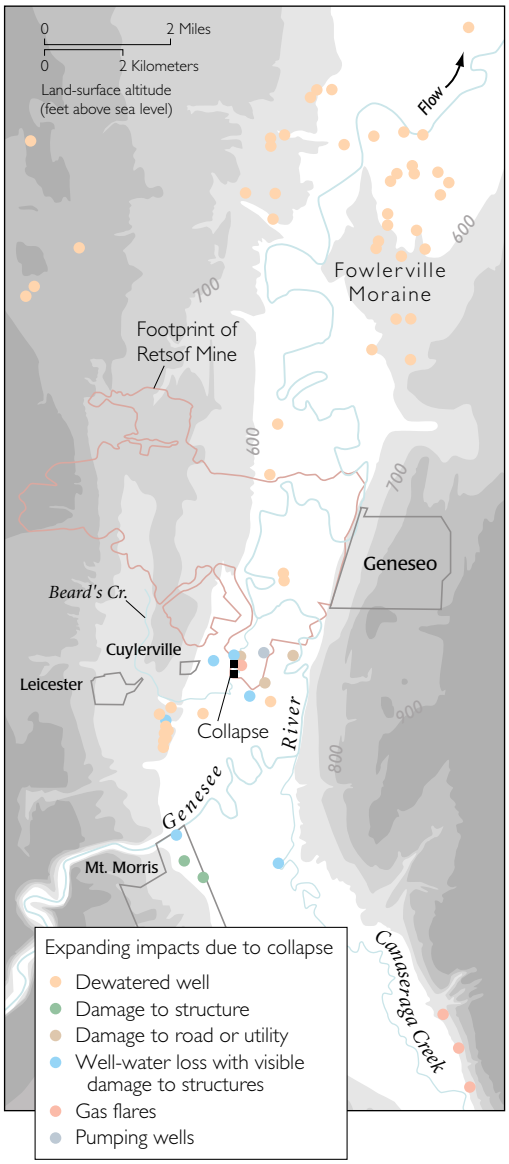
This view of the Genesee Valley floodplain was taken above the southern end of the mine looking southwest.

(Richard Young, Geological Sciences, SUNY Geneseo, 1995)

West. Water levels in wells began declining almost immediately near the collapse zones. Water levels continued to decline rapidly through 1994, and more slowly in 1995, until the mine was completely flooded in January 1996. By then, water levels had fallen more than 350 feet in some wells near the collapse zones. In total, an estimated 42,000 acre-feet of ground water invaded the mine.

The basal aquifer is relatively isolated from surficial sources of recharge and discharge, and changes in the lower part of the aquifer system are not likely to have immediate or significant impact on the shallow sources. However, the rate of ground-water drainage into the mine far exceeded the estimated rate of recharge to the deeper subsurface aquifers, and it is expected that it will take a decade or longer for ground-water levels to recover throughout the aquifer system.

IMPACTS OF THE COLLAPSE WERE OBSERVED MILES AWAY



The effects of the collapse include, but are not limited, to the following:

- Reduced air quality and public-safety issues resulting from the emanation of methane and hydrogen-sulfide gases
- The loss of potable water supplies—both a reduction of quantity and degradation in quality and
- Short- and long-term land subsidence

Natural gas was vented into the environment

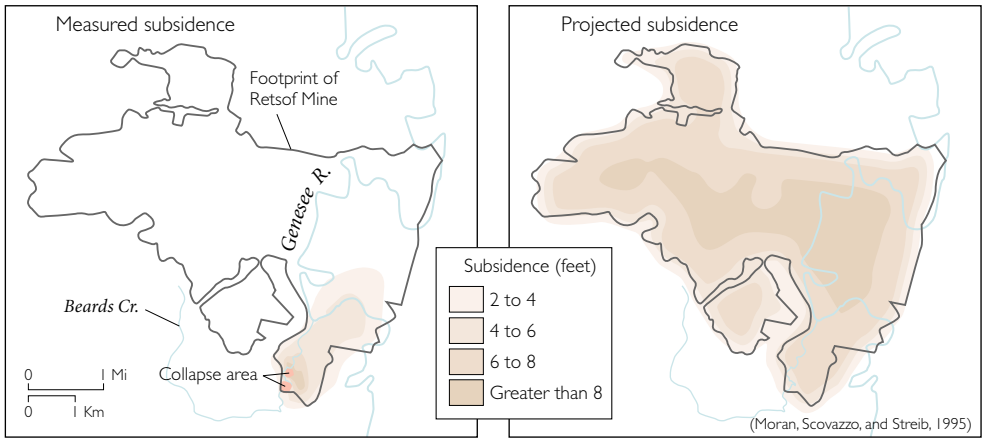
Soon after the mine began to flood and water levels in the basal aquifer were lowered, natural gas in the form of hydrogen sulfide (odor of rotten eggs) and methane (odorless, combustible) began exsolving from ground water—just as carbon dioxide comes out of solution after a bottle of soda is opened. In the area of the collapse, lowered water levels allowed natural gas to escape through test wells drilled near the collapse area and preexisting domestic water-supply wells several miles farther to the southeast. In September 1994 the State Department of Environmental Conservation ordered ANSI to develop a natural-gas monitoring and response plan. By May 1995 the County and State Health Departments required ANSI to flare-off (burn) gas from several collapse-area wells to reduce the odor and protect the health and safety of residents living in Cuylerville and the surrounding area.

Potable water supplies were diminished

Although some shallow alluvial wells near the mine were unaffected, some domestic wells along the margins of the valley and in the deeper zones of the Genesee Valley aquifer system experienced lowered water levels, and some wells went dry. The rate of water-level decline varied: water levels declined 20 feet or more along Wheelock Road (about 1 mile southwest of the mine) within days of the collapse, whereas water levels gradually declined 50 feet or more in the

Local subsidence occurred due to dissolution of salt pillars by freshwater inflow March 1994 to March 1996.

More extensive subsidence due to closure of the salt cavity is projected.



Fowlerville area (about 6 miles north of the mine) and in Mt. Morris (about 4 miles south of the mine) for 2 years following the collapse. Pursuant to an agreement between ANSI, Livingston County, and the State of New York, ANSI has been supplying water to residents whose wells have gone dry and where water quality has deteriorated.

The effects of ground-water flow to the mine extend more than 10 miles north and south of the collapse area. Following the mine collapse and lowering of ground-water levels, highly mineralized ground water has apparently migrated into freshwater supplies. There are two potential sources: a deep-basin brine that migrates upward along bedding-plane fractures within the Bertie Limestone to the intersection of the Bertie outcrop and the basal aquifer, and a halite (rock salt) component, which may be introduced through older natural-gas or salt-solution wells within the Fowlerville moraine. The mineralized ground water flows downdip (to the south) through the basal aquifer toward the mine collapse area, an apparent reversal of the pre-collapse hydraulic gradient. Presently, salinity is increasing in Fowlerville Moraine wells, south of where the Bertie outcrops and is in contact with the basal aquifer.

A well flares methane and hydrogen sulfide gases from a fracture zone on the eastern margin of the room 2-Yard South sinkhole.

(Richard Young, Geological Sciences, SUNY Geneseo, 1995)

Several types of subsidence were observed

Subsidence damage related to the mine collapse includes:

- The creation of 2 large sinkholes
- The temporary loss of State Route 20A through Cuylerville
- Structural damage to homes and businesses and
- Damage to agricultural lands, public utilities, and cultural resources.

Besides the catastrophic formation of sinkholes over rooms 2-Yard South and 11-Yard West, the damage involves three other types of subsidence, which are important at different scales.

An earth fissure ruptures a field above the western edge of the mine, northwest of 2-Yard South sinkhole. The field surrounding the fissure subsided almost 1 foot.

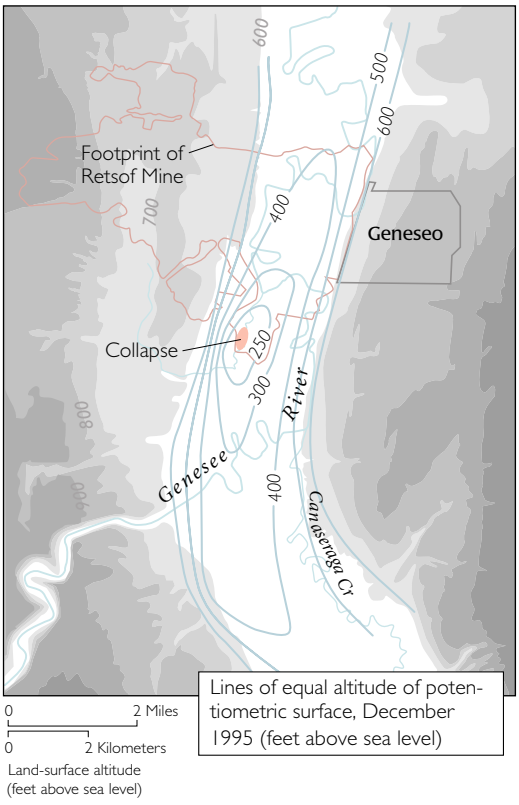
(Richard Young, Geological Sciences, SUNY-Geneseo, March 1995)

The first type of subsidence that normally occurs over any mined-out area is due to the slow closure of the mine opening. Mining engineers expect the land overlying the Retsof Mine footprint to subside about 8 to 9 feet over the next 100 to 200 years (Van Sambeek, 1994). Most of the estimated subsidence is expected to be realized during the next 100 years (Shannon and Wilson, 1997). Differential subsidence is expected along the margins of the mine, where adjacent areas will subside nonuniformly. This creates stresses within the land mass, which may rupture the surface or subsurface. Some horizontal movement of land surface in these areas is expected, as well as some tilting of the land surface toward the mine. Structures located in these regions may continue to be prone to damage as the mine subsidence evolves.

A second type of subsidence seen near the collapse area and farther to the north and east was caused by the flow of ground water into the mine and resultant dissolution of unmined salt. Fresh ground water, less dense than saltwater, entered the mine cavity quickly, and preferentially dissolved the salt along the mine roof. As the mine roof collapsed, it allowed the freshwater to dissolve more salt in the supporting salt pillars and, over time, left large areas without roof support. This type of subsidence evolved rapidly as many salt pillars were quickly dissolved by the large inflow of freshwater, and subsidence in this area was greater and occurred sooner than would be expected for a dry mine situation (Van Sambeek, 1996). When the mine filled with saturated brine, this type of subsidence ceased.

The third type of subsidence to occur in the Genesee Valley is due to the dramatic lowering and anticipated slow recovery of ground-water levels in the confined-aquifer system. This type of subsidence is due to aquifer-system compaction that typically accompanies the depletion of alluvial aquifer systems. The ground-water level declines experienced after the mine-roof collapse—more than 350 feet near the collapse and as much as 50 feet as far as 8 miles away—is sufficient to cause measurable elastic compression of the glacial sediments of the Genesee Valley aquifer system. It is possible that the large stresses imposed on the aquifer-system skeleton by the large drawdowns may have caused some inelastic, and largely irreversible, compaction of aquitards in the Genesee Valley, but

The lowering of water levels in areas beyond the mine footprint may eventually cause aquifer-system compaction and land subsidence.



currently this effect is presumed to be small. Aquifer-system compaction may contribute to land subsidence on a spatial scale larger than the mine footprint, especially in regions where large changes in ground-water levels persist and where the glacial deposits contain an appreciable thickness of fine-grained, more compressible sediments. It is possible that the valley floor may continue to be affected by residual compaction long after ground-water levels have fully recovered in the aquifers (Riley, 1969). An accurate evaluation of the magnitude, timing, and areal extent of land subsidence due to aquifer-system compaction will depend on more detailed knowledge of the hydrogeology of the Genesee Valley.

CONTINUING STUDIES WILL ASSESS FUTURE IMPACTS

The long-term lowering of aquifer hydraulic heads creates the potential for permanent compaction of the aquifer system and additional land subsidence. The distribution of compressible sediments and their mechanical behavior need to be better understood in order to predict potential impacts. The sources of poor-quality water and potential paths of migration in the aquifers also need to be assessed in order to evaluate and predict changes in ground-water quality throughout the Genesee Valley.

The USGS is currently implementing conceptual and numerical models of ground-water flow in Genesee Valley to assist in determining the impact of mine flooding on the regional aquifer system. Drainage of ground water into the collapse areas is being simulated using data collected by ANSI consultants; the State Departments of Law, Environmental Conservation, and Health; Livingston County; local citizens; the USGS; and others. The models will provide insight into the problems of lowered ground-water levels, land subsidence caused by aquifer-system compaction, and migration of mineralized ground water.

Appendix I

Village of Mount Morris Water Supply Sanitary Survey

LIVINGSTON COUNTY
DEPARTMENT OF HEALTH
2 Murray Hill Drive
Mt. Morris, New York 14510-1691

Jennifer Rodriguez, M.S.
Public Health Director

Phone (585) 243-7270
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Center for Environmental Health
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Dog Control: (585) 243-6740/(585) 335-1720/ Fax: (585) 243-6751

"IMPROVED QUALITY OF LIFE TODAY, FOR A HEALTHIER TOMORROW"

October 11, 2016

Mayor Joel Mike
Village of Mt. Morris
117 Main Street
Mt. Morris, New York 14510

Subject: Village of Mt. Morris Public Water Supply Sanitary Survey 2016
Public Water Supply Number: NY2501023
Population: 3500

Dear Mayor Mike:

In order to determine that the Village of Mt. Morris Public Water Supply System is operating in compliance with the requirements of New York State Sanitary Code Subpart 5-1 "Public Water Systems", a facility sanitary survey was conducted on September 13, 2016. The Livingston County Department of Health (LCDOH) along with the New York State Department of Health performed this review with the assistance of Water Operators Chris Young and Sam Trippi. The survey of the water supply system is conducted to ensure that there are no existing public health hazard violations at the time of inspection. The condition and operation of the water system are in good order. Mr. Young and his fellow operators do a fine job operating the system and preparing the required reports.

Based on this visit and a review of records, the following comments are offered:

Observations

- A new sludge pump has been installed to replace the undersized pump.
- The Village pre-chlorinates seasonally to reduce zebra mussels at the intake in Silver Lake. The Village of Mt. Morris water treatment plant is located approximately 11 miles from Silver Lake. There is a potential for disinfection byproducts to form during the time period that it takes for the per-chlorinated water from the intake to reach the Village of Mt. Morris's reservoir. The LCDOH may sample for disinfection byproducts in the reservoir in August of 2017.
- The Silver Lake intake is inspected once a year. The 2016 inspection has been completed and the condition of the intake was found to be satisfactory.
- Dan Willett is currently working toward getting his IIA water operator certification.

- A second air bubbler at the intake to the reservoir is planned for installation in the near future in order to keep water moving in the reservoir.

- A backup foot valve is available for the clearwell. It was reported that two valves have failed in the past six years.

- The Village has completed mapping ofthe raw water transmission main. An old map has been located depicting the locations of the main.

- The Village is in the process of replacing nonfunctioning valves and hydrants.

- The hatch gasket at the clear well has been replaced. Regular inspections should be performed on the hatch to ensure a proper seal is maintained.

- The Sample Siting Plan for Total Coliform Bacteria has been completed and submitted to the LCDOH.

Thank you for continued care and diligence in the operation and maintenance of the water supply system.

Requirements

- At the time of the inspection it was reported that chemical measuring devices (i.e.: turbidity units, chlorine analyzers) have not been calibrated in years and some calibration standards were expired. All measuring equipment must be calibrated according to manufactures recommendations. Turbidity standards were purchased for the hand held turbidity unit and the unit was calibrated. It was reported that all inline units have been calibrated and that new turbidity units are scheduled for replacement.

- Since the inline turbidity units have been calibrated, finished water combined turbidity levels after filtration are higher than previously reported and close to the maximum contaminant level. The Comprehensive Performance Evaluation (CPE) performed by the NYSDOH in 2005 identified the condition of the filter media as being poor. Continued reliance on media in poor condition may result in diminished water quality and exceedances in performance standards. The use of granular activated carbon as a filter media should be considered to reduce disinfection byproducts in the distribution system. **Engineer design plans must be received by the LCDOH prior to the 2017 sanitary survey.**

- It was reported that the alarm system for the low chorine, high turbidity and clearwell low level were never installed as indicated in the 2013 inspection report. These alarm controls must be installed **as soon as possible.** Compliance for this requirement will be reviewed at the 2017 sanitary survey.

- As stated in the New York State Sanitary Code, section 5-1.31, cross-connection control is the responsibility of the water supplier and the water customer. **Our records indicate all devices are up to date.** As the supplier of water you are required to ensure that backflow prevention containment devices are tested, operated and maintained and that adequate records of maintenance and repair are submitted to the LCDOH. **The "Cross Connection Compliance Form" must be received by January 31, 2017.**

- Please continue to replace overhead lights in the intake/coagulant room as needed.

- Please complete the "Emergency Response Plan" form, provided to you at the sanitary survey, and return to the LCDOH by **January 31, 2017.**

- According to Subpart 5-4.2 of the New York State Sanitary Code, a water treatment facility with a design capacity to produce 2.5 million gallons per day or less of water and which utilizes a surface water source such as the Village of Mount Morris's water treatment plant **must have a minimum of two IIA water plant licensed operators at all times.** We urge the Village of Mount Morris to be proactive in ensuring that appropriate licenses are maintained when a change in staff occurs.

- The portion of the raw water main that is located through the Mt. Morris dam has not been inspected by the LCDOH in several years. The LCDOH will be scheduling an inspection in the near future.

Recommendations and Comments

- A site visit has been scheduled at the treatment plant for **October 20, 2016** with the Livingston County Department of Health and the New York State Department of Health to review plant operations and controls. It may be beneficial to invite a municipal representative from the Village of Mt. Morris and the Professional Engineer that represents the water supply.

- In order to reduce disinfection by-products levels and thoroughly flush discolored water from the entire system it is important to coordinate a flushing schedule with the Town of Mt. Morris, the Village of Leicester, the Town of Leicester and the Livingston County Water and Sewer Authority. The entire distribution system should be flushed thoroughly **at least twice a year**. An adequate flushing program can also help to protect the water system from bacterial growth and may help to reduce disinfection by-product levels.

Enclosed is a copy of the DOH 4234 "Water System Field Compliance Report". Please review this form and take note of the comments. Please contact the office at 243-7280 if you have any questions or concerns.

Sincerely,

Cathy Higgins
Sr. Public Health Sanitarian

cc: Chris Young – Village of Mt. Morris, Operator in Responsible Charge
Hyland Hartsough - NYSDOH, Rochester
April Kellerhouse - NYSDOH, Buffalo

Encl.

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection

Water System Field Compliance Report: A Review of Compliance with Subpart 5-1 of the New York State Sanitary Code

Public Water System Name	Street Address
Mt Morris (V)	
Town, Village, or City	**County**
Mt. Morris	Livingston

PWS ID Number: N Y 2 5 0 1 0 2 3

PWS Type ☒ C ☐ NC ☐ NTNC ☐ NP

Source Type ☒ Surface ☐ Ground ☐ GWUDI

Date of Service: 09 / 13 / 16 (M M / D D / Y Y)

Begin Time: 09 : 15 (H H : M M)

End Time: : (H H : M M)

Disinfection Waiver Issued? ☐ Yes ☒ No **4-Log Virus Treatment?** ☒ Yes ☐ No

Field Visit Type ☐ Pre-operational ☐ Complaint ☐ Incident ☐ Illness ☐ Reinspection ☒ Sanitary Survey ☐ Inspection

Public Health Hazard Types

Part 5 Subsection	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.12(a)	Appropriate actions are taken in response to deteriorating source water quality or diminished effectiveness of treatment with potential for MCL violation.	SA	1
5-1.22(a)	Obtain health department approval prior to the construction or modification of a water system.	SB	1
5-1.23(a)	Obtain health department approval prior to use of an emergency water supply or alteration of a treatment process necessary to protect public health.	SD	1
5-1.27	Maintain minimum distribution system pressure of 20 psi at ground level.	SH	1
5-1.30	Bypass of any stage of treatment.	SJ	1
5-1.30	Disinfection of a groundwater source, surface water source or groundwater source influenced by surface water.	ND 41	1
5-1.30(b)	Filtration of surface source and groundwater influenced by surface water unless avoidance criteria is met.	42	1
5-1.30(b)(2)	Free chlorine residual disinfection concentration in the water entering the distribution system must be at least 0.2 mg/l and may not be less than the minimum concentration for compliance for more than four hours. Systems using other chemical disinfectants shall maintain residual disinfection levels entering the distribution system comparable to requirements for systems using chlorination. 1.8	41	1
5-1.30(g)	Maintain free chlorine residual at representative points in the distribution system.	NR	1
5-1.31	Protect the water distribution system from the creation of cross connections of sufficient hazard to adversely affect the health of water consumers.	SJ	1
5-1.71(a)	Exercise due care and diligence in the maintenance and supervision of all sources of the public water to prevent so far as possible, their pollution and depletion.	SN	1
5-1.71(b)	Exercise due care and diligence in the operation and maintenance of a water treatment plant and distribution system.	SO	* 1

Have all outstanding violations been resolved? ☐ Yes ☐ No

Explain _____

Part 5 Requirements

Part 5 Subsection	Deficiency	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.23(c)	M	Conspicuous posting of Sanitary Code Section 5-1.23, "Reporting Emergencies."	SF	1
5-1.29	S M	Finished (treated) water used for priming pumps.		4
5-1.30	S M	Redundant disinfection equipment provided.	ND	
5-1.30 (e)	S	Complies with disinfection waiver provision.	ND	4
5-1.31(a)(3)	S M	Cross connection control program is implemented by supplier of water, including records of all device testing.	SJ	* 1
5-1.72(c)	S M	Complete daily records of operation of a water system.	09 10	1
5-1.72(d)	S M	Maintain records (e.g., sample results, reports, filter backwash recycle flow information).	09	1
5-1.72(b)	S	System is in compliance with Subpart 5-4. The correct number and level of operator(s) are available during plant operation. System has designated operators of appropriate grade level in responsible charge.	SQ SY 12	1
5-1.73	S M	Provide or have available test kit.		* 1
App.5-A 3.2.1	S M	Developed well sources sufficient to meet maximum day demand with the largest well out of service.		4
App.5-A 6.1	S	Pumps are accessible for maintenance and 3 feet above the 100 year flood plain.		1
App.5-A.7.0.3	S M	Water tanks, hatches, roofing, and access ways are watertight, vermin proof, and secure.		1
App.5-A.7.0.7	S M	Tank overflow terminates 12"-24" above grade with proper screen on outlet.		4
App.5-B.2(d)	S M	Finished grade of well is mounded to divert surface water.		4
App.5-B.5(g)	S	Vented, water tight, vermin proof sanitary seal well cap.	SO	4
App.5-D.3(b)	S M	Well casing in good condition and more than 18" above grade.		4

Chlorine Residual 0.19 - labs mg/l Sample Collection Time 9 : 23

Point of Collection WTP

Chlorine Residual _____ mg/l Sample Collection Time _____ : _____

Point of Collection _____

Comments: All metering equipment must be calibrated.
Cross connection control records must be received by LCDOH.
* Turbidity, chlorine & clear well alarms must be installed ASAP

Completed by _____ Date 9 / 13 / 16

Received by Christine Young Date 9 / 13 / 16

Status Codes: 1. No violation observed 2. All or parts of an item in violation 3. Item was not reviewed 4. Item not applicable 5. Item(s) corrected during inspection
Deficiency Codes: S: Significant Deficiency M: Minor Deficiency R: Recommendation

LIVINGSTON COUNTY
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"IMPROVED QUALITY OF LIFE TODAY, FOR A HEALTHIER TOMORROW"

November 29, 2017

Mayor Frank Provo
Village of Mt. Morris
117 Main Street
Mt. Morris, New York 14510

Subject: Village of Mt. Morris Public Water Supply Sanitary Survey 2017

Dear Mayor Provo:

Please replace the enclosed Sanitary Survey letter with the letter sent on October 3, 2017. The date of the sanitary survey in the original letter was incorrect. Please contact the office at 243-7280 if you have any questions or concerns.

Sincerely,

Cathy Higgins
Sr. Public Health Sanitarian

cc: Chris Young – Village of Mt. Morris, Operator in Responsible Charge
Hyland Hartsough - NYSDOH, Rochester
April Kellerhouse - NYSDOH, Buffalo

Enclosure

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"Improved Quality Of Life Today, For A Healthier Tomorrow"

October 3, 2017

Mayor Frank Provo
Village of Mt. Morris
117 Main Street
Mt. Morris, New York 14510

Subject: Village of Mt. Morris Public Water Supply Sanitary Survey 2017
Public Water Supply Number: NY2501023
Population: 3500

Dear Mayor Provo:

In order to determine that the Village of Mt. Morris Public Water Supply System is operating in compliance with the requirements of New York State Sanitary Code Subpart 5-1 "Public Water Systems", a facility sanitary survey was conducted on September 11, 2017. The Livingston County Department of Health (LCDOH) performed this review with the assistance of Water Operators Chris Young. The survey of the water supply system is conducted to ensure that there are no existing public health hazard violations at the time of inspection. The condition and operation of the water system are in good order. Mr. Young and his fellow operators do a fine job operating the system and preparing the required reports.

Based on this visit and a review of records, the following comments are offered:

Observations

- At the time of the sanitary survey an on-site assessment of water treatment plant operator was performed for Thaddeus Gilbride. Mr. Gilbride's knowledge skills and abilities in operating the Village of Mount Morris Water Supply System were found to be satisfactory. Applications and associated documentation have been submitted to the New York State Department of Health (NYSDOH) for approval.

- Currently Chris Young carries a grade IIA(treatment plant) and D (distribution) Water Operator license and Kelly Roundsville carries a grade IIA, C and D Water Operator license. The NYSDOH requires a minimum of two Grade IIA, for a water treatment plant with facilities for filtration which is designed to treat 2.5 million gallons per day, and highly recommends a minimum of two Grade D Operators for the Village of Mount Morris Public Water Supply.

- The Village pre-chlorinates seasonally to reduce zebra mussels at the intake in Silver Lake. The Village of Mt. Morris water treatment plant is located approximately 11 miles from Silver Lake. There is a potential for disinfection byproducts to form during the time period that it takes for the pre-chlorinated water from the intake to reach the Village of Mt. Morris's reservoir.

- On August 15, 2017, the LCDOH sampled for disinfection byproducts from the raw water at Silver Lake, the raw water at the plant (from the reservoir), the entry point to distribution (just after the contact clearwell) and just

before the entry point to the Village of Leicester's distribution system (NAPA Auto Parts) in August of 2017 (results enclosed). Sample results revealed high levels of DBP formation in the clear well and in distribution. It was reported that the clear well does not contain any type of baffling system. A baffling system would supply fresher water to the distribution system and should be considered.

- The Silver Lake intake is inspected once a year. The 2017 inspection has been completed and the condition of the intake was found to be satisfactory.

- The surface sweeps bolts were replaced in the filter beds.

- Currently the filter beds are manually backwashed. Filter to waste capability is not functioning, but is planned for one filter in the fall of 2017.

- A second air bubbler was installed in the reservoir in order to keep water moving and help minimize the growth of algae. The connection of a third bubbler is planned in the near future.

- At the time of the inspection a mild harmful algal bloom (HAB) was noted on the reservoir surface. Samples were collected from the raw water supply at the reservoir and the finished water supply. Analysis results were <0.3 µg/L microsystem (Microcystins were detected above the reported method detection limit of 0.15 µg/L but below the EPA method reporting limit of 0.3 µg/L. An approximated value of 0.23 µg/L is being provided for informational purposes only). The report is enclosed.

- It was reported that the alarm system for the low chorine, high turbidity and clear well low level have been installed and a SCADA system was installed to all system alarms. All Staff receive a call if an alarm is activated.

- The combined turbibity filter meter has been replaced at the treatment plant.

- A new benchtop turbidity meter is available at the treatment plant. Remember to calibrate the unit per manufacturer's recommendations and check the expiration date on the calibration standards.

- New LED lighting has been installed throughout the treatment plant.

- The "Emergency Response Plan" form provided to you at the sanitary survey, was completed and return to the LCDOH at the time of the inspection. Changes to the plan were received by the LCDOH on September 14, 2017.

- The Village is in the process of replacing nonfunctioning valves and hydrants.

Thank you for continued care and diligence in the operation and maintenance of the water supply system.

Requirements

- The Comprehensive Performance Evaluation (CPE) performed by the NYSDOH in 2005 identified the condition of the filter media as being poor. At the time of the sanitary survey, what appeared to be alum from the clarifiers was noted on the surface of the filters. Continued reliance on media in poor condition may result in diminished water quality and exceedances in performance standards (DBPs, Turbidity, etc.). The use of granular activated carbon as a filter media should be considered to reduce disinfection byproducts in the distribution system. It was reported that **Engineer design plans are underway and a grant application has been submitted. A preliminary engineering report dated May 25, 2017 was received by the LCDOH.**

- Chemical to water ratios must be posted at the raw water building. **Compliance will be determined at the 2018 sanitary survey.**

- Vacuum breakers must be installed on all hose bibs with hoses connected throughout the water treatment plant. **Compliance will be determined at the 2018 sanitary survey.**

- As stated in the New York State Sanitary Code, section 5-1.31, cross-connection control is the responsibility of the water supplier and the water customer. **Our records indicate most devices are up to date.** As the supplier of water you are required to ensure that backflow prevention containment devices are tested, operated and maintained and that adequate records of maintenance and repair are submitted to the LCDOH. The "Cross Connection Compliance Form" was received at the time of inspection.

- The portion of the raw water main that is located through the Mt. Morris dam has not been inspected by the LCDOH in several years. It was reported that a valve needs to be replace on the park side of the dam. The LCDOH will be scheduling an inspection in the near future.

Recommendations and Comments

- The hatch gasket at the clear well was replaced in 2016. Regular inspections should be performed on the hatch to ensure a proper seal is maintained.

- In order to reduce disinfection by-products levels and thoroughly flush discolored water from the entire system it is important to coordinate a flushing schedule with the Town of Mt. Morris, the Village of Leicester, the Town of Leicester and the Livingston County Water and Sewer Authority. The entire distribution system should be flushed thoroughly **at least twice a year**. An adequate flushing program can also help to protect the water system from bacterial growth and may help to reduce disinfection by-product levels.

- Harmful Algal Blooms (HABs) in Silver Lake were persistent this year. Currently there are no regulatory standards for HABs in drinking water. However, the New York State Department of Health (NYSDOH) is in the process of developing standards to protect our public water supplies from harmful toxins that may enter the water supply. The NYSDOH will consider water supply monitoring for microcystin toxins if some combination of the following conditions exist:
  - ❖ Suspected illness association
  - ❖ Intake is near or in a bloom
  - ❖ Source water significantly changes as a result of a bloom
  - ❖ Plant is having treatment difficulties as a result of a bloom including a change in turbidity
  - ❖ Data becomes available (DEC, other) that shows the source water contains toxins
  - ❖ Recent algaecide treatment although we do not recommend this if the bloom is near the intake

  Updates to the NYSDOH plans to develop standards for HABs will be made available as the plan is developed. Please continue to report any changes in water quality that may be associated with harmful algal blooms.

Enclosed is a copy of the DOH 4234 "Water System Field Compliance Report". Please review this form and take note of the comments. Please contact the office at 243-7280 if you have any questions or concerns.

Sincerely,

Cathy Higgins
Sr. Public Health Sanitarian

cc: Chris Young – Village of Mt. Morris, Operator in Responsible Charge
Hyland Hartsough - NYSDOH, Rochester
April Kellerhouse - NYSDOH, Buffalo

Enclosure

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"IMPROVED QUALITY OF LIFE TODAY, FOR A HEALTHIER TOMORROW"

October 3, 2017

Mayor Frank Provo
Village of Mt. Morris
117 Main Street
Mt. Morris, New York 14510

Subject: Village of Mt. Morris Public Water Supply Sanitary Survey 2017
Public Water Supply Number: NY2501023
Population: 3500

Dear Mayor Provo:

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Based on this visit and a review of records, the following comments are offered:

Observations

- At the time of the sanitary survey an on-site assessment of water treatment plant operator was performed for Thaddeus Gilbride. Mr. Gilbride's knowledge skills and abilities in operating the Village of Mount Morris Water Supply System were found to be satisfactory. Applications and associated documentation have been submitted to the New York State Department of Health (NYSDOH) for approval.

- Currently Chris Young carries a grade IIA(treatment plant) and D (distribution) Water Operator license and Kelly Roundsville carries a grade IIA, C and D Water Operator license. The NYSDOH requires a minimum of two Grade IIA, for a water treatment plant with facilities for filtration which is designed to treat 2.5 million gallons per day, and highly recommends a minimum of two Grade D Operators for the Village of Mount Morris Public Water Supply.

- The Village pre-chlorinates seasonally to reduce zebra mussels at the intake in Silver Lake. The Village of Mt. Morris water treatment plant is located approximately 11 miles from Silver Lake. There is a potential for disinfection byproducts to form during the time period that it takes for the pre-chlorinated water from the intake to reach the Village of Mt. Morris's reservoir.

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before the entry point to the Village of Leicester's distribution system (NAPA Auto Parts) in August of 2017 (results enclosed). Sample results revealed high levels of DBP formation in the clear well and in distribution. It was reported that the clear well does not contain any type of baffling system. A baffling system would supply fresher water to the distribution system and should be considered.

- The Silver Lake intake is inspected once a year. The 2017 inspection has been completed and the condition of the intake was found to be satisfactory.

- The surface sweeps bolts were replaced in the filter beds.

- Currently the filter beds are manually backwashed. Filter to waste capability is not functioning, but is planned for one filter in the fall of 2017.

- A second air bubbler was installed in the reservoir in order to keep water moving and help minimize the growth of algae. The connection of a third bubbler is planned in the near future.

- At the time of the inspection a mild harmful algal bloom (HAB) was noted on the reservoir surface. Samples were collected from the raw water supply at the reservoir and the finished water supply. Analysis results were <0.3 µg/L microsystem (Microcystins were detected above the reported method detection limit of 0.15 µg/L but below the EPA method reporting limit of 0.3 µg/L. An approximated value of 0.23 µg/L is being provided for informational purposes only). The report is enclosed.

- It was reported that the alarm system for the low chorine, high turbidity and clear well low level have been installed and a SCADA system was installed to all system alarms. All Staff receive a call if an alarm is activated.

- The combined turbibity filter meter has been replaced at the treatment plant.

- A new benchtop turbidity meter is available at the treatment plant. Remember to calibrate the unit per manufacturer's recommendations and check the expiration date on the calibration standards.

- New LED lighting has been installed throughout the treatment plant.

- The "Emergency Response Plan" form provided to you at the sanitary survey, was completed and return to the LCDOH at the time of the inspection. Changes to the plan were received by the LCDOH on September 14, 2017.

- The Village is in the process of replacing nonfunctioning valves and hydrants.

Thank you for continued care and diligence in the operation and maintenance of the water supply system.

Requirements

- The Comprehensive Performance Evaluation (CPE) performed by the NYSDOH in 2005 identified the condition of the filter media as being poor. At the time of the sanitary survey, what appeared to be alum from the clarifiers was noted on the surface of the filters. Continued reliance on media in poor condition may result in diminished water quality and exceedances in performance standards (DBPs, Turbidity, etc.). The use of granular activated carbon as a filter media should be considered to reduce disinfection byproducts in the distribution system. It was reported that **Engineer design plans are underway and a grant application has been submitted. A preliminary engineering report dated May 25, 2017 was received by the LCDOH.**

- Chemical to water ratios must be posted at the raw water building. **Compliance will be determined at the 2018 sanitary survey.**

- Vacuum breakers must be installed on all hose bibs with hoses connected throughout the water treatment plant.

- As stated in the New York State Sanitary Code, section 5-1.31, cross-connection control is the responsibility of the water supplier and the water customer. **Our records indicate most devices are up to date.** As the supplier of water you are required to ensure that backflow prevention containment devices are tested, operated and maintained and that adequate records of maintenance and repair are submitted to the LCDOH. The "Cross Connection Compliance Form" was received at the time of inspection.

- The portion of the raw water main that is located through the Mt. Morris dam has not been inspected by the LCDOH in several years. It was reported that a valve needs to be replace on the park side of the dam. The LCDOH will be scheduling an inspection in the near future.

Recommendations and Comments

- The hatch gasket at the clear well was replaced in 2016. Regular inspections should be performed on the hatch to ensure a proper seal is maintained.

- In order to reduce disinfection by-products levels and thoroughly flush discolored water from the entire system it is important to coordinate a flushing schedule with the Town of Mt. Morris, the Village of Leicester, the Town of Leicester and the Livingston County Water and Sewer Authority. The entire distribution system should be flushed thoroughly **at least twice a year**. An adequate flushing program can also help to protect the water system from bacterial growth and may help to reduce disinfection by-product levels.

- Harmful Algal Blooms (HABs) in Silver Lake were persistent this year. Currently there are no regulatory standards for HABs in drinking water. However, the New York State Department of Health (NYSDOH) is in the process of developing standards to protect our public water supplies from harmful toxins that may enter the water supply. The NYSDOH will consider water supply monitoring for microcystin toxins if some combination of the following conditions exist:
  - Suspected illness association
  - Intake is near or in a bloom
  - Source water significantly changes as a result of a bloom
  - Plant is having treatment difficulties as a result of a bloom including a change in turbidity
  - Data becomes available (DEC, other) that shows the source water contains toxins
  - Recent algaecide treatment although we do not recommend this if the bloom is near the intake

  Updates to the NYSDOH plans to develop standards for HABs will be made available as the plan is developed. Please continue to report any changes in water quality that may be associated with harmful algal blooms.

Enclosed is a copy of the DOH 4234 "Water System Field Compliance Report". Please review this form and take note of the comments. Please contact the office at 243-7280 if you have any questions or concerns.

Sincerely,

Cathy Higgins
Sr. Public Health Sanitarian

cc: Chris Young – Village of Mt. Morris, Operator in Responsible Charge
Hyland Hartsough - NYSDOH, Rochester
April Kellerhouse - NYSDOH, Buffalo

Enclosure

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection

Water System Field Compliance Report: A Review of Compliance with Subpart 5-1 of the New York State Sanitary Code

Public Water System Name	Street Address
Mt. Morris (V)	117 Main St
Town, Village, or City	**County**
Mt. Morris	Livingston

PWS ID Number: NY2501023

PWS Type ☒ C ☐ NC ☐ NTNC ☐ NP

Source Type ☒ Surface ☐ Ground ☐ GWUDI

Date of Service: 09 / 11 / 17 (M M / D D / Y Y)

Begin Time: 09:00 (H H : M M)

End Time: 14:45 (H H : M M)

Disinfection Waiver Issued? ☐ Yes ☒ No **4-Log Virus Treatment?** ☒ Yes ☐ No

Field Visit Type ☐ Pre-operational ☐ Complaint ☐ Incident ☐ Illness ☐ Reinspection ☒ Sanitary Survey ☐ Inspection

Public Health Hazard Types

Part 5 Subsection	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.12(a)	Appropriate actions are taken in response to deteriorating source water quality or diminished effectiveness of treatment with potential for MCL violation.	SA	1
5-1.22(a)	Obtain health department approval prior to the construction or modification of a water system.	SB	1
5-1.23(a)	Obtain health department approval prior to use of an emergency water supply or alteration of a treatment process necessary to protect public health.	SD	1
5-1.27	Maintain minimum distribution system pressure of 20 psi at ground level.	SH	1
5-1.30	Bypass of any stage of treatment.	SJ	1
5-1.30	Disinfection of a groundwater source, surface water source or groundwater source influenced by surface water.	ND 41	1
5-1.30(b)	Filtration of surface source and groundwater influenced by surface water unless avoidance criteria is met.	42	1
5-1.30(b)(2)	Free chlorine residual disinfection concentration in the water entering the distribution system must be at least 0.2 mg/l and may not be less than the minimum concentration for compliance for more than four hours. Systems using other chemical disinfectants shall maintain residual disinfection levels entering the distribution system comparable to requirements for systems using chlorination.	41	1
5-1.30(g)	Maintain free chlorine residual at representative points in the distribution system.	NR	1
5-1.31	Protect the water distribution system from the creation of cross connections of sufficient hazard to adversely affect the health of water consumers.	SJ	1
5-1.71(a)	Exercise due care and diligence in the maintenance and supervision of all sources of the public water to prevent so far as possible, their pollution and depletion.	SN	1
5-1.71(b)	Exercise due care and diligence in the operation and maintenance of a water treatment plant and distribution system.	SO	1

Have all outstanding violations been resolved? ☐ Yes ☐ No

Explain N/A

Part 5 Requirements

Part 5 Subsection	Deficiency	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.23(c)	M	Conspicuous posting of Sanitary Code Section 5-1.23, "Reporting Emergencies."	SF	1
5-1.29	S M	Finished (treated) water used for priming pumps.		4
5-1.30	S M	Redundant disinfection equipment provided.	ND	1
5-1.30 (e)	S	Complies with disinfection waiver provision.	ND	4
5-1.31(a)(3)	S M	Cross connection control program is implemented by supplier of water, including records of all device testing.	SJ	1
5-1.72(c)	S M	Complete daily records of operation of a water system.	09 10	1
5-1.72(d)	S M	Maintain records (e.g., sample results, reports, filter backwash recycle flow information).	09	1
5-1.72(b)	S	System is in compliance with Subpart 5-4. The correct number and level of operator(s) are available during plant operation. System has designated operators of appropriate grade level in responsible charge.	SQ SY 12	1
5-1.73	S M	Provide or have available test kit.		1
App.5-A 3.2.1	S M	Developed well sources sufficient to meet maximum day demand with the largest well out of service.		4
App.5-A 6.1	S	Pumps are accessible for maintenance and 3 feet above the 100 year flood plain.		1
App.5-A.7.0.3	S M	Water tanks, hatches, roofing, and access ways are watertight, vermin proof, and secure.		1
App.5-A.7.0.7	S M	Tank overflow terminates 12"-24" above grade with proper screen on outlet.		4
App.5-B.2(d)	S M	Finished grade of well is mounded to divert surface water.		4
App.5-B.5(g)	S	Vented, water tight, vermin proof sanitary seal well cap.	SO	4
App.5-D.3(b)	S M	Well casing in good condition and more than 18" above grade.		4

Chlorine Residual 0.59 mg/l Sample Collection Time 11 : 25

Point of Collection Entry point to dist.

Chlorine Residual _____ mg/l Sample Collection Time _____ : _____

Point of Collection _____

Comments No public health hazards noted at time of inspection. Charcoal to water softeners must be pooled at the raw water building. Vacuum breakers must be installed on all hose bibs with hoses connected. Blue green algae noted in reservoir. LCWSA will collect samples

Completed by Cathy Hogan Date 09 / 11 / 17

Received by Christine Young Date 9 / 11 / 2017

Status Codes: 1. No violation observed 2. All or parts of an item in violation 3. Item was not reviewed 4. Item not applicable 5. Item(s) corrected during inspection

Deficiency Codes: S: Significant Deficiency M: Minor Deficiency R: Recommendation

LIVINGSTON COUNTY
DEPARTMENT OF HEALTH
2 Murray Hill Drive
Mt. Morris, New York 14510-1691

Jennifer Rodriguez, M.S.
Public Health Director

Phone (585) 243-7270
Fax (585) 243-7287
dept-of-health@co.livingston.ny.us
www.livingstoncounty.us/doh.htm

Mark Grove, P.E., Director
Center for Environmental Health
(585) 243-7280/(585) 335-1717 Fax: (585) 243-6793
Dog Control: (585) 243-6740/(585) 335-1720/ Fax: (585) 243-6751

"COMMITMENT TO LEADING THE COMMUNITY FOR A HEALTHIER AND SAFER TOMORROW"

October 11, 2018

Mayor Frank Provo
Village of Mt. Morris
117 Main Street
Mt. Morris, New York 14510

Subject: Village of Mt. Morris Public Water Supply Sanitary Survey 2018
Public Water Supply Number: NY2501023
Population: 3500

Dear Mayor Provo:

In order to determine that the Village of Mt. Morris Public Water Supply System is operating in compliance with the requirements of New York State Sanitary Code Subpart 5-1 "Public Water Systems", a facility sanitary survey was conducted on October 2, 2018. The Livingston County Department of Health (LCDOH) performed this review with the assistance of Water Operators Chris Young Thaddeus Gilbride and Kelly Roundsville. The survey of the water supply system is conducted to ensure that there are no existing public health hazard violations at the time of inspection. The condition and operation of the water system are in good order. Mr. Young and his fellow operators do a fine job operating the system and preparing the required reports.

Based on this visit and a review of records, the following comments are offered:

Observations

- Currently Chris Young carries a grade IIA(treatment plant) and D (distribution) and C (treatment and or distribution) Water Operator license; Kelly Roundsville carries a grade IIA, C and D Water Operator license; and Thaddeus Gilbride carries a grade IIA, C and D Water Operator license. The Village of Mt Morris meets the NYSDOH requirement of a minimum of two Grade IIA operators for a water treatment plant with facilities for filtration which is designed to treat 2.5 million gallons per day, and at least one grade D, distribution operator.

- Chemical to water ratios were posted at the raw water building as required in the 2017 sanitary survey.

- Vacuum breakers were installed on all hose bibs with hoses connected throughout the water treatment plant as required in the 2017 sanitary survey.

- The reservoir and the clearwell were inspected and flange bolts were replaced in the reservoir.

- It was reported that mixing curtains will be added to the finished water clearwell to improve water quality in the finished water supply.

- The Silver Lake intake was inspected in the spring and fall in 2018. The condition of the intake was found to be satisfactory. Zebra mussels attached to the intake gate were moderate in numbers.

- Currently the filter beds are manually backwashed. Filter to waste capability is now functioning in one filter. Filter to Waste function in the second filter will be restored in 2019.

- A fountain was installed in the raw water reservoir, in addition to two air bubblers previously installed, in order to keep water moving and help minimize algae growth.

- The "Emergency Response Plan" form provided to you at the sanitary survey was completed and return to the LCDOH along with an updated equipment list at the time of the inspection.

- The Village has completed replacing nonfunctioning valves and hydrants and has purchased a mapping program that will be implemented in the near future.

Thank you for continued care and diligence in the operation and maintenance of the water supply system.

Requirements

- The Comprehensive Performance Evaluation (CPE) performed by the NYSDOH in 2005 identified the condition of the filter media as being poor. At the time of the sanitary survey, what appeared to be alum from the clarifiers was noted on the surface of the filters. Continued reliance on media in poor condition may result in diminished water quality and exceedances in performance standards (DBPs, Turbidity, etc.). The use of granular activated carbon as a filter media should be considered to reduce disinfection byproducts in the distribution system. A preliminary engineering report dated May 25, 2017 was received by the LCDOH. It was reported that Engineer design plans are underway and a grant has been awarded in part for this project.

- As stated in the New York State Sanitary Code, section 5-1.31, cross-connection control is the responsibility of the water supplier and the water customer. Our records indicate most devices are up to date. As the supplier of water you are required to ensure that backflow prevention containment devices are tested, operated and maintained and that adequate records of maintenance and repair are submitted to the LCDOH. The "Cross Connection Compliance Form" was received at the time of inspection.

- The portion of the raw water main that is located through the Mt. Morris dam has not been inspected by the LCDOH in several years. The LCDOH has scheduled an inspection on Thursday, November 8, 2018 at 10:00 AM.

Recommendations and Comments

- The hatch gasket at the clear well was replaced in 2016. Regular inspections should be performed on the hatch to ensure a proper seal is maintained.

- After the filter media is replaced, future media replacement should be included in the public water budget to help prevent water quality issues in the finished water supply.

- In order to reduce disinfection by-products levels and thoroughly flush discolored water from the entire system it is important to coordinate a flushing schedule with the Town of Mt. Morris, the Village of Leicester, the Town of Leicester and the Livingston County Water and Sewer Authority. The entire distribution system should be flushed thoroughly **at least twice a year**. An adequate flushing program can also help to protect the water system from bacterial growth and may help to reduce disinfection by-product levels.

- Harmful Algal Blooms (HABs) in Silver Lake were persistent this year. Currently there are no regulatory standards for HAB in drinking water. However, the New York State Department of Health (NYSDOH) refers to the Environmental Protection Agency 2015 drinking water health advisories pertaining to HAB. The NYSDOH is in the process of developing standards to protect our public water supplies from harmful toxins that may enter the water supply. The NYSDOH will consider water supply monitoring for microcystin toxins if some combination of the following conditions exist:

    - ❖ Suspected illness association
    - ❖ Intake is near or in a bloom
    - ❖ Source water significantly changes as a result of a bloom
    - ❖ Plant is having treatment difficulties as a result of a bloom including a change in turbidity
    - ❖ Data becomes available (DEC, other) that shows the source water contains toxins
    - ❖ Recent algaecide treatment although we do not recommend this if the bloom is near the intake

  Updates to the NYSDOH plans to develop standards for HABs will be made available as the plan is developed. Please continue to report any changes in water quality that may be associated with harmful algal blooms.

Enclosed is a copy of the DOH 4234 "Water System Field Compliance Report". Please review this form and take note of the comments. Please contact the office at 243-7280 if you have any questions or concerns.

Sincerely,

Cathy Higgins
Sr. Public Health Sanitarian

cc: Chris Young – Village of Mt. Morris, Operator in Responsible Charge
Hyland Hartsough - NYSDOH, Rochester
April Kellerhouse - NYSDOH, Buffalo

Enclosure

NEW YORK STATE DEPARTMENT OF HEALTH
Bureau of Water Supply Protection

Water System Field Compliance Report: A Review of Compliance with Subpart 5-1 of the New York State Sanitary Code

Public Water System Name	Street Address
Mt. Morris (V)	117 Main St
Town, Village, or City	**County**
	Livingston

PWS ID Number: NY 2 5 0 1 0 2 3

PWS Type ☒ C ☐ NC ☐ NTNC ☐ NP

Source Type ☒ Surface ☐ Ground ☐ GWUDI

Date of Service: 10 / 02 / 18 (M M / D D / Y Y)

Begin Time: 09 : 00 (H H : M M)

End Time: : (H H : M M)

Disinfection Waiver Issued? ☐ Yes ☒ No

4-Log Virus Treatment? ☒ Yes ☐ No

Field Visit Type ☐ Pre-operational ☐ Complaint ☐ Incident ☐ Illness ☐ Reinspection ☒ Sanitary Survey ☐ Inspection

Public Health Hazard Types

Part 5 Subsection	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.12(a)	Appropriate actions are taken in response to deteriorating source water quality or diminished effectiveness of treatment with potential for MCL violation.	SA	1
5-1.22(a)	Obtain health department approval prior to the construction or modification of a water system.	SB	1
5-1.23(a)	Obtain health department approval prior to use of an emergency water supply or alteration of a treatment process necessary to protect public health.	SD	1
5-1.27	Maintain minimum distribution system pressure of 20 psi at ground level.	SH	1
5-1.30	Bypass of any stage of treatment.	SJ	1
5-1.30	Disinfection of a groundwater source, surface water source or groundwater source influenced by surface water.	ND 41	1
5-1.30(b)	Filtration of surface source and groundwater influenced by surface water unless avoidance criteria is met.	42	1
5-1.30(b)(2)	Free chlorine residual disinfection concentration in the water entering the distribution system must be at least 0.2 mg/l and may not be less than the minimum concentration for compliance for more than four hours. Systems using other chemical disinfectants shall maintain residual disinfection levels entering the distribution system comparable to requirements for systems using chlorination.	41	1
5-1.30(g)	Maintain free chlorine residual at representative points in the distribution system.	NR	1
5-1.31	Protect the water distribution system from the creation of cross connections of sufficient hazard to adversely affect the health of water consumers.	SJ	1
5-1.71(a)	Exercise due care and diligence in the maintenance and supervision of all sources of the public water to prevent so far as possible, their pollution and depletion.	SN	1
5-1.71(b)	Exercise due care and diligence in the operation and maintenance of a water treatment plant and distribution system.	SO	1

Have all outstanding violations been resolved? ☐ Yes ☐ No N/A

Explain

Part 5 Requirements

Part 5 Subsection	Deficiency (Circle)	Summary Description of Sanitary Code Requirement	SDWIS	Status
5-1.23(c)	M	Conspicuous posting of Sanitary Code Section 5-1.23, "Reporting Emergencies."	SF	1
5-1.29	S M	Finished (treated) water used for priming pumps.		4
5-1.30	S M	Redundant disinfection equipment provided.	ND	1
5-1.30 (e)	S	Complies with disinfection waiver provision.	ND	4
5-1.31(a)(3)	S M	Cross connection control program is implemented by supplier of water, including records of all device testing.	SJ	1
5-1.72(c)	S M	Complete daily records of operation of a water system.	09 10	1
5-1.72(d)	S M	Maintain records (e.g., sample results, reports, filter backwash recycle flow information).	09	1
5-1.72(b)	S	System is in compliance with Subpart 5-4. The correct number and level of operator(s) are available during plant operation. System has designated operators of appropriate grade level in responsible charge.	SQ SY 12	1
5-1.73	S M	Provide or have available test kit.		1
App.5-A 3.2.1	S M	Developed well sources sufficient to meet maximum day demand with the largest well out of service.		4
App.5-A 6.1	S	Pumps are accessible for maintenance and 3 feet above the 100 year flood plain.		1
App.5-A.7.0.3	S M	Water tanks, hatches, roofing, and access ways are watertight, vermin proof, and secure.		1
App.5-A.7.0.7	S M	Tank overflow terminates 12"-24" above grade with proper screen on outlet.		1
App.5-B.2(d)	S M	Finished grade of well is mounded to divert surface water.		4
App.5-B.5(g)	S	Vented, water tight, vermin proof sanitary seal well cap.	SO	4
App.5-D.3(b)	S M	Well casing in good condition and more than 18" above grade.		4

Chlorine Residual 0.69 mg/l Sample Collection Time 10 : 10

Point of Collection finished water at plant

Chlorine Residual _____ mg/l Sample Collection Time _____ : _____

Point of Collection _____

Comments No public health hazards noted at the time of inspection. Upgrade plans must be received and approved by CDOH before work commences. Secondary Containment required on pre Cl2 day tk

Completed by _____ Date 10 / 2 / 18

Received by _____ Date 10 / 2 / 18

Status Codes: 1. No violation observed 2. All or parts of an item in violation 3. Item was not reviewed 4. Item not applicable 5. Item(s) corrected during inspection
Deficiency Codes: S: Significant Deficiency M: Minor Deficiency R: Recommendation

Appendix J

Proposed Scenario Maps

TankID	NAME	GALLONS	OWNER	HGL
LimaTank	Water Storage Tank	500,000	Village of Lima	991
EAvTank	East Avon Hamlet Tank	100,000	Town of Avon	970
256Tank	Route 256 Water Tank	500,000	Village of Avon	930
AirPTank	Airport Water Tank	150,000	LCWSA	1040
MurrTank	Murray Hill		Livingston County	0
ARSTank	ARS Water Tank	250,000	LCWSA	950
Tuttle1	Tuttle Rd Water Tanks	500,000	Town of York	991
Tuttle2	Tuttle Rd Water Tanks	500,000	Town of York	991
ResATank	Reservoir Rd Tank	2,000,000	Village of Avon	842
SpwtTank	Water Storage Tank	60,000	Town of Springwater	1275
SlkrTank	Silker Hill Rd Water Tank	500,000	LCWSA	1390
GrvInd1	Groveland Corrections 1		State of New York	0
GrvInd2	Groveland Corrections 2		State of New York	0
ResGTank	Reservoir Rd Water Tank	3,000,000	Village of Geneseo	1075
BurbTank	Burbank Dr Water Tank	250,000	Town of Geneseo	1200
NvrTank	Niver Rd Water Tank	250,000	LCWSA	1390
ShelTank	Shelly Rd Water Tank	500,000	LCWSA	1390
LkviTank	Lakeville Water Tank	200,000	LCWSA	1040
HemTank	Hemlock Water Tank	150,000	LCWSA	1215
CalTank	Caledonia Rd Water Tank	250,000	Town of Leicester	850
GrvStUp	Groveland Station Upper Water Tank	150,000	LCWSA	1415
GrvStLw	Groveland Station Lower Water Tank	150,000	LCWSA	1069
520Tank	Route 5-20 Tank	100,000	Town of Avon	1000
GranTank	Graney Rd Tank	400,000	Village of Caledonia	815
SctsTank	Scottsburg Water Tank	125,000	LCWSA	1040
DennTank	Dennison Rd Water Tank	500,000	LCWSA	1460
RRTank	Railroad Ave Water Tank	160,000	LCWSA	1390
DansTank	Water Storage Tank	1,500,000	Village of Dansville	920
DansWTP	WTP Tank	3,000,000	Village of Dansville	0
NunTank	Water Storage Tank	500,000	Village of Nunda	1126
PeoTank	Water StorageTank	500,000	Town of York	1210
20ATank	Route 20A Water Tank	200,000	Village of Leicester	850

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County

Monroe County Water Authority System

Genesee County

Village of Caledonia

815 +/-

GranTank

Town of Caledonia

Village of Avon

NEW LCWSA TANK

Uplands Supply Conduits

LCWSA PUMP STATION UPGRADE (PHASE 2)

EAvTank

520Tank

LimaTank

966 +/-

996 +/-

996 +/-

996 +/-

Town of Avon

Town of Lima

991 +/-

815 +/-

840 +/-

ResATank

1210 +/-

Town of York

PeoTank

955 +/-

Avon Water Works

256Tank

1215 +/-

NEW LCWSA PUMP STATION

RIVER ROAD TRANSMISSION MAIN

Tuttle1

Tuttle2

1075 +/-

AirPTank

LkviTank

Village of Livonia

Ontario County

NEW YORK PUMP STATION

Village of Geneseo

Town of Geneseo

Genesee Water Works

ShelTank

Town of Livonia

HemTank

NEW LCWSA TRANSMISSION MAIN

1105 +/-

850 +/-

ResGTank

BurbTank

1040 +/-

City of Rochester

Wyoming County Water Resources Agency System

Village of Leicester

CalTank

20ATank

1200 +/-

NvrTank

NEW LEICESTER TANK

Town of Leicester

Wyo County

1160 +/-

1310 +/-

ARSTank

1390 +/-

WEST LAKE ROAD SERVICE TRANSFER

950 +/-

1460 +/-

Village of Mount Morris

Village of Mt. Morris

RRTank

Town of Conesus

SlkrTank

DennTank

905 +/-

Town of Groveland

MAPLE BEACH PUMP STATION UPGRADES

Groveland Correctional

1170 +/-

GrvStUp

1314 +/-

ROUTE 36 CONNECTION

850 +/-

GrvStLw

1155 +/-

SctsTank

830 +/-

Springwater Water District #1

1275 +/-

SpwtTank

Town of Springwater

Town of Sparta

Town of West Sparta

1126 +/-

Village of Nunda

NunTank

Town of Nunda

Town of Portage

Town of North Dansville

Village of Dansville

DansTank

920 +/-

Town of Ossian

Steuben County

Allegany County

Livingston County

MAP SHEET:

Scenario 1

MAP TITLE:

Tanks & Treatment Plants with Hydraulic Grades

DATE PREPARED:

FEBRUARY 14, 2022

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Watermains
- Water Storage Tanks
- Water Treatment Facilities
- Hydraulic Grades

N W E S

ARCHITECTURE ENGINEERING PLANNING CPLteam.com

Document Path: S:\Projects\Livingston_Co\Wtr Study Update\G Comm\Meetings\2022.02.14\LivCo Water_Tanks-Grades.mxd | CPLTeam-JSteinbach | 2/14/2022

TankID	NAME	GALLONS	OWNER	HGL
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Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Wyoming County Water Resources Agency System

Genesee County

Monroe County

Ontario County

Wyo County

Allegany County

Steuben County

Livingston County

NEW AVON CONNECTIONS

NEW LCWSA TANK

Uplands Supply Conduits

LCWSA PUMP STATION UPGRADE (PHASE 2)

RIVER ROAD TRANSMISSION MAIN

NEW YORK PUMP STATION

NEW LEICESTER TANK

ROUTE 36 CONNECTION

NEW LCWSA PUMP STATION

NEW LCWSA TRANSMISSION MAIN

MAPLE BEACH PUMP STATION UPGRADES

815 +/-

991 +/-

966 +/-

996 +/-

996 +/-

840 +/-

1210 +/-

955 +/-

1215 +/-

1075 +/-

850 +/-

1105 +/-

1040 +/-

1200 +/-

1160 +/-

1310 +/-

1390 +/-

950 +/-

1460 +/-

905 +/-

1170 +/-

1314 +/-

850 +/-

1155 +/-

830 +/-

1275 +/-

1126 +/-

920 +/-

Village of Caledonia
Town of Caledonia
Village of Avon
Town of Avon
Village of Lima
Town of Lima
Town of York
Village of Geneseo
Town of Geneseo
Village of Livonia
Town of Livonia
Village of Leicester
Town of Leicester
Village of Mt. Morris
Village of Mount Morris
Town of Groveland
Village of Nunda
Town of Nunda
Town of Portage
Town of Sparta
Town of Springwater
Town of West Sparta
Town of Ossian
Village of Dansville
Town of North Dansville
Town of Conesus
City of Rochester
Springwater Water District #1
Avon Water Works
Geneseo Water Works
Groveland Correctional
Conesus Lake
Honeoye Lake
Hemlock Lake
Canadice Lake
Silver Lake

GranTank
ResATank
EAvTank
520Tank
LimaTank
256Tank
AirPTank
LkviTank
ShelTank
HemTank
ResGTank
BurbTank
NvrTank
CalTank
20ATank
ARSTank
DennTank
SlkrTank
RRTank
GrvStUp
GrvStLw
SctsTank
Tuttle1
Tuttle2
PeoTank
NunTank
SpwtTank
DansTank

MAP SHEET:
Scenario 1A

MAP TITLE:
Tanks & Treatment Plants with Hydraulic Grades

DATE PREPARED:
FEBRUARY 14, 2022

Legend
- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Watermains
- Water Storage Tanks
- Water Treatment Facilities
- Hydraulic Grades

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TankID	NAME	GALLONS	OWNER	HGL
LimaTank	Water Storage Tank	500,000	Village of Lima	991
EAvTank	East Avon Hamlet Tank	100,000	Town of Avon	970
256Tank	Route 256 Water Tank	500,000	Village of Avon	930
AirPTank	Airport Water Tank	150,000	LCWSA	1040
MurrTank	Murray Hill		Livingston County	0
ARSTank	ARS Water Tank	250,000	LCWSA	950
Tuttle1	Tuttle Rd Water Tanks	500,000	Town of York	991
Tuttle2	Tuttle Rd Water Tanks	500,000	Town of York	991
ResATank	Reservoir Rd Tank	2,000,000	Village of Avon	842
SpwtTank	Water Storage Tank	60,000	Town of Springwater	1275
SlkrTank	Silker Hill Rd Water Tank	500,000	LCWSA	1390
GrvInd1	Groveland Corrections 1		State of New York	0
GrvInd2	Groveland Corrections 2		State of New York	0
ResGTank	Reservoir Rd Water Tank	3,000,000	Village of Geneseo	1075
BurbTank	Burbank Dr Water Tank	250,000	Town of Geneseo	1200
NvrTank	Niver Rd Water Tank	250,000	LCWSA	1390
ShelTank	Shelly Rd Water Tank	500,000	LCWSA	1390
LkviTank	Lakeville Water Tank	200,000	LCWSA	1040
HemTank	Hemlock Water Tank	150,000	LCWSA	1215
CalTank	Caledonia Rd Water Tank	250,000	Town of Leicester	850
GrvStUp	Groveland Station Upper Water Tank	150,000	LCWSA	1415
GrvStLw	Groveland Station Lower Water Tank	150,000	LCWSA	1069
520Tank	Route 5-20 Tank	100,000	Town of Avon	1000
GranTank	Graney Rd Tank	400,000	Village of Caledonia	815
SctsTank	Scottsburg Water Tank	125,000	LCWSA	1040
DennTank	Dennison Rd Water Tank	500,000	LCWSA	1460
RRTank	Railroad Ave Water Tank	160,000	LCWSA	1390
DansTank	Water Storage Tank	1,500,000	Village of Dansville	920
DansWTP	WTP Tank	3,000,000	Village of Dansville	0
NunTank	Water Storage Tank	500,000	Village of Nunda	1126
PeoTank	Water Storage Tank	500,000	Town of York	1210
20ATank	Route 20A Water Tank	200,000	Village of Leicester	850

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County

Monroe County Water Authority System

Genesee County

Wyoming County

Ontario County

Steuben County

Allegany County

NEW LCWSA TANK

LCWSA PUMP STATION UPGRADE (PHASE 2)

Uplands Supply C

RIVER ROAD TRANSMISSION MAIN

NEW YORK PUMP STATION

NEW LEICESTER TANK

ROUTE 36 CONNECTION

NEW LCWSA PUMP STATION

NEW LCWSA TRANSMISSION MAIN

WEST LAKE ROAD SERVICE TRANSFER

815 +/-
991 +/-
815 +/-
966 +/-
996 +/-
996 +/-
996 +/-
1210 +/-
840 +/-
955 +/-
1075 +/-
1215 +/-
850 +/-
1040 +/-
1200 +/-
1160 +/-
1310 +/-
1390 +/-
950 +/-
1460 +/-
905 +/-
1170 +/-
1314 +/-
850 +/-
1155 +/-
830 +/-
1275 +/-
1105 +/-
1126 +/-
920 +/-

Village of Caledonia
Town of Caledonia
Village of Avon
Town of Avon
Village of Lima
Town of Lima
Village of Livonia
Town of Livonia
Village of Geneseo
Town of Geneseo
Village of Leicester
Town of Leicester
Village of Mt. Morris
Village of Mount Morris
Town of Groveland
Village of Nunda
Town of Nunda
Town of Portage
Town of York
Town of Conesus
Town of Sparta
Town of Springwater
Town of West Sparta
Town of Ossian
Village of Dansville
Town of North Dansville
City of Rochester
Groveland Correctional
Avon Water Works
Genesee Water Works
Springwater Water District #1

GranTank
PeoTank
Tuttle1
Tuttle2
ResGTank
BurbTank
20ATank
CalTank
ARSTank
DennTank
GrvStUp
GrvStLw
ResATank
EAvTank
520Tank
LimaTank
256Tank
AirPTank
LkviTank
ShelTank
HemTank
NvrTank
RRTank
SlkrTank
SctsTank
SpwtTank
NunTank
DansTank

Conesus Lake

MAP SHEET:
Scenario 2

MAP TITLE:
Tanks & Treatment Plants with Hydraulic Grades

DATE PREPARED:
FEBRUARY 14, 2022

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Watermains
- Water Storage Tanks
- Water Treatment Facilities
- Hydraulic Grades

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TankID	NAME	GALLONS	OWNER	HGL
LimaTank	Water Storage Tank	500,000	Village of Lima	991
EAvTank	East Avon Hamlet Tank	100,000	Town of Avon	970
256Tank	Route 256 Water Tank	500,000	Village of Avon	930
AirPTank	Airport Water Tank	150,000	LCWSA	1040
MurrTank	Murray Hill		Livingston County	0
ARSTank	ARS Water Tank	250,000	LCWSA	950
Tuttle1	Tuttle Rd Water Tanks	500,000	Town of York	991
Tuttle2	Tuttle Rd Water Tanks	500,000	Town of York	991
ResATank	Reservoir Rd Tank	2,000,000	Village of Avon	842
SpwtTank	Water Storage Tank	60,000	Town of Springwater	1275
SlkrTank	Silker Hill Rd Water Tank	500,000	LCWSA	1390
GrvInd1	Groveland Corrections 1		State of New York	0
GrvInd2	Groveland Corrections 2		State of New York	0
ResGTank	Reservoir Rd Water Tank	3,000,000	Village of Geneseo	1075
BurbTank	Burbank Dr Water Tank	250,000	Town of Geneseo	1200
NvrTank	Niver Rd Water Tank	250,000	LCWSA	1390
ShelTank	Shelly Rd Water Tank	500,000	LCWSA	1390
LkviTank	Lakeville Water Tank	200,000	LCWSA	1040
HemTank	Hemlock Water Tank	150,000	LCWSA	1215
CalTank	Caledonia Rd Water Tank	250,000	Town of Leicester	850
GrvStUp	Groveland Station Upper Water Tank	150,000	LCWSA	1415
GrvStLw	Groveland Station Lower Water Tank	150,000	LCWSA	1069
520Tank	Route 5-20 Tank	100,000	Town of Avon	1000
GranTank	Graney Rd Tank	400,000	Village of Caledonia	815
SctsTank	Scottsburg Water Tank	125,000	LCWSA	1040
DennTank	Dennison Rd Water Tank	500,000	LCWSA	1460
RRTank	Railroad Ave Water Tank	160,000	LCWSA	1390
DansTank	Water Storage Tank	1,500,000	Village of Dansville	920
DansWTP	WTP Tank	3,000,000	Village of Dansville	0
NunTank	Water Storage Tank	500,000	Village of Nunda	1126
PeoTank	Peoria WaterTank	500,000	Town of York	1210
20ATank	Route 20A Water Tank	200,000	Village of Leicester	850

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County

Monroe County Water Authority System

Uplands Supply Conduits

Genesee County

Wyoming County Water Resources Agency System

Wyo County

Allegany County

Steuben County

AVON-YORK 955' CONNECTION

AVON WTP UPGRADE

NEW LCWSA TANK (PHASE 2)

NEW LCWSA PUMP STATION (PHASE 2)

RIVER ROAD TRANSMISSION MAIN NORTH

NEW YORK PUMP STATION

RIVER ROAD TRANSMISSION MAIN MIDDLE (PHASE 2)

NEW LCWSA TRANSMISSION MAIN (PHASE 2)

NEW LEICESTER TANK (PHASE 2)

WEST LAKE ROAD SERVICE TRANSFER

MAPLE BEACH PUMP STATION UPGRADES

ROUTE 36 CONNECTION

ARS ENHANCEMENTS

815 +/-
966 +/-
996 +/-
996 +/-
991 +/-
815 +/-
840 +/-
1210 +/-
955 +/-
1215 +/-
1075 +/-
850 +/-
1040 +/-
1200 +/-
1105 +/-
1160 +/-
1310 +/-
1390 +/-
950 +/-
1460 +/-
905 +/-
1170 +/-
1314 +/-
850 +/-
1155 +/-
830 +/-
1275 +/-
1126 +/-
920 +/-

Village of Caledonia
Town of Caledonia
GranTank
Village of Avon
Town of Avon
EAvTank
520Tank
ResATank
Town of Lima
Avon Water Works
256Tank
Town of Geneseo
ResGTank
Genesee Water Works
AirPTank
LkviTank
Village of Livonia
Town of Livonia
ShelTank
HemTank
City of Rochester
BurbTank
NvrTank
Village of Leicester
CalTank
20ATank
Town of Leicester
Village of Mt. Morris
Village of Mount Morris
ARSTank
Town of Groveland
DennTank
RRTank
Town of Conesus
SlkrTank
Groveland Correctional
GrvStUp
GrvStLw
SctsTank
Town of York
Tuttle1
Tuttle2
Town of Sparta
Springwater Water District #1
SpwtTank
Town of Springwater
Village of Nunda
Village of Nunda
NunTank
Town of Nunda
Town of Portage
Town of West Sparta
Town of Ossian
Town of North Dansville
Village of Dansville
Village of Dansville
DansTank

MAP SHEET:
Scenario 3

MAP TITLE:
Tanks & Treatment Plants with Hydraulic Grades

DATE PREPARED:
FEBRUARY 14, 2022

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Watermains
- Water Storage Tanks
- Water Treatment Facilities
- Hydraulic Grades

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TankID	NAME	GALLONS	OWNER	HGL
LimaTank	Water Storage Tank	500,000	Village of Lima	991
EAvTank	East Avon Hamlet Tank	100,000	Town of Avon	970
256Tank	Route 256 Water Tank	500,000	Village of Avon	930
AirPTank	Airport Water Tank	150,000	LCWSA	1040
MurrTank	Murray Hill		Livingston County	0
ARSTank	ARS Water Tank	250,000	LCWSA	950
Tuttle1	Tuttle Rd Water Tanks	500,000	Town of York	991
Tuttle2	Tuttle Rd Water Tanks	500,000	Town of York	991
ResATank	Reservoir Rd Tank	2,000,000	Village of Avon	842
SpwtTank	Water Storage Tank	60,000	Town of Springwater	1275
SlkrTank	Silker Hill Rd Water Tank	500,000	LCWSA	1390
GrvInd1	Groveland Corrections 1		State of New York	0
GrvInd2	Groveland Corrections 2		State of New York	0
ResGTank	Reservoir Rd Water Tank	3,000,000	Village of Geneseo	1075
BurbTank	Burbank Dr Water Tank	250,000	Town of Geneseo	1200
NvrTank	Niver Rd Water Tank	250,000	LCWSA	1390
ShelTank	Shelly Rd Water Tank	500,000	LCWSA	1390
LkviTank	Lakeville Water Tank	200,000	LCWSA	1040
HemTank	Hemlock Water Tank	150,000	LCWSA	1215
CalTank	Caledonia Rd Water Tank	250,000	Town of Leicester	850
GrvStUp	Groveland Station Upper Water Tank	150,000	LCWSA	1415
GrvStLw	Groveland Station Lower Water Tank	150,000	LCWSA	1069
520Tank	Route 5-20 Tank	100,000	Town of Avon	1000
GranTank	Graney Rd Tank	400,000	Village of Caledonia	815
SctsTank	Scottsburg Water Tank	125,000	LCWSA	1040
DennTank	Dennison Rd Water Tank	500,000	LCWSA	1460
RRTank	Railroad Ave Water Tank	160,000	LCWSA	1390
DansTank	Water Storage Tank	1,500,000	Village of Dansville	920
DansWTP	WTP Tank	3,000,000	Village of Dansville	0
NunTank	Water Storage Tank	500,000	Village of Nunda	1126
PeoTank	Peoria WaterTank	500,000	Town of York	1210
20ATank	Route 20A Water Tank	200,000	Village of Leicester	850

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County

Monroe County Water Authority System

Uplands Supply Conduits

Genesee County

Wyoming County Water Resources Agency System

Wyo County

Allegany County

Steuben County

Livingston County

AVON-YORK 955' CONNECTION

AVON WTP UPGRADE

NEW LCWSA TANK (PHASE 2)

NEW LCWSA PUMP STATION (PHASE 2)

RIVER ROAD TRANSMISSION MAIN NORTH

NEW YORK PUMP STATION

RIVER ROAD TRANSMISSION MAIN MIDDLE (PHASE 2)

NEW LCWSA TRANSMISSION MAIN (PHASE 2)

NEW LEICESTER TANK (PHASE 2)

WEST LAKE ROAD SERVICE TRANSFER

MAPLE BEACH PUMP STATION UPGRADES

GROVELAND LEICESTER CONNECTION

ROUTE 36 CONNECTION

815 +/-
991 +/-
815 +/-
966 +/-
996 +/-
996 +/-
840 +/-
1210 +/-
955 +/-
1215 +/-
1075 +/-
850 +/-
1040 +/-
1200 +/-
1105 +/-
1160 +/-
1310 +/-
1390 +/-
950 +/-
1460 +/-
905 +/-
1170 +/-
1314 +/-
850 +/-
1155 +/-
830 +/-
1275 +/-
1126 +/-
920 +/-

Village of Caledonia
Town of Caledonia
Village of Avon
Town of Avon
Town of Lima
Town of York
Village of Geneseo
Town of Geneseo
Village of Livonia
Town of Livonia
Village of Leicester
Town of Leicester
Village of Mt. Morris
Village of Mount Morris
Town of Groveland
Town of Conesus
Village of Dansville
Town of North Dansville
Village of Nunda
Town of Nunda
Town of Portage
Town of Sparta
Town of Springwater
Town of West Sparta
Town of Ossian
Avon Water Works
Geneseo Water Works
Springwater Water District #1
Groveland Correctional

GranTank
ResATank
ResGTank
BurbTank
CalTank
20ATank
EAvTank
520Tank
256Tank
AirPTank
LkviTank
ShelTank
HemTank
NvrTank
ARSTank
DennTank
SlkrTank
RRTank
GrvStUp
GrvStLw
SctsTank
SpwtTank
NunTank
DansTank
Tuttle1
Tuttle2

Conesus Lake
Honeoye Lake
Silver Lake

MAP SHEET:
Scenario 4

MAP TITLE:
Tanks & Treatment Plants with Hydraulic Grades

DATE PREPARED:
FEBRUARY 14, 2022

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Watermains
- Water Storage Tanks
- Water Treatment Facilities
- Hydraulic Grades

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TankID	NAME	GALLONS	OWNER	HGL
LimaTank	Water Storage Tank	500,000	Village of Lima	991
EAvTank	East Avon Hamlet Tank	100,000	Town of Avon	970
256Tank	Route 256 Water Tank	500,000	Village of Avon	930
AirPTank	Airport Water Tank	150,000	LCWSA	1040
MurrTank	Murray Hill		Livingston County	0
ARSTank	ARS Water Tank	250,000	LCWSA	950
Tuttle1	Tuttle Rd Water Tanks	500,000	Town of York	991
Tuttle2	Tuttle Rd Water Tanks	500,000	Town of York	991
ResATank	Reservoir Rd Tank	2,000,000	Village of Avon	842
SpwtTank	Water Storage Tank	60,000	Town of Springwater	1275
SlkrTank	Silker Hill Rd Water Tank	500,000	LCWSA	1390
GrvInd1	Groveland Corrections 1		State of New York	0
GrvInd2	Groveland Corrections 2		State of New York	0
ResGTank	Reservoir Rd Water Tank	3,000,000	Village of Geneseo	1075
BurbTank	Burbank Dr Water Tank	250,000	Town of Geneseo	1200
NvrTank	Niver Rd Water Tank	250,000	LCWSA	1390
ShelTank	Shelly Rd Water Tank	500,000	LCWSA	1390
LkviTank	Lakeville Water Tank	200,000	LCWSA	1040
HemTank	Hemlock Water Tank	150,000	LCWSA	1215
CalTank	Caledonia Rd Water Tank	250,000	Town of Leicester	850
GrvStUp	Groveland Station Upper Water Tank	150,000	LCWSA	1415
GrvStLw	Groveland Station Lower Water Tank	150,000	LCWSA	1069
520Tank	Route 5-20 Tank	100,000	Town of Avon	1000
GranTank	Graney Rd Tank	400,000	Village of Caledonia	815
SctsTank	Scottsburg Water Tank	125,000	LCWSA	1040
DennTank	Dennison Rd Water Tank	500,000	LCWSA	1460
RRTank	Railroad Ave Water Tank	160,000	LCWSA	1390
DansTank	Water Storage Tank	1,500,000	Village of Dansville	920
DansWTP	WTP Tank	3,000,000	Village of Dansville	0
NunTank	Water Storage Tank	500,000	Village of Nunda	1126
PeoTank	Peoria WaterTank	500,000	Town of York	1210
20ATank	Route 20A Water Tank	200,000	Village of Leicester	850

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Uplands Supply Conduits

LCWSA PUMP STATION EXPANSION (PHASE 2)

NEW LCWSA TANK

RIVER ROAD TRANSMISSION MAIN

NEW YORK PUMP STATION

NEW LCWSA PUMP STATION

NEW LCWSA TRANSMISSION

NEW LEICESTER TANK

LIVONIA CONESUS TRANSMISSION MAIN

WEST LAKE ROAD SERVICE TRANSFER

SOUTH CONESUS HIGH PRESSURE MAIN

ROUTE 36 CONNECTION

MAPLE BEACH PUMP STATION UPGRADES

ARS ENHANCEMENTS

Genesee County

Monroe County

Ontario County

Wyoming County

Wyoming County Water Resources Agency System

Steuben County

Allegany County

Livingston County

MAP SHEET:

Scenario 5

MAP TITLE:

Tanks & Treatment Plants with Hydraulic Grades

DATE PREPARED:

FEBRUARY 14, 2022

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Watermains
- Water Storage Tanks
- Water Treatment Facilities
- Hydraulic Grades

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Appendix K

Proposed Scenario Estimates

LIVINGSTON COUNTY
REGIONAL WATER STUDY
SCENARIO 1

Phase 1

ITEM	DESCRIPTION	ESTIMATED COST
1	New Lima PS (City of Rochester Source) (4 MGD)	$2,500,000
2	Livonia Transmisson Main 20"	$21,120,000
3	New LCWSA Tank	$1,000,000
4	New York PS (1MG)	$600,000
5	New Leicester Tank	$1,000,000
6	Maple Beach PS Upgrades	$750,000
7	West Lake Road Transfer	$50,000
8	Route 36 Connection	$2,772,000
9	River Road Transmission Main	$9,504,000

Subtotal =	**$ 39,296,000.00**
Contingency (10%) =	$ 3,929,600.00
Legal, Engineering, Administration (20%) =	$ 7,859,200.00
Total Estimated Capital Cost =	**$ 51,084,800.00**
Total Estimated Capital Cost (Rounded) =	**$ 51,100,000.00**

Phase 2

ITEM	DESCRIPTION	ESTIMATED COST
1	Expand LCWSA PS	$1,500,000

Subtotal =	**$ 1,500,000.00**
Contingency (10%) =	$ 150,000.00
Legal, Engineering, Administration (20%) =	$ 300,000.00
Total Estimated Capital Cost =	**$ 1,950,000.00**
Total Estimated Capital Cost (Rounded) =	**$ 2,000,000.00**

TOTAL $ 53,100,000.00

LIVINGSTON COUNTY
REGIONAL WATER STUDY
SCENARIO 1A

Phase 1

ITEM	DESCRIPTION	ESTIMATED COST
1	New Lima PS (City of Rochester Source) (4 MGD)	$2,500,000
2	Livonia Transmisson Main 20"	$21,120,000
3	New LCWSA Tank	$1,000,000
4	New York PS (1MG)	$600,000
5	New Leicester Tank	$1,000,000
6	Maple Beach PS Upgrades	$750,000
7	Route 36 Connection	$2,772,000
8	River Road Transmission Main	$9,504,000
9	Village of Avon Papermill Connection	$2,376,000
10	Town of Avon Route 15 Connection	$910,000

Subtotal =	**$ 42,532,000.00**
Contingency (10%) =	$ 4,253,200.00
Legal, Engineering, Administration (20%) =	$ 8,506,400.00
Total Estimated Capital Cost =	**$ 55,291,600.00**
Total Estimated Capital Cost (Rounded) =	**$ 55,300,000.00**

Phase 2

ITEM	DESCRIPTION	ESTIMATED COST
1	Expand LCWSA PS	$1,500,000

Subtotal =	**$ 1,500,000.00**
Contingency (10%) =	$ 150,000.00
Legal, Engineering, Administration (20%) =	$ 300,000.00
Total Estimated Capital Cost =	**$ 1,950,000.00**
Total Estimated Capital Cost (Rounded) =	**$ 2,000,000.00**

TOTAL $ 57,300,000.00

LIVINGSTON COUNTY
REGIONAL WATER STUDY
SCENARIO 2

Phase 1

ITEM	DESCRIPTION	ESTIMATED COST
1	New Lima PS (City of Rochester Source) (4 MGD)	$2,500,000
2	Livonia Transmisson Main 20"	$21,120,000
3	New LCWSA Tank	$1,000,000
4	New York PS (1MG)	$600,000
5	New Leicester Tank	$1,000,000
6	West Lake Road Transfer	$50,000
7	Route 36 Connection	$2,772,000
8	River Road Transmission Main	$9,504,000

Subtotal =	**$ 38,546,000.00**
Contingency (10%) =	$ 3,854,600.00
Legal, Engineering, Administration (20%) =	$ 7,709,200.00
Total Estimated Capital Cost =	**$ 50,109,800.00**
Total Estimated Capital Cost (Rounded) =	**$ 50,200,000.00**

Phase 2

ITEM	DESCRIPTION	ESTIMATED COST
1	Expand LCWSA PS	$1,500,000

Subtotal =	**$ 1,500,000.00**
Contingency (10%) =	$ 150,000.00
Legal, Engineering, Administration (20%) =	$ 300,000.00
Total Estimated Capital Cost =	**$ 1,950,000.00**
Total Estimated Capital Cost (Rounded) =	**$ 2,000,000.00**

TOTAL $ 52,200,000.00

LIVINGSTON COUNTY
REGIONAL WATER STUDY
SCENARIO 3

Phase 1

ITEM	DESCRIPTION	ESTIMATED COST
1	Avon WTP Upgrade	$7,100,000
2	Avon York 955' Zone Connection	$8,236,800
3	River Road Transmission Main North	$4,752,000
4	ARS Enhancements	$1,267,200
5	Maple Beach PS Upgrades	$750,000
6	West Lake Road Transfer	$50,000
7	New York Pump Station	$600,000
8	Route 36 Connection	$2,772,000

Subtotal =	**$ 25,528,000.00**
Contingency (10%) =	$ 2,552,800.00
Legal, Engineering, Administration (20%) =	$ 5,105,600.00
Total Estimated Capital Cost =	**$ 33,186,400.00**
Total Estimated Capital Cost (Rounded) =	**$ 33,200,000.00**

Phase 2

ITEM	DESCRIPTION	ESTIMATED COST
1	New LCWSA PS	$3,750,000
2	New LCWSA Transmission Main 20"	$19,219,200
3	New LCWSA Tank	$1,500,000
4	River Road Transmission Main Middle	$7,128,000
5	New Leicester Tank	$1,500,000

Subtotal =	**$33,097,200**
Contingency (10%) =	$ 3,309,720.00
Legal, Engineering, Administration (20%) =	$ 6,619,440.00
Total Estimated Capital Cost =	**$ 43,026,360.00**
Total Estimated Capital Cost (Rounded) =	**$ 43,100,000.00**

TOTAL $ 76,300,000.00

LIVINGSTON COUNTY
REGIONAL WATER STUDY
SCENARIO 4

Phase 1

ITEM	DESCRIPTION	ESTIMATED COST
1	Avon WTP Upgrade	$7,100,000
2	Avon York 955' Zone Connection	$8,236,800
3	River Road Transmission Main North	$4,752,000
4	Groveland Leicester Connection	$4,564,000
5	Maple Beach PS Upgrades	$750,000
6	West Lake Road Transfer	$50,000
7	Route 36 Connection	$2,772,000
8	New York Pump Station	$600,000

Subtotal = $ 28,824,800.00
Contingency (10%) = $ 2,882,480.00
Legal, Engineering, Administration (20%) = $ 5,764,960.00
Total Estimated Capital Cost = $ 37,472,240.00
Total Estimated Capital Cost (Rounded) = $ 37,500,000.00

Phase 2

ITEM	DESCRIPTION	ESTIMATED COST
1	New LCWSA PS	$3,750,000
2	New LCWSA Transmission Main 20"	$19,219,200
3	New LCWSA Tank	$1,500,000
4	River Road Transmission Main Middle	$7,128,000
5	New Leicester Tank	$1,500,000

Subtotal = $33,097,200
Contingency (10%) = $ 3,309,720.00
Legal, Engineering, Administration (20%) = $ 6,619,440.00
Total Estimated Capital Cost = $ 43,026,360.00
Total Estimated Capital Cost (Rounded) = $ 43,100,000.00

TOTAL $ 80,600,000.00

LIVINGSTON COUNTY
REGIONAL WATER STUDY
SCENARIO 5

Phase 1

ITEM	DESCRIPTION	ESTIMATED COST
1	New LCWSA Pump Station	$2,500,000
2	New LCWSA Transmission Main	$14,414,400
3	South Conesus High Pressure Line	$4,804,800
4	Livonia - Conesus Transmission Main	$9,082,000
5	Maple Beach PS Upgrades	$750,000
6	West Lake Road Transfer	$50,000
7	ARS Enhancements	$1,267,200
8	River Road Transmission Main	$15,312,000
9	New York PS	$600,000
10	New Leicester Tank	$1,000,000
11	Route 36 Connection	$2,772,000

Subtotal =	**$ 52,552,400.00**
Contingency (10%) =	$ 5,255,240.00
Legal, Engineering, Administration (20%) =	$ 10,510,480.00
Total Estimated Capital Cost =	**$ 68,318,120.00**
Total Estimated Capital Cost (Rounded) =	**$ 68,400,000.00**

Phase 2

ITEM	DESCRIPTION	ESTIMATED COST
1	Expand Hemlock/LCWSA Pump Station	$1,500,000

Subtotal =	**$1,500,000**
Contingency (10%) =	$ 150,000.00
Legal, Engineering, Administration (20%) =	$ 300,000.00
Total Estimated Capital Cost =	**$ 1,950,000.00**
Total Estimated Capital Cost (Rounded) =	**$ 2,000,000.00**

TOTAL $ 70,400,000.00

Appendix L

Proposed Scenario Water Rate Tables

LIVINGSTON COUNTY WATER & SEWER AUTHORITY
LEICESTER/YORK WATER SUPPLY
COST SUMMARY - SCENARIO 1
September 8, 2022

Capital Costs

Total Estimated Capital Cost =	**$**	**51,100,000**

Grants

USDA-RD Grant =	$	-
NYSEFC WIIA Grant =	$	20,440,000
CDBG Grant =	$	-
Other Grants =	$	-
AKZO Funds =	$	17,000,000
County Contribution =	$	-
Local Contribution =	$	-
Net Local Project Cost =	**$**	**13,660,000**

New Users =	320

Loan

Loan Term =	30	30
Loan Interest Rate =	*2%*	*0%*
Estimated Debt Service =	**$ 609,918**	**$ 455,334**

Water Usage

Mount Morris (V) =	115,705,000	x	115,705,000	x
Mount Morris (T) =	12,045,000	x	12,045,000	x
Leicester (V) =	37,595,000	x	37,595,000	x
Leicester (T) =	27,375,000	x	27,375,000	x
Avon (T) =	-		-	
York (T) =	157,680,000	x	157,680,000	x
Geneseo (T) =	-		-	
Lima (V) =	-		-	
Lima (T) =	-		-	
Covington (T) =	12,775,000	x	12,775,000	x
New Users =	19,200,000		19,200,000	
Total Water Usage =	**382,375,000**		**382,375,000**	

LCWSA Wholesale Water Rate

Capital Cost Surcharge per 1,000 Gallons =	$ 1.60	$ 1.19
City of Rochester Purchase Rate =	$ 1.07	$ 1.07
Estimated O&M Cost per 1,000 Gallons =	$ 0.50	$ 0.50
Total Bulk Water Cost per 1,000 Gallons =	**$ 3.17**	**$ 2.76**

Village of Leicester

Existing Wholesale =	$ 4.02	$ 4.02
Proposed Wholesale =	$ 3.17	$ 2.76
Annual Impact per EDU =	**$ 51.30**	**$ 75.55**

Town of Leicester

Existing Wholesale =	$ 5.50	$ 5.50
Proposed Wholesale =	$ 3.17	$ 2.76
Annual Impact per EDU =	**$ 140.10**	**$ 164.35**

Town of Mt. Morris

Existing Wholesale =	$ 4.25	$ 4.25
Proposed Wholesale =	$ 3.17	$ 2.76
Annual Impact per EDU =	**$ 65.10**	**$ 89.35**

Town of York

Existing Wholesale =	$ 3.54	$ 3.54
Proposed Wholesale =	$ 3.17	$ 2.76
Annual Impact per EDU =	**$ 22.50**	**$ 46.75**

Town of Geneseo

Existing Wholesale =	$ 3.54	$ 3.54

LIVINGSTON COUNTY WATER & SEWER AUTHORITY
LEICESTER/YORK WATER SUPPLY
COST SUMMARY - SCENARIO 1A
September 8, 2022

Capital Costs

Total Estimated Capital Cost =	**$**	**55,300,000**

Grants

USDA-RD Grant =	$	-
NYSEFC WIIA Grant =	$	22,120,000
CDBG Grant =	$	-
Other Grants =	$	-
AKZO Funds =	$	17,000,000
County Contribution =	$	-
Local Contribution =	$	-
Net Local Project Cost =	**$**	**16,180,000**

New Users =	320

Loan

Loan Term =	30	30
Loan Interest Rate =	*2%*	*0%*
Estimated Debt Service =	**$ 722,436**	**$ 539,334**

Water Usage

Mount Morris (V) =	115,705,000	x	115,705,000	x
Mount Morris (T) =	12,045,000	x	12,045,000	x
Leicester (V) =	37,595,000	x	37,595,000	x
Leicester (T) =	27,375,000	x	27,375,000	x
Avon (T) =	91,250,000	x	91,250,000	x
York (T) =	157,680,000	x	157,680,000	x
Geneseo (T) =	-		-	
Lima (V) =	-		-	
Lima (T) =	-		-	
Covington (T) =	12,775,000	x	12,775,000	x
New Users =	19,200,000		19,200,000	
Total Water Usage =	**473,625,000**		**473,625,000**	

LCWSA Wholesale Water Rate

Capital Cost Surcharge per 1,000 Gallons =	$ 1.53	$ 1.14
City of Rochester Purchase Rate =	$ 1.07	$ 1.07
Estimated O&M Cost per 1,000 Gallons =	$ 0.50	$ 0.50
Total Bulk Water Cost per 1,000 Gallons =	**$ 3.10**	**$ 2.71**

Village of Leicester

Existing Wholesale =	$ 4.02	$ 4.02
Proposed Wholesale =	$ 3.10	$ 2.71
Annual Impact per EDU =	**$ 55.48**	**$ 78.68**

Town of Leicester

Existing Wholesale =	$ 5.50	$ 5.50
Proposed Wholesale =	$ 3.10	$ 2.71
Annual Impact per EDU =	**$ 144.28**	**$ 167.48**

Town of Mt. Morris

Existing Wholesale =	$ 4.25	$ 4.25
Proposed Wholesale =	$ 3.10	$ 2.71
Annual Impact per EDU =	**$ 69.28**	**$ 92.48**

Town of York

Existing Wholesale =	$ 3.54	$ 3.54
Proposed Wholesale =	$ 3.10	$ 2.71
Annual Impact per EDU =	**$ 26.68**	**$ 49.88**

Town of Geneseo

Existing Wholesale =	$ 3.54	$ 3.54

LIVINGSTON COUNTY WATER & SEWER AUTHORITY
LEICESTER/YORK WATER SUPPLY
COST SUMMARY - SCENARIO 2
August 29, 2022

Capital Costs

Total Estimated Capital Cost =	**$**	**50,200,000**

Grants

USDA-RD Grant =	$	-
NYSEFC WIIA Grant =	$	20,080,000
CDBG Grant =	$	-
Other Grants =	$	-
AKZO Funds =	$	17,000,000
County Contribution =	$	-
Local Contribution =	$	-
Net Local Project Cost =	**$**	**13,120,000**

New Users =	320

Loan

Loan Term =	30	30
Loan Interest Rate =	*2%*	*0%*
Estimated Debt Service =	**$ 585,807**	**$ 437,334**

Water Usage

Mount Morris (V) =	-		-	
Mount Morris (T) =	12,045,000	x	12,045,000	x
Leicester (V) =	37,595,000	x	37,595,000	x
Leicester (T) =	27,375,000	x	27,375,000	x
Avon (T) =	-		-	
York (T) =	157,680,000	x	157,680,000	x
Geneseo (T) =	43,800,000	x	43,800,000	x
Lima (V) =	-		-	
Lima (T) =	-		-	
Covington (T) =	12,775,000	x	12,775,000	x
New Users =	19,200,000		19,200,000	
Total Water Usage =	**310,470,000**		**310,470,000**	

LCWSA Wholesale Water Rate

Capital Cost Surcharge per 1,000 Gallons =	$ 1.89	$ 1.41
City of Rochester Purchase Rate =	$ 1.07	$ 1.07
Estimated O&M Cost per 1,000 Gallons =	$ 0.50	$ 0.50
Total Bulk Water Cost per 1,000 Gallons =	**$ 3.46**	**$ 2.98**

Village of Leicester

Existing Wholesale =	$ 4.02	$ 4.02
Proposed Wholesale =	$ 3.46	$ 2.98
Annual Impact per EDU =	**$ 33.79**	**$ 62.48**

Town of Leicester

Existing Wholesale =	$ 5.50	$ 5.50
Proposed Wholesale =	$ 3.46	$ 2.98
Annual Impact per EDU =	**$ 122.59**	**$ 151.28**

Town of Mt. Morris

Existing Wholesale =	$ 4.25	$ 4.25
Proposed Wholesale =	$ 3.46	$ 2.98
Annual Impact per EDU =	**$ 47.59**	**$ 76.28**

Town of York

Existing Wholesale =	$ 3.54	$ 3.54
Proposed Wholesale =	$ 3.46	$ 2.98
Annual Impact per EDU =	**$ 4.99**	**$ 33.68**

Town of Geneseo

Existing Wholesale =	$ 3.54	$ 3.54

LIVINGSTON COUNTY WATER & SEWER AUTHORITY
LEICESTER/YORK WATER SUPPLY
COST SUMMARY - SCENARIO 3
August 29, 2022

Capital Costs

Total Estimated Capital Cost =	**$**	**33,200,000**

Grants

USDA-RD Grant =	$	-
NYSEFC WIIA Grant =	$	13,280,000
CDBG Grant =	$	-
Other Grants =	$	-
AKZO Funds =	$	17,000,000
County Contribution =	$	-
Local Contribution =	$	-
Net Local Project Cost =	**$**	**2,920,000**

New Users =	45

Loan

Loan Term =	30	30
Loan Interest Rate =	*2%*	*0%*
Estimated Debt Service =	**$ 130,378**	**$ 97,334**

Water Usage

Mount Morris (V) =	115,705,000	x	115,705,000	x
Mount Morris (T) =	12,045,000	x	12,045,000	x
Leicester (V) =	37,595,000	x	37,595,000	x
Leicester (T) =	27,375,000	x	27,375,000	x
Avon (T) =	-		-	
York (T) =	157,680,000	x	157,680,000	x
Geneseo (T) =	43,800,000	x	43,800,000	x
Lima (V) =	-		-	
Lima (T) =	-		-	
Covington (T) =	12,775,000	x	12,775,000	x
New Users =	2,700,000		2,700,000	
Total Water Usage =	**409,675,000**		**409,675,000**	

LCWSA Wholesale Water Rate

Capital Cost Surcharge per 1,000 Gallons =	$ 0.32	$ 0.24
City of Rochester Purchase Rate =	$ 1.07	$ 1.07
Estimated O&M Cost per 1,000 Gallons =	$ 0.50	$ 0.50
Total Bulk Water Cost per 1,000 Gallons =	**$ 1.89**	**$ 1.81**

Village of Leicester

Existing Wholesale =	$ 4.02	$ 4.02
Proposed Wholesale =	$ 1.89	$ 1.81
Annual Impact per EDU =	**$ 127.91**	**$ 132.74**

Town of Leicester

Existing Wholesale =	$ 5.50	$ 5.50
Proposed Wholesale =	$ 1.89	$ 1.81
Annual Impact per EDU =	**$ 216.71**	**$ 221.54**

Town of Mt. Morris

Existing Wholesale =	$ 4.25	$ 4.25
Proposed Wholesale =	$ 1.89	$ 1.81
Annual Impact per EDU =	**$ 141.71**	**$ 146.54**

Town of York

Existing Wholesale =	$ 3.54	$ 3.54
Proposed Wholesale =	$ 1.89	$ 1.81
Annual Impact per EDU =	**$ 99.11**	**$ 103.94**

Town of Geneseo

Existing Wholesale =	$ 3.54	$ 3.54

LIVINGSTON COUNTY WATER & SEWER AUTHORITY
LEICESTER/YORK WATER SUPPLY
COST SUMMARY - SCENARIO 4
August 29, 2022

Capital Costs

Total Estimated Capital Cost =	**$**	**37,500,000**

Grants

USDA-RD Grant =	$	-
NYSEFC WIIA Grant =	$	15,000,000
CDBG Grant =	$	-
Other Grants =	$	-
AKZO Funds =	$	17,000,000
County Contribution =	$	-
Local Contribution =	$	-
Net Local Project Cost =	**$**	**5,500,000**

New Users =	45

Loan

Loan Term =	30	30
Loan Interest Rate =	*2%*	*0%*
Estimated Debt Service =	**$ 245,575**	**$ 183,334**

Water Usage

Mount Morris (V) =	-		-	
Mount Morris (T) =	12,045,000	x	12,045,000	x
Leicester (V) =	37,595,000	x	37,595,000	x
Leicester (T) =	27,375,000	x	27,375,000	x
Avon (T) =	-		-	
York (T) =	157,680,000	x	157,680,000	x
Geneseo (T) =	43,800,000	x	43,800,000	x
Lima (V) =	-		-	
Lima (T) =	-		-	
Covington (T) =	12,775,000	x	12,775,000	x
New Users =	2,700,000		2,700,000	
Total Water Usage =	**293,970,000**		**293,970,000**	

LCWSA Wholesale Water Rate

Capital Cost Surcharge per 1,000 Gallons =	$ 0.84	$ 0.62
City of Rochester Purchase Rate =	$ 1.07	$ 1.07
Estimated O&M Cost per 1,000 Gallons =	$ 0.50	$ 0.50
Total Bulk Water Cost per 1,000 Gallons =	**$ 2.41**	**$ 2.19**

Village of Leicester

Existing Wholesale =	$ 4.02	$ 4.02
Proposed Wholesale =	$ 2.41	$ 2.19
Annual Impact per EDU =	**$ 96.88**	**$ 109.58**

Town of Leicester

Existing Wholesale =	$ 5.50	$ 5.50
Proposed Wholesale =	$ 2.41	$ 2.19
Annual Impact per EDU =	**$ 185.68**	**$ 198.38**

Town of Mt. Morris

Existing Wholesale =	$ 4.25	$ 4.25
Proposed Wholesale =	$ 2.41	$ 2.19
Annual Impact per EDU =	**$ 110.68**	**$ 123.38**

Town of York

Existing Wholesale =	$ 3.54	$ 3.54
Proposed Wholesale =	$ 2.41	$ 2.19
Annual Impact per EDU =	**$ 68.08**	**$ 80.78**

Town of Geneseo

Existing Wholesale =	$ 3.54	$ 3.54

LIVINGSTON COUNTY WATER & SEWER AUTHORITY
LEICESTER/YORK WATER SUPPLY
COST SUMMARY - SCENARIO 5
August 29, 2022

Capital Costs

Total Estimated Capital Cost =	**$**	**68,400,000**

Grants

USDA-RD Grant =	$	-
NYSEFC WIIA Grant =	$	27,360,000
CDBG Grant =	$	-
Other Grants =	$	-
AKZO Funds =	$	17,000,000
County Contribution =	$	-
Local Contribution =	$	-
Net Local Project Cost =	**$**	**24,040,000**

New Users =	385

Loan

Loan Term =	30	30
Loan Interest Rate =	*2%*	*0%*
Estimated Debt Service =	**$ 1,073,385**	**$ 801,334**

Water Usage

Mount Morris (V) =	115,705,000	x	115,705,000	x
Mount Morris (T) =	12,045,000	x	12,045,000	x
Leicester (V) =	37,595,000	x	37,595,000	x
Leicester (T) =	27,375,000	x	27,375,000	x
Avon (T) =	-		-	
York (T) =	157,680,000	x	157,680,000	x
Geneseo (T) =	43,800,000	x	43,800,000	x
Lima (V) =	-		-	
Lima (T) =	-		-	
Covington (T) =	12,775,000	x	12,775,000	x
New Users =	23,100,000		23,100,000	
Total Water Usage =	**430,075,000**		**430,075,000**	

LCWSA Wholesale Water Rate

Capital Cost Surcharge per 1,000 Gallons =	$ 2.50	$ 1.86
City of Rochester Purchase Rate =	$ 1.07	$ 1.07
Estimated O&M Cost per 1,000 Gallons =	$ 0.50	$ 0.50
Total Bulk Water Cost per 1,000 Gallons =	**$ 4.07**	**$ 3.43**

Village of Leicester

Existing Wholesale =	$ 4.02	$ 4.02
Proposed Wholesale =	$ 4.07	$ 3.43
Annual Impact per EDU =	**$ (2.75)**	**$ 35.21**

Town of Leicester

Existing Wholesale =	$ 5.50	$ 5.50
Proposed Wholesale =	$ 4.07	$ 3.43
Annual Impact per EDU =	**$ 86.05**	**$ 124.01**

Town of Mt. Morris

Existing Wholesale =	$ 4.25	$ 4.25
Proposed Wholesale =	$ 4.07	$ 3.43
Annual Impact per EDU =	**$ 11.05**	**$ 49.01**

Town of York

Existing Wholesale =	$ 3.54	$ 3.54
Proposed Wholesale =	$ 4.07	$ 3.43
Annual Impact per EDU =	**$ (31.55)**	**$ 6.41**

Town of Geneseo

Existing Wholesale =	$ 3.54	$ 3.54

Appendix M

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 an authorized representative of the applicant, preferably the project engineer or other design professional.[1]

Section 1 – General Applicant and Project Information

Applicant: Livingston County Water and Sewer Authority Project No.:

Project Name: Leicester/York Water Supply Expansion

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

Please provide a brief project summary in plain language including the location of the area the project serves:

The project involves various upgrades to existing water systems, as well as expansion of existing water systems to provide increased capacity to areas of Livingston in areas that either do not currently have public water or have growing demands. Upgrades include new transmission mains, new pump stations, upgrades to existing pump stations, increased water storage and new distribution mains

Section 2 – Screening Questions

A. Prior Approvals

1. Has the project been previously approved for Environmental Facilities Corporation (EFC) financial assistance? ☐ Yes ☑ No
2. If yes to A(1), what is the project number(s) for the prior approval(s)? Project No.:
3. If yes to A(1), is the scope of the previously-approved project substantially the same as the current project? ☐ Yes ☐ No

If your responses to A(1) and A(3) are both yes, please proceed to Section 5, Signature.

B. New or Expanded Infrastructure

1. Does the project involve the construction or reconstruction of new or expanded infrastructure? ☑ Yes ☑ No

Examples of new or expanded infrastructure include, but are not limited to:

(i) The addition of new wastewater collection/new water mains or a new wastewater treatment system/water treatment plant where none existed previously;

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

[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.

(iii) An increase of the permitted water withdrawal or the permitted flow capacity for the water treatment system such that a Department of Environmental Conservation (DEC) water withdrawal permit will need to be obtained or modified, or result in the Department of Health (DOH) approving an increase in the capacity of the water treatment plant.

If your response to B(1) is no, please proceed to Section 5, Signature.

Section 3 –Smart Growth Criteria

Your project must be consistent will all relevant Smart Growth criteria. For each question below please provide a response and explanation.

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

   Explain your response: Project involves the expansion of the existing LCWSA water system including upgrading existing facilities and installing new transmission and distribution mains

2. Is the project located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center, as such terms are defined herein (please select one response)?

   ☐ Yes, my project is located in a municipal center, which is an area of concentrated and mixed land uses that serves as a center for various activities, including but not limited to: central business districts, main streets, downtown areas, brownfield opportunity areas (see *www.dos.ny.gov* for more information), downtown areas of local waterfront revitalization program areas (see *www.dos.ny.gov* for more information), areas of transit-oriented development, environmental justice areas (see *www.dec.ny.gov/public/899.html* for more information), and hardship areas (projects that primarily serve census tracts or block numbering areas with a poverty rate of at least twenty percent according to the latest census data).

   ☑ Yes, my project is located in an area adjacent to a municipal center which has clearly defined borders, is designated for concentrated development in the future in a municipal or regional comprehensive plan, and exhibits strong land use, transportation, infrastructure, and economic connections to an existing municipal center.

   ☐ Yes, my project is located in an area designated as a future municipal center in a municipal or comprehensive plan and is appropriately zoned in a municipal zoning ordinance

   ☐ No, my project is not located in a (1) municipal center, (2) area adjacent to a municipal center, or (3) area designated as a future municipal center.

   Explain your response and reference any applicable plans:

   Project will involve construction adjacent to the Village of Livonia, as well as through densely populated areas of Livingston County that include residential, agricultural, commercial and industrial zoned areas.

3. Is the project located in a developed area or an area designated for concentrated infill development in a municipally-approved comprehensive land use plan, local waterfront revitalization plan, and/or brownfield opportunity area plan?

☐Yes ☑No

Explain your response and reference any applicable plans:

Project will involve construction adjacent to the Village of Livonia, as well as through densely populated areas of Livingston County that include residential, agricultural, commercial and industrial zoned areas.

4. Does the project protect, preserve, and enhance the State's resources, including surface and groundwater, agricultural land, forests, air quality, recreation and open space, scenic areas, and significant historic and archaeological resources?

☑Yes ☐No

Explain your response:

The project will not alter any DEC surface water withdrawal allocations, and will provide water to areas of the County who's wells have been negatively impacted by the Salt Mine collapse in the Towns of York and Leicester

5. Does the project foster mixed land uses and compact development, downtown revitalization, brownfield redevelopment, the enhancement of beauty in public spaces, the diversity and affordability of housing in proximity to places of employment, recreation and commercial development, and the integration of all income and age groups?

☐Yes ☑No

Explain your response:

Project proposes to provide public water to areas affected by the Salt Mine Collapse in the Towns of York and Leicester and increased capacity to developing communities

6. Does the project provide mobility through transportation choices including improved public transportation and reduced automobile dependency?

☐Yes ☐No ☑N/A

Explain your response:

Project proposes to provide public water to areas affected by the Salt Mine Collapse in the Towns of York and Leicester and increased capacity to developing communities

7. Does the project involve coordination between State and local government, intermunicipal planning, or regional planning?

☑Yes ☑No

Explain your response and reference any applicable plans:

Project will serve the residents of multiple municipalities within Livingston County, and will require review and approval from state and local Departments of Health

8. Does the project involve community-based planning and collaboration?

   ☑Yes ☑No

   Explain your response and reference any applicable plans:

   Project will serve the residents of multiple municipalities within Livingston County and will require planning and collaboration from each, along with planning from multiple water providers in the County

9. Does the project support predictability in building and land use codes?

   ☐Yes ☐No ☑N/A

   Explain your response:

   Project proposes to provide public water to areas affected by the Salt Mine Collapse in the Towns of York and Leicester and increased capacity to developing communities

10. Does the project promote sustainability by adopting measures such as green infrastructure techniques, decentralized infrastructure techniques, or energy efficiency measures?

    ☑Yes ☐No

    Explain your response and reference any applicable plans:

    Project proposes installation of new equipment to deliver water to multiple communities in the County, and energy efficiency will be factored into design of these facilities

11. Does the project mitigate future physical climate risk due to sea-level rise, storm surges, and/or flooding, based on available data predicting the likelihood of future extreme weather events, including hazard risk analysis data, if applicable?

    ☐Yes ☑No

    Explain your response and reference any applicable plans:

    Project proposes to provide public water to areas affected by the Salt Mine Collapse in the Towns of York and Leicester and increased capacity to developing communities

Section 4 – Miscellaneous

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

   If yes, and you have not previously provided the applicable order to EFC/DOH, please submit it with this form.

Section 5 – Signature

By signing 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: Livingston County Water and Sewer Authority	Phone Number: (585) 346-3523
Name and Title of Signatory: Jason Molino	
Signature:	Date:

Appendix N

2020 Livingston County Comprehensive Water Supply Study

Livingston County
Comprehensive Water Supply Study Update

VOLUME 1 OF 2

Livingston County, New York

December 2020

ARCHITECTURE
ENGINEERING
PLANNING
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Common Acronyms/Abbreviations

AEM	Agriculture Environmental Management
ARS	American Rock Salt
BMP	Best Management Practices
DBP	Disinfection By-Product
DOCCS	Department of Corrections and Community Supervision
DOH	Department of Health
EPA	Environmental Protection Agency
ERP	Emergency Response Plan
ERU	Equivalent Residential Unit
GPD	Gallons Per Day
HAA	Haloacetic Acids
HABs	Harmful Algal Blooms
IDA	Industrial Development Agency
I&I	Inflow and Infiltration (referring to sanitary sewer collection systems)
LCWSA	Livingston County Water and Sewer Authority
MCL	Maximum Contaminant Level
MGD	Million Gallons Per Day
MCWA	Monroe County Water Authority
NYSDEC	New York State Department of Environmental Conservation
PRV	Pressure Reducing Valve
RPZ	Reduced Pressure Zone device
SPDES	State Pollutant Discharge Elimination System
THM	Trihalomethane, a type of disinfection byproduct
WTP	Water Treatment Plant
WWTF	Wastewater Treatment Facility

Executive Summary

Livingston County developed a comprehensive water supply study in 1991 that led to several significant water improvement projects throughout the County including treatment and distribution systems. The 1991 Water Study included 15 recommendations which were either fully implemented, modified, carried over into this study update or deemed unnecessary based on regulatory changes or other circumstances or events including the 1995 Retsof Salt Mine collapse. One of the most significant actions was the creation of the Livingston County Water and Sewer Authority (LCWSA), providing a centralized organization for providing water through existing sources and/or maintaining distribution services. In addition, LCWSA also provides sanitary sewer collection and treatment for several municipalities. The County has also utilized the 1991 study to establish a successful watershed council that coordinates with the Planning and Health Departments to monitor water quality, enforce water regulations, and educate the community on best practices for Conesus Lake and its watershed.

Since 1991, water quality and treatment standards have been updated and revised to reflect new science, methods, and issues both on the National and State level. Additionally, development and growth patterns have changed throughout the County, though the southern portion of the County remains predominantly rural with private water and sewer systems. To respond to these regulatory updates and existing and future water demands related to development patterns (actual and community desired), Livingston County has updated the 1991 Water Study to identify new actions to take in order to continue providing high-quality water both on the local and County level. The study update also includes cursory review and analysis of public sewer systems throughout the County as these two (2) systems are intrinsically connected.

Water Resources Needs

As noted, since the 1991 Water Study, significant improvements have been made at the local and County level on public water systems, though the sustainability, quality, and capabilities of these systems remain a concern. New issues have emerged in that time including the presence of harmful algae blooms (HABs), increases in disinfection by-products from treatment, outdated water source allocation/safe yield studies, and a lack of emergency backups among others. In addition, water supply, transmission, and distribution improvements that have occurred in adjacent counties have revealed potential cooperative endeavors to improve efficiency, reliability, water quality, and potential cost savings. Investment in the water and sewer systems in the County is needed to continue providing high quality water to residents and effectively treating wastewater, as well as encouraging economic development where feasible. Expanding water and sewer service to areas where water quality is a concern and development is expected will help to ensure the health and welfare of residents now and in the future.

Continuing the methodology from the 1991 Water Study, data for each water source, distribution system, and treatment facility throughout the County was collected as well as operations, administrative, and financial information to provide a robust foundation for analysis. Demographics, development trends, and desired growth patterns (zoning and land use plans) were also updated and collected. Projected demands for public water are based on reasonable engineering assumptions that 2/3rd of existing residents will have a desire for connecting to water and existing industrial parks have documented buildout scenarios based on current zoning and land use regulations. County-wide, the projected 2050 average water demand will reach approximately 7.25 mgd, nearly 3.50 mgd more than current demands, with max day usage reaching up to 14.25 mgd.

In a number of communities, most notably the Villages of Nunda, Avon, Geneseo, Lima, and Caledonia, insufficient capacity exists given the current available water treatment capabilities. Water sources supplying users in the County include Conesus Lake, Hemlock/Canadice Lakes (City of Rochester), Lake Ontario (MCWA), Silver Lake, Mill Creek, Chidsey Road Reservoir, and several local community wells. Similar to the 1991 Water Study, capacity concerns do not necessarily imply that there is an insufficient quantity of water from the existing sources to meet the demands on an overall county-wide basis.

Instead, it indicates that either intermunicipal agreements could potentially be negotiated to supply water where it is needed or that new water sources and/or expanded treatment plants could be developed to meet the demands. In addition, the permitted allocations for each of these sources, especially for Conesus, Silver, and Hemlock Lakes, need to be re-evaluated in order to determine the best allocation limit for each treatment facility and redistribute it as necessary; this was a common theme in the 1991 Water Study as well. In many cases, distribution and storage systems require upgrades to replace aging infrastructure to service existing areas. The key factor in almost all of these systems lies in the lack of redundancy to address emergency needs in instances of fire protection or droughts. Interconnections with adjacent systems or secondary sources can provide this relief.

Water source protection, especially for wells, remains another important carryover need from the previous study. Surface and groundwater quality in Livingston County are primarily impacted by poorly maintained private septic systems and agricultural runoff, the latter of which is a contributing factor in HABs. Wellhead protection measures are geared more towards the southern portion of the County.

For public sewer systems, the primary needs are centered around limitations associated with collection and treatment capacities. As more municipalities are connected to public water systems or water districts are expanded, more wastewater will be generated. Capacity limitations at LCWSA's wastewater facility may limit development potential made possible through public water system improvements and investments. As a result, expansions and treatment investments in public sewer should be made in the Towns of Caledonia, Avon, Lima, Leicester, Livonia, Conesus, and Groveland to compensate and provide more robust

opportunities for future development. In addition to capacity needs, addressing inflow and infiltration (I&I) of the collection system will help minimize peak flows that tend to inundate treatment facilities during storm events.

Similar to the 1991 Water Study, the following two basic water resource utilization goals remain valid:

1. To ensure that residents receive adequate quantities of good quality potable water that will meet the appropriate drinking water standards.
2. To provide adequate and reliable water supply to areas within the County that have a significant potential for economic development, while designing water systems in a way that does not detrimentally impact existing water systems with over-allocation of supply.

Additionally, the following new goals can be interpolated from the study update:

3. Identify and establish backups and supplementary connections and/or sources to ensure adequate public water supply to users to mitigate potential environmental threats while protecting existing water resources.
4. Capitalize on investments made in adjacent regional water programs and agencies through cooperative efforts to promote greater efficiency within the County and the region.
5. Promote investments to public sewer systems and facilities to provide adequate wastewater collection and treatment needs that match public water investments for improving economic development opportunities.
6. Address water quality concerns associated with public sewer systems as well as private septic systems within surface water or wellhead protection areas.
7. When and where possible, promote the regionalization and economies of scale of the public water supply.
8. Ensure raw water sources are protected from excessive withdrawal by maintaining valid safe yield calculations and water allocations.

Alternatives and Implementation

Water Systems

Unlike the 1991 Water Study, definitive recommendations are limited to initial actions that are needed to determine the usable capacity for water sources (i.e. safe yield study), most notably in Conesus Lake which is already over-allocated beyond the optimal withdrawal volume in comparison to a dated study for the waterbody from 1994. Specific

recommendations for the various water supplies, treatment facilities, and transmission/distribution systems are dependent on the alternative chosen for each including:

- Water Source/Supply – increase/decrease in permitted allocation, new water supply, interconnections
- Water Treatment – continued operation with facility upgrades, new facilities, taking facilities offline
- Water Distribution – mergers/consolidation

The chosen initial alternative will determine the follow up recommendations to carry out the goals of protecting water quality, ensuring quantity for existing and future expansion, providing redundancy for emergencies and backups, and improving delivery and operational efficiency.

The update provides a flow chart of these various alternatives along with a decision-making model in order to assist County and local leaders on the best course of action to take regarding public water system improvements. In a few cases, specific triggers or metrics will determine the appropriate alternative path to take. For instance, if an updated safe yield study for Conesus Lake reveals that insufficient capacity exists to continue the allocation of water to the current users, more difficult decisions will need to be made on whether to continue operations at the Village of Geneseo or Avon treatment plants vs. connecting to other sources.

At its core, decisions will rely on three key elements:

- Funding – The use of local funds, State/Federal grants, loans/bonds or a combination thereof to carry out improvements/upgrades including any local matches.
- Political will/leadership – Various alternatives made may result in taking facilities offline, staff or operational changes, or cost increases, necessitating the need to "champion" and carry out the chosen alternative.
- Community support – The backing of the community is essential as the costs to make any improvements will be paid for by users over the long term through rate changes resulting in more reliable, high quality water service in the long-run.

Since various alternatives could be chosen, estimated costs for the proposed water investments vary. On the lower end, land explorations for the establishment of new wells for redundancy may cost around $50,000 with construction and drilling of new wells estimated at $1,500 per foot. On the higher end, interconnections for some areas to adjacent systems would include replacement/installation of new water main, pumps, and up to 3 mg water storage tanks estimated to cost around $31 million.

Sewer Systems

As the needs associated with public sewer systems are narrower, the alternatives associated with them follow suit. This study update provided a cursory review and analysis of the public sewer systems, though focused primarily on public water systems. At a minimum, the County should invest in a more robust sewer study on the same level as this water study in order to build upon the needs and alternatives for public sewer systems.

The alternatives outlined in this study include the development of wastewater facilities in the Town and Village of Leicester, upgrades to current facilities at the Village of Avon and County Lakeville facility, construction of decentralized County-operated facilities at strategic locations, consolidation of existing systems, and/or utilizing more shared services/equipment.

Similar to public water systems, the initial alternative chosen for public sewer will be the determining factor for subsequent recommendations. Investments range from a low-end estimate of $30,000 for the purchase of shared equipment up to $30 million for the construction of a new 2.0 mgd wastewater treatment facility (typical costs for facilities start at $2 million for 0.1 mgd).

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1 Introduction

1.1 General

"The quality of water and the quality of life in all its infinite forms are critical parts of the overall, ongoing health of this planet of ours…"

- Sir Peter Blake (1948-2001)

In 1991, Livingston County developed a comprehensive water supply study (1991 Livingston County Comprehensive Water Supply Study, hereinafter called the 1991 Water Study) to identify the state of various municipal water systems serving the residents and businesses of 17 towns and 9 villages within the County. That study led to a number of significant capital improvement projects for treatment and distribution systems to meet drinking water rules and regulations, as well as expansions to meet projected population and economic growth. Additionally, the 1991 Water Study looked at opportunities for addressing improvements and delivering water on a regional scale versus an individual system approach. Though many of the municipal water systems remain in place today, the 1991 Water Study did lead to the creation of the Livingston County Water and Sewer Authority (LCWSA) which is a regional entity transmitting water to individual distribution systems and operating the previous Conesus Lake Sewer District.

Since completion of the 1991 Water Study, many of the recommendations that were identified have been successfully implemented. However, as a result of newer, more stringent water quality regulations, as well as a new vision for economic development opportunities and population changes, many of those same challenges have resurfaced almost 30 years later. Reflecting from the proactive approach of the 1991 Water Study and the implementation success that resulted from it, this study seeks to update and identify new challenges as well as the opportunities and initiatives necessary to address them to meet community demands in the future. This study goes a step further and includes an analysis of the wastewater treatment systems within the County as regulations and growth have changed since 1991, and public water and sewer systems are tied to one another.

The ultimate goal of this study is to review and analyze the conditions of various water and sewer systems throughout the County by identifying critical improvements necessary to address deficiencies and current regulations to continue to deliver potable water to users in a cost-efficient manner. In addition, the study will identify areas where improvements or expansions to those system(s) could stimulate economic growth as supported by each community in their comprehensive plan(s) or other community-adopted land use plan(s).

1.2 Project Objectives

The objectives of this water study update are:

- Highlight the successes of the 1991 Comprehensive Water Study;
- Review and analyze the current state of water and sewer systems within the County including operations, management, and budgets;
- Analyze demographic, socio-economic, and development trends as well as future land use goals and plans at the community and County level to identify targeted areas where water and/or sewer expansion is likely or needed;
- Identify critical needs and improvements within individual communities as well as the LCWSA to address current regulations and laws associated with water and wastewater quality;
- Identify opportunities for increasing efficiencies and collaboration among the County and municipal systems including interconnections within the County and to outside entities, shared services and equipment, training, staff, and software; and
- Provide recommendations and an implementation strategy identifying partnerships, key roles/responsibilities, funding sources, priorities, and follow-up actions.

1.3 Previous Reports / Studies

Livingston County Comprehensive Water Study (1991)

This report updated previous reports from the 1970's and 1980's and studied various public water systems throughout Livingston County identifying the needs associated with each to address population growth as well as stringent surface and groundwater quality requirements. At the time, the amendments to the American Safe Water Act and other Federal regulations and standards were not yet finalized, though it was anticipated that additional filtering and disinfection processes would likely be required in these updated regulations.

The 1991 Water Study noted that growth was especially higher in the northern communities of Livingston County (those specifically noted include the more populated Towns of Avon and Livonia and the Villages of Leicester, Lima, and Livonia) and those communities would not be able to meet the anticipated demand under the then-current NYSDEC water allocations, further straining the systems and limiting growth opportunities. Sufficient raw water supplies (capacity) existed but transmission/distribution of these resources and the condition of the infrastructure were the primary issues noted throughout all communities with public water systems.

The conclusions drawn from the study indicated that (1) municipal systems would need to provide or redistribute up to 6.8 million gallons per day (mgd) of potable water, (2) raw water

quality must be improved, and (3) local systems must be able to supply water to those areas where growth is supported and desired. Additional details on the 1991 study and specific achievements are noted in Section 1.4.

Conesus Lake Dependable Yield Study (1994)

In 1994, NYSDEC prepared a dependable safe yield study for Conesus Lake to examine the then-current maximum volume of water that could be withdrawn, at a constant rate, during the drought of record, without exceeding the available storage capacity (dependable yield). The intent was to arrive at a yield that would provide users with water without jeopardizing other resource uses.

In 1994, the total demand was 6.9 mgd with a 6.5 mgd downstream release; the study indicated a dependable safe yield of 7.8 mgd. This estimate is based on a storage volume of 3100 million gallons, reflecting a maximum drawdown of 3 ft. A daily withdrawal of 1.5 mgd for water supply was assumed throughout the period of record. Several uses were noted in the study including municipal water supply, recreation, waste assimilation (downstream release from wastewater plants), flood control, and ecosystem; these uses may conflict with one another, as each has a different goal associated with it.

The 1994 safe yield estimate implies that more water has been allocated for water supply and downstream uses than is available during a drought. Conditions such as droughts and over-subscription of water can further aggravate the dependable safe yield. A deficit of 5.6 mgd is calculated based on the permitted withdrawals during the drought of record. This projected deficit varies depending on the value assumed for feasible and acceptable drawdown. Within the timeframe of the 1994 study, the Town of Livonia was connecting to the Hemlock (City of Rochester) supply system, resulting in a change to the Lake demand in the future. Demand reduction such as this, along with resource optimization in the form of an operating rule curve (i.e. water management), were the two recommended actions to be undertaken to address existing or future potential resource conflicts that would affect the dependable safe yield. To date, the only permit that has been rescinded for decrease demand at the Conesus Lake has been the Town of Livonia (400,000 gpd). Additionally, the operating curve has not been updated since the completion of the 1994 Safe Yield Study. Because the safe yield of Conesus Lake water appears (on paper) to be over allocated, there may be a need for NYSDEC to review the safe yield analysis and consider recommending modifications to the water supply permits in place for the Villages of Avon and Geneseo, as well as for the inactive Lakeville Water District. Given the age of the dependable safe yield study and the likelihood of various use conflict changes that have taken place during that timeframe, an update to this study would provide an up-to-date yield as well as actions to undertake to maintain it. In addition, many of the recommendations and alternatives contained within this study update are dependent upon current, up-to-date figures associated with safe study results.

Livingston County Population Profile (2016)

This document, developed by the County, provided a basis of information for demographic data that is more thorough than typical sources such as the United States Census and the Genesee/Finger Lakes Regional Planning Council. This document was utilized for developing the demographics discussed in this report, in Section 2.

Livingston County Housing Needs Assessment and Market Analysis (2019)

This study entailed a county-wide assessment of current and future housing needs, identified trends, provided an analysis of issues and conditions, and included recommendations for all 17 towns and 9 villages. While residential housing is not contingent upon nor a direct factor in the development or extension of public utilities (water and wastewater in this case), it is one element to consider in the future investment of utilities in higher density communities. Some of the pertinent findings contained within the study were integrated in this report as part of the county-wide analysis for future water and wastewater investments.

Local Comprehensive Plans

Most Livingston County communities have comprehensive plans in place that help to guide future development, land use, and growth through specific goals and maps – more detail on each of these documents is provided in Section 2.

1.4 Achievements of 1991 Livingston County Comprehensive Water Study

As noted in Section 1.3 above, the 1991 Water Study provided the impetus for investment, upgrades and improvements, community education, assessment, and monitoring of the various water systems that provide public water to County residents. The result is that adequate quantity (capacity) existed, but the allocation, distribution, and quality of the water were the primary issues. The study recommended 15 specific actions to address these issues—9 of these were completed or otherwise addressed, the remaining 6 were either carried over to this plan update (subsequently modified based on additional engineering and analysis) or determined to be unnecessary (based on regulatory changes or other events). Those that were completed or otherwise addressed include:

- New public potable water service should be provided to the residents surrounding Conesus Lake currently utilizing private supplies. This system should connect into the existing Livonia (Lakeville) system and loop around the Lake encompassing the Lake residents within the Towns of Conesus, Geneseo, Groveland, and Livonia. Referred to as the Conesus Lake Perimeter project. *(Recommendation #2 - Completed)*

- Treated Hemlock water should be provided to the seven (7) interconnected systems, as well as the Conesus Lake Perimeter subject to an agreement with the City of Rochester. *(Recommendation #3 - Completed)*
- The Village of Caledonia should investigate the use of Monroe County Water Authority as a source of supply through the existing connection. Upgrades to this connection would be required. *(Recommendation #4 – Completed)*
- The Village and Town of Lima should continue to be supplied from the City of Rochester. *(Recommendation #5 – Continues today)*
- The Village and Town of Leicester should continue to be supplied from Silver Lake via the existing connection to Mount Morris. The maximum day demand should be supplemented by connection to the Hemlock Lake source via a new transmission main to the Village of Geneseo. *(Recommendation #6 – Mount Morris supply continues today, Leicester system connected to Geneseo through York.)*
- The Mount Morris Demand Center including Hampton Corners in Groveland should continue to be supplied from Silver Lake. The water intake and transmission system to the existing filtration plant, as well as the transmission main to Hampton Corners should be upgraded. *(Recommendation #7 – Partial completion, transmission main has not yet been upgraded)*
- The existing municipal water systems located in the Villages of Nunda and Dansville, as well as the Town of Springwater should continue to operate separately. A filtration plant should be developed for the Dansville System at Mill Creek to meet the more stringent federal safe drinking water standards. The permitted withdrawal allocation for Dansville will need to be increased to approximately 1.2 MGD average day. *(Recommendation #8 – Completed, Dansville plant is rated for 3 MGD for all water sources used)*
- The two New York State correctional facilities in Sonyea in the Town of Groveland should remain a separate system utilizing Keshequa Creek, groundwater wells, and their existing filtration plant. Other areas of Groveland including the Hamlet of Groveland Station Water Corporation should continue to operate separately with existing groundwater sources. *(Recommendation #9 – Modified/Completed, LCWSA providing water)*
- The Town of Sparta (Hamlet of Scottsburg) and the northeastern portion of the Town of West Sparta should develop a groundwater source for municipal water supplies to serve areas experiencing water quality problems with individual wells. *(Recommendation #10 – Modified/Completed, LCWSA providing water)*

The remaining recommendations noted below were not carried out due to additional analysis that needed to be undertaken and had not up to this point; lacked adequate funding, political will, leadership, community support, or some combination thereof; additional improvements

needed to fully implement the recommendation; or were general policy recommendations for future expansion/improvement endeavors. In some instances, these actions were carried over into this update and modified to reflect current conditions.

- Existing municipal water systems for the Villages of Avon, Geneseo, and Livonia and the Towns of Avon, Geneseo, Livonia and York should be interconnected. *(Recommendation #1 – interconnection exists between LCWSA and Geneseo on West Lake Road for 500,000 gpd, but Geneseo WTP improvements needed to allow water to get into the Village distribution system. Noted/modified in update.)*
- Watershed regulations for surface waters should be reviewed and upgraded. Comprehensive regulatory protections should be instituted for recharge zones and watersheds. *(Recommendation #11. Carried over in update.)*
- Comprehensive regulatory protections should be instituted and enforced to protect groundwater recharge zones of all groundwater supply sources within the County. *(Recommendation #12, Carried over in update.)*
- Adequate treated water storage capacity must be provided for all public potable water systems. *(Recommendation #13. Modified and noted where necessary in update.)*
- Out of district users should be formally incorporated into existing water districts. *(Recommendation #14. Noted/modified in update.)*
- All residential, commercial, institutional, and industrial water users supplied by public or municipal systems should be metered. *(Recommendation #15. Modified and noted where necessary in update.)*

1.5 Statement of Need

Although the County has taken a proactive approach in assessing and addressing the needs of the water systems within each of the communities following the 1991 Water Study, the sustainability, quality, and capabilities of potable water and their distribution systems continue to be a significant concern in the face of additional regulations, environmental concerns, and desire for growth. Water supply systems within Livingston County vary with a majority of users relying on private wells in the south and a mix between municipal and the County system in the central and northern portions.

Since the time of the 1991 Water Study, a number of communities made needed upgrades to their treatment, distribution, and/or storage/supply facilities in response to their age or deteriorating condition. However, after 30 years new upgrades are still needed to address current water quality regulations, provide sufficient capacity to adequately account for existing and projected demand, take into account recent environmental concerns that impact water quality (e.g. harmful algae blooms), emergency backups, and improve overall operational efficiency. In addition, there is a need for additional water system operators in

the near future in many of the communities in order to continue adequate operations, ensuring that current rules and regulations are being implemented and all operators have the required qualifications. This study also expands beyond public water systems and includes a preliminary assessment for the local and County sewer systems, which function independently but are tied to water systems.

Investment in the water and sewer systems in the County is needed to continue to provide residents with high quality water and effectively treat wastewater as well as encourage economic development where feasible. Expanding water and sewer service to areas where water quality is a concern and development is expected will help to ensure the health and welfare of residents now and in the future. This study update will identify key recommendations and create an implementation strategy for investment; improving management, operations, and maintenance; identify opportunities for efficiency improvements; and tie into long-range planning for the community water systems providing the vehicle for accomplishing these goals and ensuring potable water for residents.

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2 Livingston County Demographic & Land Use Trends

2.1 Population & Socioeconomic Trends

The U.S. Census Bureau Population Estimates Program (PEP) recorded a population of 63,227 for Livingston County as of July 1, 2018. **Table 2-1** displays historical and current population data as well as projections out to the year 2050 for the County and all its individual municipalities with the projected population change in that time. Historical population data and projections were obtained from the United States Census Bureau and Genesee/Finger Lakes Regional Planning Council (G/FLRPC) Regional Population Forecasts, published in 2013 and the 2017 U.S. Census American Community Surveys (ACS).

Table 2-1
Livingston County Population Trends

	Total Population					*Projected Population*				Change (2020-2050)	
Town/Village	**1980**	**1990**	**2000**	**2010**	**2017**	**2020**	**2030**	**2040**	**2050**	**Number**	**%**
Avon (T)	3,179	3,288	3,466	3,770	3,686	3,675	3,755	3,824	3,885	210.0	5.6%
Avon (V)	3,006	2,995	2,977	3,394	3,293	3,207	3,294	3,370	3,438	231.0	7.0%
Caledonia (T)	1,846	2,179	2,240	2,054	2,141	2,091	2,035	1,986	1,942	(149.0)	-7.3%
Caledonia (V)	2,188	2,262	2,327	2,201	2,037	2,376	2,395	2,410	2,425	49.0	2.0%
Conesus (T)	1,970	2,196	2,353	2,473	2,499	2,506	2,564	2,615	2,660	154.0	6.0%
Geneseo (T)	1,927	1,991	2,075	2,452	2,564	2,216	2,271	2,318	2,360	144.0	6.3%
Geneseo (V)	6,746	7,187	7,579	8,031	8,151	8,159	8,382	8,574	8,744	585.0	7.0%
Groveland (T)	2,140	3,190	3,853	3,249	3,344	3,418	3,252	3,107	2,978	(440.0)	-13.5%
Leicester (T)	1,426	1,818	1,818	1,732	1,675	1,923	1,963	1,998	2,028	105.0	5.3%
Leicester (V)	462	405	469	468	463	482	487	491	495	13.0	2.7%
Lima (T)	1,834	2,022	2,082	2,166	1,722	2,178	2,215	2,247	2,276	98.0	4.4%
Lima (V)	2,025	2,165	2,459	2,139	2,445	2,318	2,263	2,216	2,175	(143.0)	-6.3%
Livonia (T)	4,504	5,370	5,913	6,400	6,530	6,334	6,496	6,635	6,759	425.0	6.5%
Livonia (V)	1,238	1,434	1,373	1,409	1,105	1,434	1,456	1,477	1,494	60.0	4.1%
Mount Morris (T)	1,439	1,531	1,301	1,479	1,829	1,323	1,332	1,339	1,346	23.0	1.7%
Mount Morris (V)	3,039	3,102	3,266	2,986	2,511	3,250	3,244	3,238	3,233	(17.0)	-0.5%
North Dansville (T)	1,015	781	906	819	876	938	950	961	970	32.0	3.4%
Dansville (V)	4,979	5,002	4,832	4,719	4,499	4,753	4,723	4,697	4,673	(80.0)	-1.7%
Nunda (T)	1,523	1,584	1,687	1,687	1,523	1,767	1,797	1,823	1,847	80.0	4.5%
Nunda (V)	1,169	1,347	1,330	1,377	1,442	1,343	1,349	1,354	1,358	15.0	1.1%
Ossian (T)	667	797	751	789	786	793	808	823	835	42.0	5.2%
Portage (T)	771	893	859	884	825	880	887	895	901	21.0	2.4%
Sparta (T)	1,458	1,578	1,627	1,624	1,481	1,714	1,747	1,775	1,801	87.0	5.0%
Springwater (T)	2,143	2,407	2,322	2,439	2,252	2,478	2,538	2,590	2,636	158.0	6.2%
West Sparta (T)	1,100	1,335	1,244	1,255	1,373	1,311	1,337	1,360	1,379	68.0	5.1%
York (T)	3,212	3,513	3,219	3,397	3,321	3,312	3,347	3,378	3,405	93.0	2.8%
Livingston County Total	**57,006**	**62,372**	**64,328**	**65,393**	**64,373**	**66,179**	**66,887**	**67,501**	**68,043**	**1,864**	**2.79%**

Source: U.S. Census Bureau and Genesee/Finger Lakes Regional Planning Council Regional Population Forecasts (May 2013)

In the 1991 Water Study, population projections showed a projected 2020 population of 77,061 residents, 16.4 percent higher than the recent projection by Genesee Finger Lakes Regional Planning Council (G/FLRPC) of 66,179 residents for 2020. While the discrepancy between the projected population and the actual population figures in 2020 are significant, they can be attributed to various reasons including overall methodology, level/accuracy of data available at the time, and unforeseen local economic changes resulting in population loss/gain, among others. In Livingston County there are several public institutions (e.g. Correctional Facilities, SUNY Geneseo, and other County facilities) that influence population patterns.

The County's population growth has been gradually increasing since the 1940's with a significant increase (23 percent) observed in the 1960's. Trends since 2000, however, show a more stable, though slower, growth pattern in the 2-3 percent range. In fact, between the 2010 Census figures and 2017 estimates, the overall County population reduced slightly, though still higher than year 2000 figures. Projections between 2020 and 2050 show a more conservative increase (2.79 percent) over the next 30 years with the overall population just over 68,000 people (see **Maps 2-1** and **2-2**).

Looking at individual communities in the County, almost all are projected to increase at varying levels, with the majority of growth surrounding the Villages of Avon and Geneseo - Avon primarily due to the proximity to the City of Rochester, Interstate 390, and several larger industries and Geneseo with the presence of SUNY Geneseo and the County seat. The Town of Livonia is also included in the upper growth areas, likely as a result of the local schools, the extent of lake frontage, and the availability of infrastructure. A few communities are forecasted to decline, though not by a significant amount. The exception to this is the Town of Groveland as the Livingston Correctional Facility closed operations in September 2019 which will likely result in the loss of local employees and support services as well as the inmates that were included as part of the population count.

Comparing Livingston County to other counties in the Genesee/Finger Lakes Region, Livingston County has experienced an almost negligible change in population since 2000. Wyoming County had the highest decrease at approximately 5.8 percent and Seneca County increased the most at approximately 4.5 percent. **Table 2-2** displays population change throughout the Genesee/Finger Lakes Region between 2000-2017.

Genesee County
Monroe County
Ontario County
Wyoming County
Steuben County
Allegany County
Village of Caledonia
2201
2054
Town of Caledonia
Village of Avon
3394
Town of Avon
3770
Village of Lima
2139
Town of Lima
2166
Town of York
3397
Village of Geneseo
2452
Town of Geneseo
8031
Village of Livonia
1409
Town of Livonia
6400
Conesus Lake
Village of Leicester
468
Town of Leicester
1732
Village of Mount Morris
2986
Town of Groveland
3249
Town of Conesus
2473
Hemlock Lake
Canadice Lake
Silver Lake
Honeoye Lake
Town of Mount Morris
1479
Town of Sparta
1624
Town of Springwater
2439
Town of West Sparta
1255
Village of Nunda
1377
Town of Nunda
1687
Town of Portage
884
Village of Dansville
4719
819
Town of North Dansville
Town of Ossian
789

MAP SHEET:
MAP 2-1

MAP TITLE:
2010 Population

DATE PREPARED:
AUGUST 20, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies

Pop. Range

- 495 - 500
- 501 - 2000
- 2001 - 3000
- 3001 - 5000
- 5001 - 9000

N W E S

Miles
0 0.5 1 2

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Monroe County

Genesee County

Ontario County

Wyoming County

Steuben County

Allegany County

Village of Caledonia
2425

Town of Caledonia
1942

Village of Avon
Town of Avon
3438
3885

Village of Lima
2178

Town of Lima
2276

Town of York
3405

Village of Geneseo
Town of Geneseo
2360
8744

Village of Livonia
1494

Town of Livonia
6759

Conesus Lake

Village of Leicester
495

Town of Leicester
2028

Village of Mount Morris
3233

Town of Mount Morris
1346

Town of Groveland
2978

Town of Conesus
2660

Hemlock Lake

Canadice Lake

Honeoye Lake

Silver Lake

Town of Sparta
1801

Town of Springwater
2636

Village of Nunda
1358

Town of Nunda
1847

Town of Portage
901

Village of Dansville
4673

Town of North Dansville
970

Town of Ossian
835

MAP SHEET:
MAP 2-2

MAP TITLE:
Estimated 2050 Population

DATE PREPARED:
NOVEMBER 19, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies

N W E S

0 0.5 1 2 Miles

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Table 2-2
Population Trends for Genesee/Finger Lakes Region, 2000-2017

County	2000	2010	2017	% Change
Livingston	64,328	65,393	64,373	0.07
Genesee	60,370	60,079	58,537	(3.04)
Wyoming	43,424	42,155	40,886	(5.84)
Monroe	735,343	744,344	748,680	1.81
Ontario	107,931	107,931	109,491	1.45
Orleans	42,883	42,883	41,584	(3.03)
Seneca	33,342	35,251	34,843	4.50
Wayne	93,765	93,772	91,442	(2.48)
Yates	24,621	25,348	25,083	1.88

Source: Livingston County Population Profile 2016 by the Livingston County Planning Department, U.S. Census Bureau American Community Surveys.

From a water and sewer infrastructure perspective, population growth is an important element to consider for future planning, especially in areas where there is population growth that may result in expansion to businesses and residential housing and thereby expansions to water distribution and sewer collections systems and their associated treatment systems. Areas where population growth are highest or are slated to increase can provide direction for strategies in investment or expansion for water and sewer systems. Population growth combined with an analysis of available housing, zoning, new building permits, and other socioeconomic elements all factor in when planning for future water and sewer infrastructure.

The age distribution across the County over the past 17 years is listed in **Table 2-3**. As is the typical trend seen in many communities across the County (as well as the country as a whole), the greatest increase in population was in the 60-64 age group with an approximately 94.6 percent increase. This age group, while more stable, tends to require more in social and community services in later years due to their growing age. Conversely, the 35-44 age group, typically the prime family years, experienced the greatest decrease at approximately 37.8 percent, which can point to an overall population that may be less sustainable over the longer term due to family growth.

The breakdown of the population by age groups provides another element in infrastructure planning by identifying potential growth areas in terms of development styles, ranging from single-family housing (typically ages 24-55) to senior and elderly care (70+). In 2020, the County completed a *Housing Needs and Assessment and Market Analysis* that provides additional data on desired and trending housing development. Combined with areas of

population growth, this data can provide additional guidance on the extent of infrastructure investments.

Table 2-3
Age Distribution for Livingston County, 2000-2017

Population by Age	2000	2010	2017	% Change	% of Total Population
Under 5 Years	3,505	3,168	2,888	(17.6)	4.8
5 to 9 Years	4,137	3,601	2,976	(28.1)	5.5
10 to 14 Years	4,552	4,037	3,697	(18.8)	6.2
15 to 19 Years	6,141	5,907	5,565	(9.4)	9.0
20 to 24 Years	5,832	6,417	6,530	12.0	9.8
25 to 34 Years	7,690	6,403	6,976	(9.3)	9.8
35 to 44 Years	10,928	8,923	6,781	(37.8)	13.6
45 to 54 Years	8,928	10,468	9,288	4.0	16.0
55 to 59 Years	3,011	4,300	4,794	59.2	6.6
60 to 64 Years	2,308	3,565	4,491	94.6	5.4
65 to 74 Years	3,904	4,517	5,965	52.8	6.9
75 to 84 Years	2,504	2,791	3,049	21.8	4.3
85+ Years	920	1,344	1,373	49.2	2.1
Total	**64,328**	**65,441**	**66,373**		

Source: U.S. Census Bureau American Community Surveys.

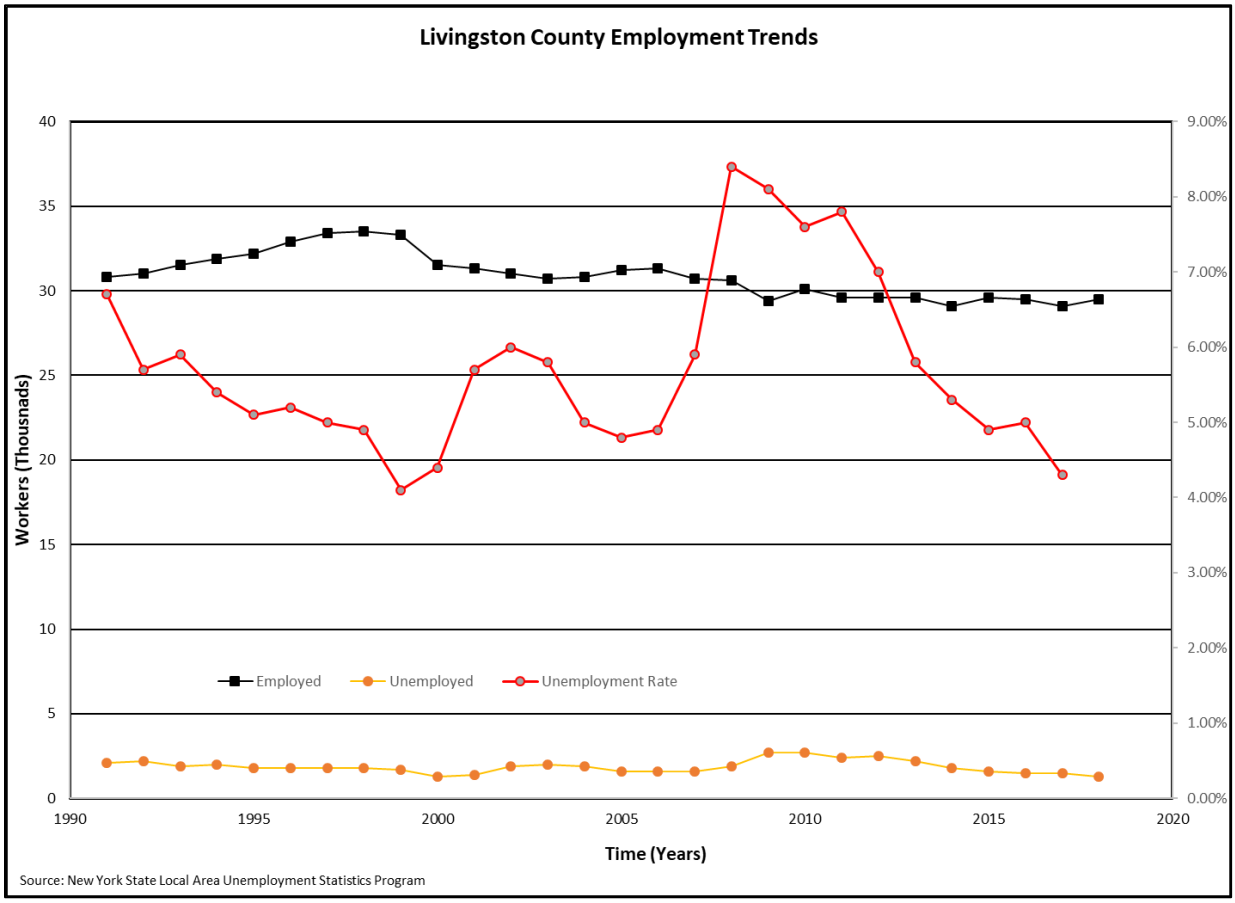
2.2 Labor Force Trends

The economic health of a community can be measured through a number of aspects including the size of its workforce, extent of industries, and income levels - a larger workforce indicates greater potential for employee hiring, a variety of businesses provides diversity, and higher median income levels typically point to a more skilled workforce. These aspects can all help to drive economic development and provide additional insight into future needs for infrastructure investments.

Unemployment

New York State Department of Labor collects monthly statistics on Livingston County's labor force. **Figure 2-1** illustrates the yearly averages of unemployed and employed residents in Livingston County from 1991 to 2018 based on data provided by the State Department of Labor.

Figure 2-1

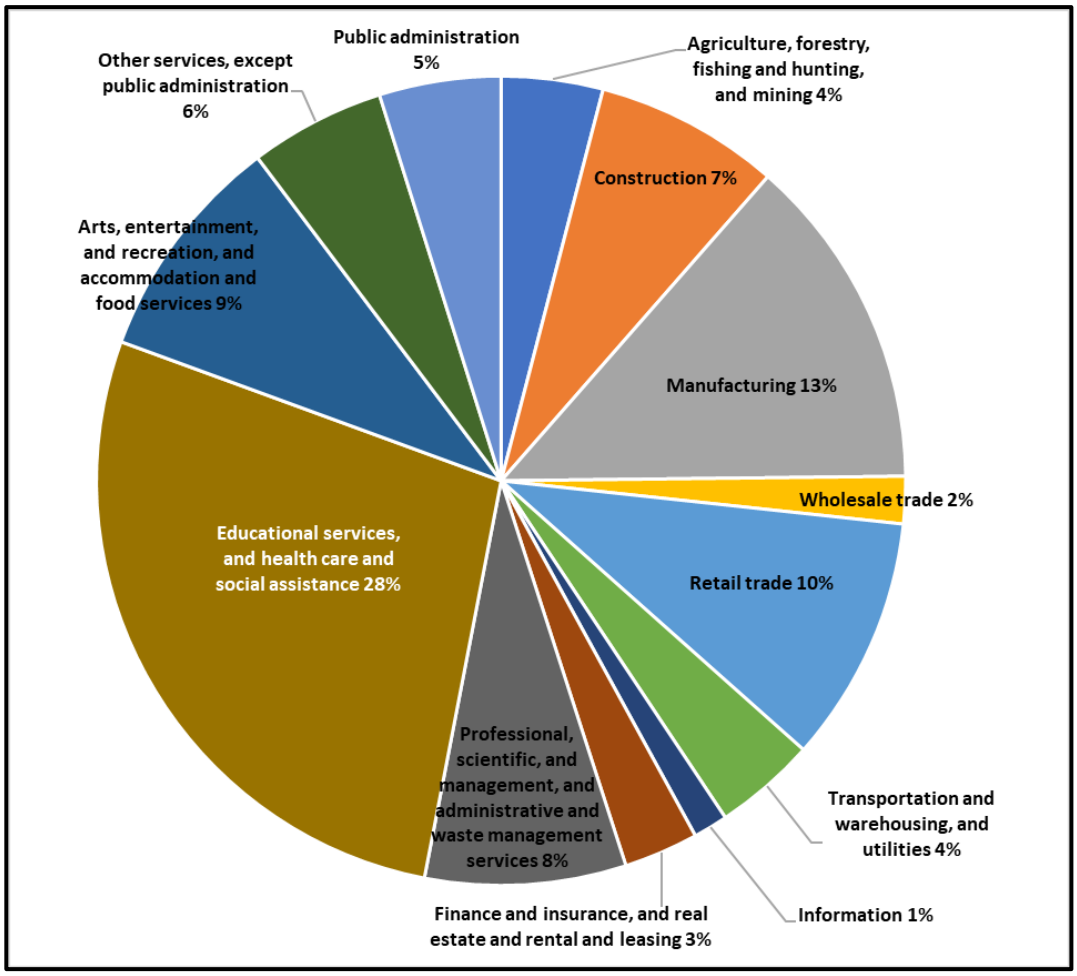


Despite spikes in unemployment in the past (between 2003 and 2008), the unemployment rate in the County has been at its lowest level since 2000, currently at 3.6 percent as of November 2019. The County is ranked 22nd in the State (of 36 total counties lowest to highest) and, by comparison, is in line with the Genesee/Finger Lakes Region (3.7 percent) and New York State (3.6 percent). Counties within the Genesee/Finger Lakes Region that individually have slightly lower unemployment rates (3.3 to 3.5 percent) include Ontario, Seneca, Yates, and Wayne, respectively.

Local Workforce & Industries

There are approximately 28,800 people employed in Livingston County (ages 16 and over). **Figure 2-2** highlights the breakdown of the workforce according to industry.

Figure 2-2
Livingston County Industries (2017)



Educational services, healthcare, and social assistance are the largest sources of employment and in almost every municipality across the County. The Town of Geneseo has the largest percentage of this sector in its population (over 30 percent), mainly due to the population at SUNY Geneseo, followed by Avon (28 percent) and Livonia (26 percent).

Manufacturing is the second largest industry in terms of workforce and is a significant component of the County's economic profile. This industry is predominantly located in the northern portion of the County with the Town of Avon holding the greatest percentage of their population in that industry followed by Livonia, Caledonia, and Lima. It is likely that this is primarily due to the proximity of the higher population centers within Livingston County as well as access to major transportation corridors. Manufacturing and industry, depending on the exact nature of the products developed, are typically on the higher side of municipal water usage as water is used for a variety of means including fabrication, processing, washing, diluting, cooling, and incorporating water into a product, as well as

general sanitation and potable water. Examples local to Livingston County include food processors such as Seneca Foods and Sweeteners Plus, Inc., as well as machining fabricators such as Exceptional Precision Machining, Inc. and Johnson Machine Tool.

As a subset of the manufacturing sector, growth in microbreweries have been on the rise throughout the State and region. In 2016, the first brewery opened in Linwood followed by a cidery in Lakeville. In 2017, the County initiated a $600,000 investment plan to attract breweries to the area and tap into the burgeoning market with seven (7) additional breweries awarded funding for startup or expansion in the area. Manufacturing facilities can have specific water and wastewater needs and impacts—microbreweries are no exception. Although there are no concerns with breweries in the County as of the date of this report, the concern with these facilities is in terms of high strength contaminant loadings at the wastewater treatment facilities if significant growth occurs. With the possibility of stricter future wastewater treatment discharge permit limits, additional treatment may be needed.

Workforce Incomes

Earnings from employment are typically the main source of income for a household. Other sources may include social security, veterans' benefits, and public assistance. In terms of median household income (**Table 2-4**) as an element of the labor force analysis, the County median household income is $53,654 with the Town of Sparta at the highest end ($67,250) and the Village of Geneseo at the lowest end ($35,038). Over half of the communities are higher than the County median income level.

The highest paying industries in the County include utilities work with a median salary of $60,750; mining, quarrying, oil, gas extraction with a median salary of $52,234; and public administration with a median salary of $51,915.

Higher incomes typically are equated with a more educated workforce or higher skilled workforce, attributes that future employers are looking at when considering relocation or expansion to their businesses. This is another element that guides future infrastructure investments. In addition, many water and sewer funding sources require local data on median household income as part of applications – the inclusion of this data provides a baseline for future funding submissions.

Table 2-4
Median Household Income

Town/Village	2010	2017	% Change
Avon (V)	$ 53,287.00	$ 65,598.00	18.8%
Avon (T)	$ 59,306.00	$ 55,050.00	(7.7)%
Caledonia (V)	$ 53,149.00	$ 50,163.00	(6.0)%
Caledonia (T)	$ 52,933.00	$ 53,891.00	1.8%
Conesus (T)	$ 67,717.00	$ 68,295.00	0.8%
Geneseo (V)	$ 34,387.00	$ 35,038.00	1.9%
Geneseo (T)	$ 43,258.00	$ 44,263.00	2.3%
Groveland (T)	$ 61,397.00	$ 62,273.00	1.4%
Leicester (V)	$ 55,278.00	$ 63,636.00	13.1%
Leicester (T)	$ 55,400.00	$ 54,038.00	(2.5)%
Lima (V)	$ 47,120.00	$ 56,319.00	16.3%
Lima (T)	$ 55,500.00	$ 58,606.00	5.3%
Livonia (V)	$ 53,977.00	$ 57,813.00	6.6%
Livonia (T)	$ 59,568.00	$ 64,838.00	8.1%
Mount Morris (V)	$ 42,813.00	$ 38,098.00	(12.4) %
Mount Morris (T)	$ 48,333.00	$ 46,524.00	(3.9) %
Dansville (V)	$ 33,750.00	$ 37,553.00	10.1%
North Dansville (T)	$ 34,400.00	$ 36,810.00	6.5%
Nunda (V)	$ 40,329.00	$ 35,883.00	(12.4) %
Nunda (T)	$ 43,856.00	$ 53,042.00	17.3%
Ossian (T)	$ 55,446.00	$ 65,938.00	15.9%
Portage (T)	$ 40,208.00	$ 47,237.00	14.9%
Sparta (T)	$ 54,871.00	$ 67,250.00	18.4%
Springwater (T)	$ 50,792.00	$ 53,023.00	4.2%
West Sparta (T)	$ 56,445.00	$ 52,500.00	(7.5) %
York (T)	$ 60,000.00	$ 55,101.00	(8.9) %
Livingston County	*$ 51,690.00*	*$53,654.00*	*3.7%*

Source: US Census (2017 ACS)

Major Employers

Table 2-5 lists the current major employers in Livingston County in 2018. The County Facilities, including those at the Mount Morris and Geneseo locations, as well as the Department of Social Services (DSS) Health Facility, combined have the greatest number of employees at 1,257. SUNY Geneseo is the second largest employer in the County, in part contributing to the growth of the population of the Village of Geneseo. Despite the closure

of the Livingston County Correctional Facility in 2019, correctional facilities are still the third highest employer at 711 total employees.

Table 2-5
Livingston County Major Employers (2018)

Employer	Products	No. of Employees
Livingston County Facilities	County Government and Health	1,257
SUNY Geneseo Geneseo, NY	Educations	1,064
NYS Correctional Facility Groveland, NY	Correctional Facility	711
Noyes Memorial Hospital Dansville, NY	Hospital	591
Kraft Foods North America Avon, NY	Food Processing	400
Coast Professional, Inc. Geneseo, NY	Debt Collection Agency	389
American Rock Salt Mount Morris, NY	Rock Salt	370
Livingston Associates Scottsville, NY	Construction Services	361
Wegmans Geneseo, NY	Supermarket	326
Hilltop Industries Mount Morris, NY	Manufacturing and Service Solutions	325
Star Headlight Avon, NY	Lighting	215
NYSDEC Avon, NY	Dept. of Environmental Conservation	200
Graymetal Products Avon, NY	Heating and Air Conditioning Products	190
Walmart Stores Geneseo, NY	Retail Company	175
Barilla America Avon, NY	Food Manufacturing	138
Arkema Piffard, NY	Liquid Organic Peroxides	118

Source: Livingston County Office of Economic Development

2.3 Residential Development Trends

Public water and sewer infrastructure can encourage growth in new residential development, but it is not a necessity - in fact, many residential properties in rural and small towns rely on private sewer (septic) and water (wells). Villages and hamlets tend to have higher density of residents and therefore are more apt to have these public facilities available. Additionally, these residential properties are typically very compact, making it difficult to construct on-site septic systems complying with current regulations. Though minimum lot sizes vary by municipality, it has been generally accepted that the minimum size for a property with a private sewer is 20,000 square feet (1/2 acre).

Trends in new residential development can provide insight on areas where growth is apparent and potential opportunities for expansion of public water and/or sewer may be warranted. Multi-family housing such as townhouses, condominiums, and apartments are more likely to require public utilities due to the higher concentration of residents in one location. Single-family developments on larger lots can still rely on private systems, though more innovative technologies such as package plants (decentralized pre-manufactured treatment facilities) could also be considered.

Since 1990, the Census year that the 1991 Water Study was based on, there have been a total of 5,906 housing units constructed as shown in **Table 2-6** below. The Genesee/Finger Lakes Regional Planning Council (G/FLRPC) provides a Regional Land Use Monitoring Report each year for various counties in the region that includes a summary of residential, commercial, and industrial development. It should be noted that while this information is more readily available and updated regularly, the County undertook a local study (*Housing Needs Assessment and Market Analysis, 2019*) with regards to housing and residential needs and the results of that deviate from the regional monitoring report in this regard. Where local, updated information from the County is available with respect to development trends, that information has been provided. Regional information for other land use categories (i.e. non-residential) is included for general trends, but may not fully reflect current, local conditions.

Between 2014 and 2018 approximately 468 residential units were permitted in the County, predominantly in the central and northern portion (Geneseo and Livonia had the highest numbers). These permits were for new construction only and do not include additions/repairs, accessory uses or storage buildings. The Villages of Livonia and Geneseo and Towns of Livonia and Geneseo led this trend with the highest numbers in the County during that time.

Table 2-6
Housing Units Built Prior to 2017

Year Built	Housing Units
2014 to 2017	152
2010 to 2013	375
2000 to 2009	2,141
1990 to 1999	3,238
1989 and earlier	*21,521*
Total	27,427

Source: US Census, 2017 ACS

Since 2014, several permits were issued that have included new multi-family housing units. In 2018 the Village of Livonia issued a total of 4 building permits that accounted for a total of 48 housing units (3 to 4 family units and 5 or more units) at a total value of $7.2 million. A total of 31 new single-family building permits were issued in 2018 with the Town of Livonia at the lead (12) followed by the Villages of Caledonia, Avon, and Nunda, and the Towns of Conesus, Geneseo, Groveland, Leicester, Lima, and York, totaling over $8 million. The other communities did not report any new construction in 2018.

According to the *2019 Housing Needs Assessment and Market Analysis* developed for the County, the quality of existing water from private sources (i.e. wells) or the overall lack of public water service is noted as being a constraint in a number of local communities including the Towns of Ossian, Portage, Springwater, West Sparta, Leicester (west side), Nunda, Lima, and Conesus (outside Hamlet overlay area). In several of these areas, residents haul water from the Villages or other sources to supplement their private supply.

The study also indicated that in terms of wastewater, many of the same areas lack public sewers which also has been a noted constraint on residential development. Approximately 40 percent of County residents are served by public sewers. Aside from the above communities, the study notes that the Village of Lima's plant is at capacity as of 2018 and the Town of Caledonia voted down the development of a public sewer system.

2.4 Non-Residential Development Trends

Unlike residential development, commercial and industrial development (i.e. non-residential) typically requires public water and sewer due to the number of employees and/or their operational needs (e.g. processing or manufacturing). The availability of public utilities is a significant incentive to attract new or expanding businesses and industries. In Section 2.6, general areas are outlined within each of the Livingston County municipalities where

additional non-residential growth is encouraged through current planning or zoning regulations (i.e. districts).

County Industrial Parks

The development of industrial parks by the Livingston County Industrial Development Agency has been the primary avenue for attracting new businesses. Over the last 30 years, Livingston County has added five (5) industrial development areas (**Figures 2-3** and **2-4** on the following page), some of which are close to fully developed and others that still hold a significant amount of availability.

Figure 2-3
Livingston County Industrial Parks (north)

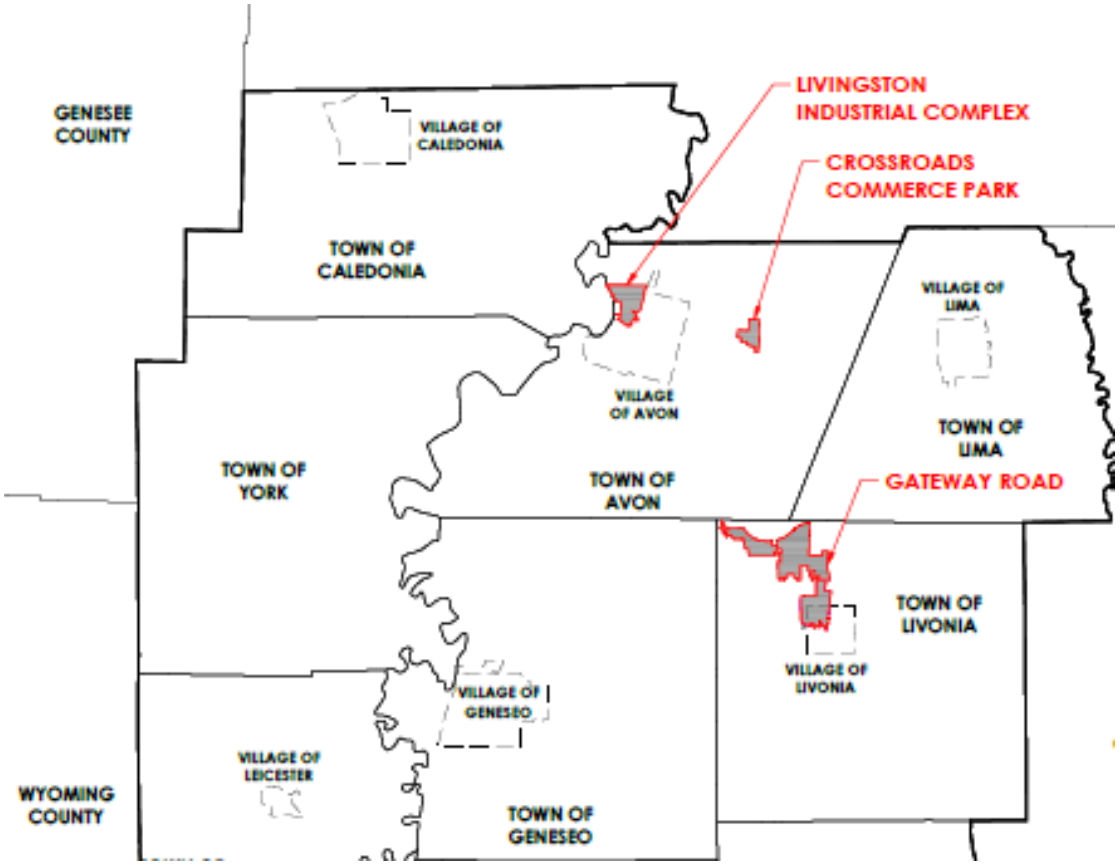
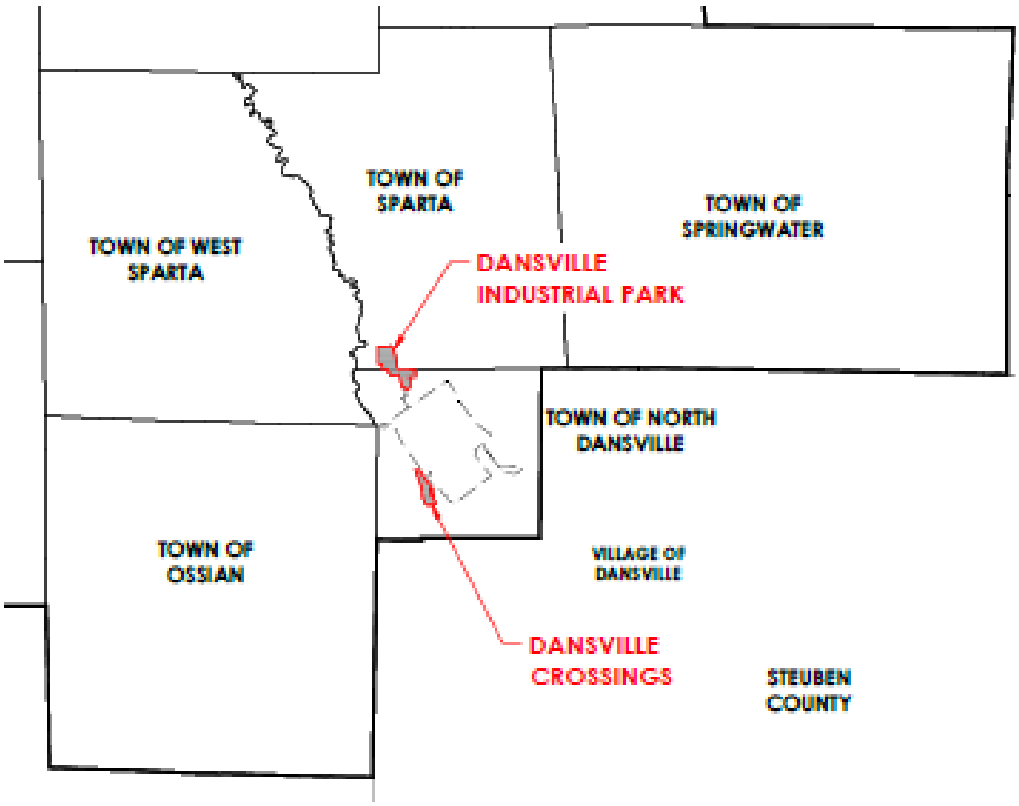


Figure 2-4:
Livingston County Industrial Parks (south)



Avon (Town & Village):

The Town of Avon's James M. Steele ("Crossroads") Commerce Park, located adjacent to I-390 at Exit 10, contains eight (8) businesses, including: Land Pro Equipment, Monroe Industries, Rain for Rent, DP Tool & Machine Inc., Mortalis Brewing Company, Evening Star Coffee Roasters, Pride and Joy Child Care of Avon, and Genesee Valley Motors. Additionally, a new Noyes Mental Health facility is currently being constructed. The complex is approximately 115 acres. The park continues to be developed and still has approximately 70 acres available for future development. There is 3-phase electric, natural gas, and telecommunications available on site. Public water and sewer are also available on site, but neither have capacity available at the Village of Avon treatment facilities. Estimated remaining demand for water and sewer are approximately 10,000 gpd or less.

In the Village of Avon, the Livingston Industrial Complex is the location of Barilla America Inc. and Jacobson Companies. Barilla America, Inc. is a significant user of water, using approximately 30,000 gpd. The Livingston Industrial Complex has approximately 182 acres available for future development. All utilities, electric, natural gas, and telecommunications

are available on site. Public water and sewer are available on site, but there is no capacity available at the Village of Avon treatment facilities. Estimated remaining demand for water and sewer at the Industrial Complex is approximately 140,000 gpd based on zoning regulations for the area and the types of projects that could potentially fit the land that is still available (i.e. smaller businesses that do not have large water/sewer use).

Dansville (Town & Village):

The Dansville Industrial Park is located on New York State Route 63, adjacent to the Dansville Airport. Two (2) businesses, UR Medicine (Noyes Mental Health Facility) and A-TIP Control, Inc., are found within the park. Approximately 120 acres are currently available for future development. Currently there are no potential developers for the additional lots. All utilities are available on site. Estimated remaining demand for water and sewer is approximately 110,000 gpd.

Dansville Crossings is another future retail development site located off I-390 at Exit 4 adjacent to the Village of Dansville. The site encompasses approximately 42 acres of available land. Currently there are no businesses on site. However, the County Industrial Development Agency is reviewing a variety of potential options and opportunities for the area. Water and sewer utilities are available through the Village of Dansville (adequate capacity available), New York State Electric and Gas (NYSEG), and a variety telecommunication utilities. Estimated demand for water and sewer is approximately 25,000 gpd. The Village of Dansville does not currently have capacity issues with the planned industrial parks based on projected land usage and demands.

Livonia (Town & Village):

The Town and Village of Livonia's Gateway Park, located with access on NYS Route 15, is the largest development opportunity area of the five (5) industrial development parks, encompassing approximately 970 acres of land. The majority of the site is available and future land use is flexible. The park was developed primarily to cater to agriculture-centric businesses given the rural characteristics of the area and the proximity of Sweeteners Plus, though industrial uses are also encouraged. Currently, the development park consists of a two (2) phase build out; phase one (1) has 192 acres and an estimated build out of approximately 5-10 years. The remaining 775 acres is expected to reach build out in the next 20 years. Estimated demand for water and sewer is approximately 1.1 mgd. A 2016 study of the park indicated that LCWSA could provide water and sewer up to a certain point (685,000 gpd water and 120,000 gpd sewer) after which upgrades would be needed including new mains, tanks, and pumps for water and several improvements to the Lakeville WWTF to operate at the permitted capacity (980,000 gpd).

Ramsey Constructors, a construction company, is the first establishment in the park located in the Phase 1 project area. They have a small office building and a storage facility on-site,

but water usage and wastewater production is negligible. Sanitary sewer, water, and gas are available on NYS Route 15 at the park entrance. Extending the service mains from the existing roadside utilities is the current plan as development continues.

Other Non-Residential Development

In addition to the industrial parks, non-residential development is found in other areas of the County. Permit data from 2018 (*G/FLRPC Regional Land Use Monitoring Report*) indicates that this was at a much lower rate when compared to residential development in the previous section. In the period between 2014 and 2018, there were a total of 42 units permitted throughout the County with the largest concentration found in the Town of Caledonia (16 in the 2014-2018 period). In 2018, only five (5) permits were issued for industrial buildings with two (2) in the Town of Livonia and one (1) each in the Towns of York and North Dansville and the Village of Lima. In total, these permitted buildings account for an increase of 15,000 SF and $1.4 million in total value.

New commercial buildings accounted for only four (4) total permits in 2018 in the Towns of Avon, Lima, and Livonia and Village of Dansville at 12,000 SF and were valued at approximately $1.5 million. Between 2014 and 2018 a total of 10 commercial permits were issued. It should be noted that the permit data acquired for the *Regional Land Use Monitoring Report* included only new construction – any conversion of existing buildings to commercial use was not factored in.

2.5 Agricultural

There are three (3) major agricultural districts in Livingston County: Districts #1, 2, and 3. Approximately 52 percent of the County is contained within agricultural districts for a total of approximately 225,000 acres of farmland. **Table 2-7** below represents which municipalities make up each agricultural district with **Map 2-3** highlighting the extent of the districts in the County.

Table 2-7
Livingston County Agricultural Districts

District	Municipalities
1	Towns of Caledonia, Leicester and York
2	Towns of Avon, Conesus, Geneseo, Groveland, Lima and Livonia
3	Towns of Mount Morris, North Dansville, Nunda, Ossian, Portage, Sparta, West Sparta and Springwater

Source: Livingston County Agricultural Programs

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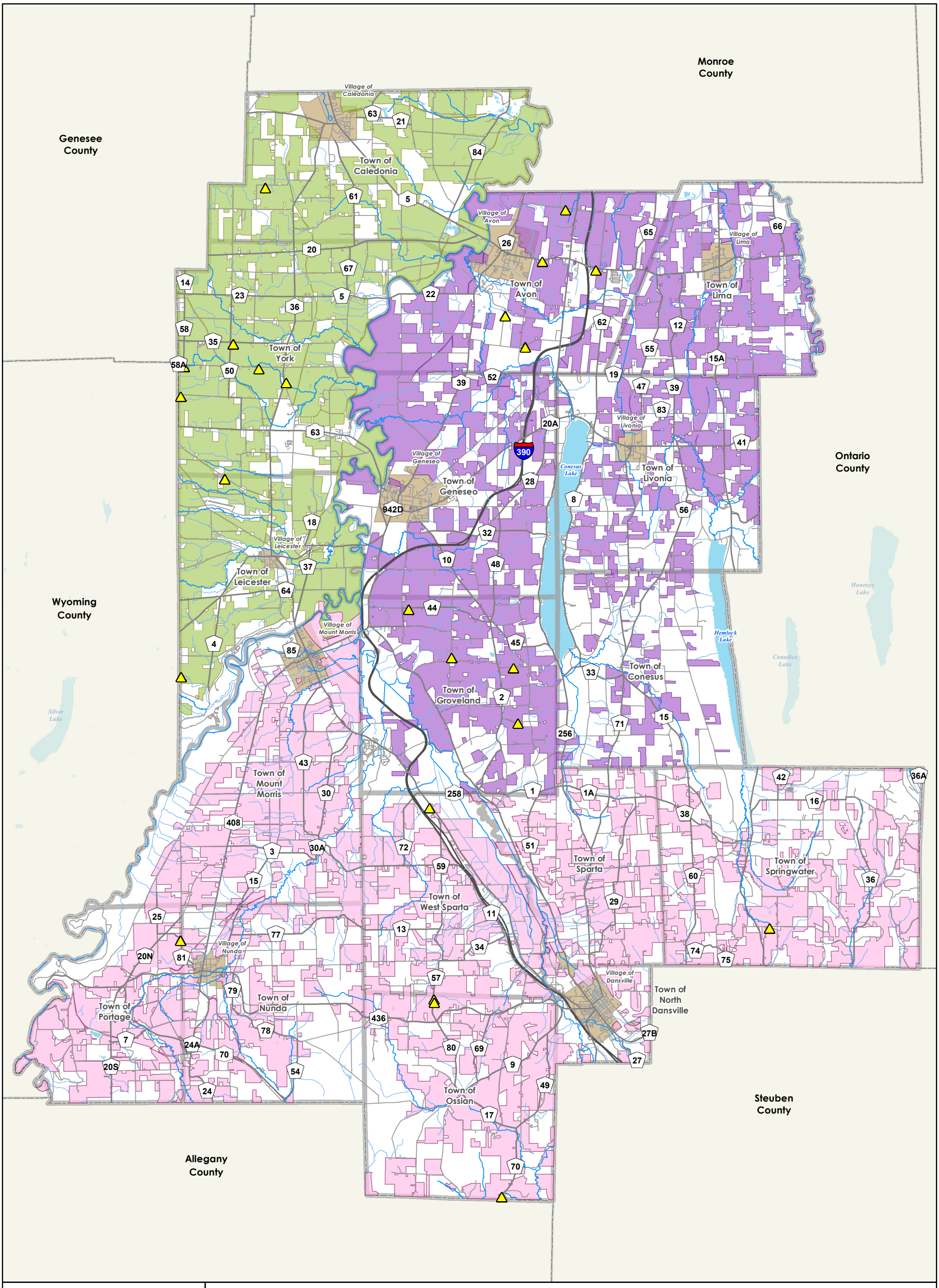

MAP SHEET:
MAP 2-3

MAP TITLE:
Livingston County Agriculture

DATE PREPARED:
AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Ag District 01
- Ag District 02
- Ag District 03
- CAFO Farms

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ARCHITECTURE
ENGINEERING
PLANNING
CPLteam.com

Document Path: S:\Projects\Livingston_Co\Wtr Study Update\D Design\Reports\CPL Maps\2-3 Ag Districts.mxd | CPLTeam-JSteinbach | 8/27/2020

In terms of infrastructure and development potential, inclusion in the State Certified, County-adopted Agricultural Districts provides a level of protection for agriculture by discouraging conversion to non-agricultural uses, especially when coupled with agricultural tax assessments. The inclusion of properties in agricultural districts can discourage residential, commercial, and non-agricultural industrial growth, primarily due to connection restrictions related to providing new public water or sewer service to these properties. The Livingston County Water and Sewer Authority instituted these restrictions in 1998.

Agricultural districts are scattered throughout the County with the largest concentration contained within the Towns of York, Caledonia, Leicester, Mount Morris, and Groveland. As a result, non-agriculture development is likely to be significantly lower in these areas. However, public water does extend out to several of these agricultural areas despite the low non-agricultural development potential as local farmers have been significant users for their farming operations. The Town of York is a primary example of this as the majority of its water system expansion has been for the benefit of farmers or agri-businesses. The Dairy Farmers of America operate a milk processing facility in the Town of York and utilize large amounts of water for its operations. Other users, including larger agricultural operations such as concentrated animal feeding operations (CAFOs) and agriculture-related operations also need to be considered when investing and expanding in future public water infrastructure. **Map 2-3** also highlights the location of CAFOs throughout the County.

2.6 Planning and Zoning

Development and growth are regulated and managed at the local level through a combination of two (2) mechanisms - Comprehensive Planning and Zoning (as part of a larger municipal code). While the Comprehensive Plan provides a general direction on policies, land use decisions, and longer-term goals that are developed and supported by the community, it has no legal enforcement or regulatory function. The local zoning code provides the legal parameters for land development. Those that have developed comprehensive plans have explicitly outlined where they prefer to see development occur and how they would like it to look in the future. The County provides technical assistance to municipalities as well as other functions including limited municipal land use recommendations in accordance with General Municipal Law 239m.

Comprehensive Plan and zoning regulations identify where/if economic development of various types is preferred. When determining where development is encouraged, the availability of public infrastructure and the proximity to existing areas of density are the primary drivers. Infrastructure availability can have a significant impact on the type and intensity of development that may occur. Expansions or improvements to public water and/or sewer systems and any potential local economic development opportunities that arise will need to be balanced with overall land development goals to ensure consistency with local plans and regulations.

With few exceptions, all the communities in Livingston County have zoning and a Comprehensive Plan to guide land use decision-making. The following is a brief overview of each – respective future land use and zoning maps are included in **Appendix A**.

Town of Avon

The Town of Avon's Comprehensive Plan (2016 update) outlined several areas for potential economic development based on its Future Land Use map. These areas include:

- Industrial uses northwest of the State Route 5 & 20/Interstate 390 interchange as well as a dedicated "Interchange Development" category, building off the existing industrial and commercial areas in the vicinity.
- A small commercial area at Bronson Hill Road and State Route 5 & 20.
- A significant "Interchange Development" area at the State Route 15/Interstate 390 interchange extending down to the railroad. This would be a new area for commercial development, capitalizing on the traffic volumes from I-390.
- Limited residential development (medium density) adjacent to the Village with hamlet-style residential noted in East Avon and cluster development to the south.

The zoning map reflects these same development patterns, though calling out the "Interchange Development" areas as Planned Development Districts for commercial and industrial uses. Generally, zoning for the Town focuses commercial and industrial development along the State Route 15 corridor in two (2) nodes at State Route 5 & 20 and the I-390 interchange. The rest of the Town is zoned for agriculture and lower-density residential uses.

Village of Avon

The Village of Avon updated their Comprehensive Plan in 2016-2017 and developed a Future Land Use map that reflects the existing zoning makeup of the Village that was adopted in September 2019 including:

- Focusing commercial development in the downtown area on the east side of the Village.
- Two (2) industrial areas located in the northwest (Barilla plant currently located here) and the southern-central portion of the Village, both adjacent to the railroad.
- Residential areas encompassing a majority of the Village with mixed residential outside of the Downtown Core.

A draft zoning map (along with draft regulations) has been developed that re-categorizes these industrial areas as Light Industrial districts which are intended to accommodate less intensive or lower impact industrial uses - a trend common in most communities looking to

minimize potential environmental impacts and encourage more "campus-style" industrial parks.

Town of Caledonia

The Town and Village of Caledonia originally developed a joint Comprehensive Plan in 1964. The Village updated their portion of the Plan in 2016. The Town of Caledonia still relies on the 55-year-old document to provide policy and land use guidance for current development. Generally, little has changed from what the Comprehensive Land Use Plan laid out for the Town including:

- Industrial areas on the eastern and western border with the Village as well as the northwest and southeast corners of the Town.
- Smaller highway commercial corridors along State Route 5/Caledonia-LeRoy Road, State Route 36/Leicester Road, and State Route 5/State Road.
- Within these areas the only significant businesses that have developed since the 1964 Plan include a Dollar General, auto parts/salvage yard, and Commodity Resource Corporation (dairy feed distribution/manufacturing).
- Residential areas are primarily adjacent to the Village with medium and high density at the Village border.

The Town of Caledonia's zoning map generally reflects the Future Land Use map in terms of where industrial uses are encouraged, though it more clearly delineates these between heavy industry (southeast corner of the Town and east of the Village) and light industry (northwest corner of the Town adjacent to the Village). Commercial (Highway Business) development is limited to a small area along State Route 5 in the extreme southeast corner of the Town. A Planned Development District in the northeast corner of the Town permits industrial parks, further expanding the economic development potential in the community and residential districts generally are adjacent to the Village; the remainder of the Town is centered around agriculture and rural residential.

Village of Caledonia

In the Village of Caledonia, the 2016 Future Land Use plan outlines several areas for growth and development including:

- Industrial areas on the eastern and western borders of the Village adjacent to the railroad.
- Industrial transitional areas south of the central business area along the former railroad corridor (abandoned).
- Commercial development within the central business district at the intersection of State Routes 5 and 36 as well as another block of land west of the Caledonia Fairgrounds.

- Maintaining existing residential lands throughout the Village with higher density areas along main roads. Agricultural areas on the periphery are identified as potential residential areas as well.

The Village of Caledonia has not yet updated their zoning map to reflect the Future Land Use map in their Comprehensive Plan, though the extent of the Industrial districts mirrors those areas shown in the Future Land Use map. The subtle difference is that the zoning map differentiates these areas between Light Industrial (the majority of the lands) and Industrial (a smaller area along the eastern border). The Industrial-Transitional areas highlighted in the Future Land Use map are still indicated as industrial as well. Residential districts, encompassing three (3) classes of various densities, make up the majority of the Village predominantly found in the southwest portion.

Town of Conesus

The Town of Conesus has a 2014 update to the 2005 Comprehensive Plan which highlighted a few areas for economic development on their future land use map, generally in the hamlets including:

- A small industrial area straddling Federal Road just north of Durkee Road.
- The Hamlet of Conesus is intended to be a mixed used area.
- There are very little to no commercial areas in the Town with the exception of a small lot on the northeast corner of the intersection of West Lake Road and Sliker Hill Road.
- Low and moderate density residential growth is encouraged north of and around the Hamlet of Conesus with rural residential areas (5-10 acres) along key corridors of the center of Town.

The zoning map is slightly different from the future land use map where there is only a small commercial zoned area in the Hamlet of Conesus along both sides of South Livonia Road. The majority of the town is zoned as agriculture and several different types of residential.

Village of Dansville

The Village of Dansville's future land use map, developed in 2006 highlighted several areas for economic development, generally along the NYS Route 63 corridor including:

- Light industrial use located in the northern part of the Village, which is also the industrial development area referred to as Dansville Industrial Park. At the northwest corner of the Village, there is an additional area of light industrial that connects to the northern part of the Village. An additional small area is located on the north side of Ossian Street, just before the intersection of Ossian Street and NYS Route 63.

- The center of the Village at the intersections of Ossian Street, Clara Barton Street, and NYS Route 63 is an area of central business.
- General business use is adjacent to the light industrial area at the northwest corner of the Village, a large area in the southwest corner of the Village, and on both sides of NYS Route 63 on the southeast Village line.
- Residential uses make up the majority of the Village with high density development encouraged in the south adjacent to Route 63.

The official zoning map matches the future land use plan laid out for the Village with the majority of the municipality geared to various forms of residential development (i.e. single-family, multi-family) with some agricultural along the east side of the Village.

Town of Geneseo

The Town of Geneseo's 2008 Comprehensive Plan highlighted several areas for economic development on the future land use map generally surrounding the east side of the Village of Geneseo. In 2016 the Town of Geneseo also developed a Farmland Protection Plan to preserve the agricultural roots of the Town. Future land use included:

- The majority of the land closely surrounding the east side of the Village of Geneseo and along Reservoir Road has been designated for Low Density Residential.
- The north side of NYS Route 20A on the east side of the Village of Geneseo has special zoning referred to as a "Gateway Overlay District" which is a mixed-use designated area.
- The south side of NYS Route 20A on the east side of the Village of Geneseo is designated for business use.
- A general industrial use area is located in the I-390 corridor in the southwest corner of the Town.

Residential usage is indicated in various areas and styles including strip development along Route 20A, hamlet style at Conesus Lake, lake residential, and rural residential (large lot) making up the majority of the Town.

The zoning map reflects these same development patterns, though calling out the low intensity office area on the south side of NYS Route 20A as low density residential and the "gateway overlay district" as a multiple mixed-use area. The majority of the Town is zoned for agriculture and rural residential.

Village of Geneseo

The Village of Geneseo's 2007 Comprehensive Plan highlighted several areas for economic development on their future land use map in the core of the Village along the NYS Route 20A main corridor including:

- The east side of the Village is intended for mixed uses.
- The northwest corner of the Village along the Genesee River has a projected use for light industrial.
- The remainder of the Village is a mix of low, medium, and high density residential.

The zoning map reflects these same development patterns, though segregating the mixed-use area into commercial, industrial, and residential. Additionally, the future light industrial use area is split into waterfront mixed-use and commercial. The majority of the Village is zoned for three (3) types of residential use.

Town of Groveland

The Town of Groveland is an agricultural community which has established an agricultural and farmland protection plan to preserve the farming community and keep agriculture as the primary industry.

The majority of the Town is zoned as some type of agriculture. There are a few areas of mixed agriculture generally located at the I-390 entrance/exit ramps along the west side of NYS Route 63 with the exception of a mixed agricultural-industrial zoned area on the west side of NYS Route 63 between Pioneer Road and the south Town line. Residential uses are generally large lot/low density.

Village of Leicester

The Village of Leicester zoning map depicts a few commercial areas along NYS Route 20A except for an area along NYS Route 36 south of NYS Route 20A on the west and east side. The largest commercial area is along NYS Route 20A on the west side of the railroad tracks, potentially providing an additional transportation route. There is one small industrial zoned area on the west Village line, south of NYS Route 20A. The remaining area in the Village is residentially zoned.

Town of Lima

The Town and Village of Lima Adopted their Comprehensive Plan in March of 2008 which outlined a few areas of potential industrial and commercial growth. These areas include:

- A large commercial area on the west side of NYS Route 15A between Gale Road and Heath Markham Road and continuing to the north side of Heath Markham for a small distance. Other small commercial areas are at the intersection of NYS Route 5 & 20 and Dalton Road, NYS Route 5 & 20 and Health Markham Road, and at the intersection of NYS Route 15A and Community Drive.
- A large Industrial area is on the southeast, southwest, and northwest corners of the York Street and NYS Route 5 & 20 intersection. An additional industrial use area is located at the Martin Road Split.

- Medium density residential uses in the Town are highlighted around the Village as well as adjacent to the Town of Mendon/Village of Honeoye Falls in the northeast with the remainder of the Town dedicated to lower density rural residential.

The zoning map reflects these same development patterns. Generally, zoning for the Town focuses commercial and industrial development along NYS Route 15A and East Main Street. The rest of the Town is zoned for agriculture and lower-density residential uses. There have been additional discussions about potential development along Heath Markham and Corby Roads.

Village of Lima

The Town and Village of Lima adopted their Comprehensive Plan in March of 2008 which outlined a few areas of potential industrial and commercial growth. These areas include:

- Commercial usage is focused surrounding the intersection of NYS Route 15A and NYS Route 5 & 20 and the intersection of NYS Route 15A and Community Drive.
- A light industrial area is located along the north and south sides of Community Drive.
- Within the Village, single family residential encompasses a majority of the area with a manufactured home park found on the northern portion.

The zoning map reflects these same development patterns. Generally, zoning for the Town focuses commercial and industrial development along the NYS Route 15A and NYS Route 5 & 20. The rest of the Village is catered to residential development.

Town of Livonia

Livonia's 2004 Update to the 1996 Comprehensive Plan highlighted several areas for economic development on their future land use map, generally along the main state road corridors as follows:

- In Lakeville along NYS Route 15 on the east side is a projected industrial use area, also referring to the proposed Gateway Park with a significant amount of development opportunities.
- Across NYS Route 15 from the industrial use area is a small area of medium intensity commercial. Two (2) medium intensity commercial areas are located on the north side of NYS Route 20A running parallel with the north side of Conesus Lake and a small area on the south side on Route 20A at the Conesus Lake outlet. The northeast corner and southeast corner of the NYS Route 20A and West Lake Road intersection as well as the southwest corner and southeast corner of the Richmond Mills Road and NYS Route 20A/15A intersection are medium and high intensity commercial areas.

- Medium density-style residential areas are highlighted in the area between the Village of Livonia and the Town of Avon to the northwest with some multi-family areas found there as well. Lower density (rural residential) is the majority of the Town.

The zoning map generally reflects these same development patterns, though calling out the medium/low intensity commercial area on the south side of NYS Route 20A as a waterfront development district. In this same area (western portion of Town), a combination of industrial, mixed use, and gateway commercial districts are found – the latter providing for pedestrian-friendly commercial uses in the vicinity of the waterfront. The medium/high intensity commercial area at the NYS Route 20A/15A and Richmond Mills Road intersection is zoned for agriculture, not commercial. There is a large "mixed use hamlet district" south of Big Tree Road along NYS Route 20A/15A on both sides of the road, but mainly the east side. This area extends south to the NYS Route 20A and 15A split. The majority of the Town is zoned agriculture and rural residential.

Village of Livonia

Livonia's 2004 Update to the 1996 Comprehensive Plan highlighted several areas for economic development in the Village on their future land use map generally along the main state road corridors including:

- Commercial areas are found on the north and south side of the NYS Route 20A and Big Tree Road split. The north side is intended for general commercial whereas the south side, also the heart of the Village, is for core commercial.
- West of the general commercial area on the north side of NYS Route 20A is a mixed use district.
- Low density residential is the predominant land use in the Village with smaller multi-family pockets along Route 20A.

These same land use and development patterns are outlined on the zoning map, though it calls out the transitional development district on the north side of NYS Route 20A as a mixed-use district and the general commercial to the east as a Gateway Commercial District. The majority of the Village is zoned for neighborhood residential.

Town of Mount Morris

The Town of Mount Morris, as of the development of this Study update, is undertaking an update of its Comprehensive Plan. The Town of Mount Morris' future land use map from 1997 highlighted a few areas for economic development in terms of commercial and industrial uses including:

- Business and Industrial areas are along both sides of NYS Route 408 and along the east side of Village of Mount Morris along NYS Route 408 out to Interstate 390 and south along NYS Route 36.

- The remainder of the Town is geared towards low density/rural residential uses with higher density residential indicated for the area immediately west of the Village.
- Preliminary discussions for utility-scale solar energy facility projects have been brought forth in the Town, including the potential for a battery energy storage component. The latter element could potentially be a significant water user for cooling and/or emergency needs.

Village of Mount Morris

The future land use map from its 1997 Plan highlighted a few areas for economic development in terms of commercial and industrial uses, though it is anticipated that this may likely change following the adoption of the new plan including:

- Highway commercial areas are scattered at many different locations on both sides of NYS Route 408 and NYS Route 36 from the intersection of the two (2) roads heading east and north.
- In the northeast corner of the Village between NYS Routes 408 and NYS Route 36 and the Village limits there is a large strip of industrial area.
- In the heart of the Village is a mixture of local and downtown business.
- Single family residential makes up the western and southern portions of the Village with multi-family uses in the core and to the north.

Town of North Dansville

The Town of North Dansville's future land use map, developed in 2006 highlighted a few areas for economic development including:

- Light and Heavy industrial uses are located at the northwest corner of the Town along the west side of NYS Route 63.
- There are a few larger areas of business use generally located along the west side of I-390, one location being part of the industrial development area referred to as Dansville Crossings. Another large business area is located at the southeast corner of the Town between NYS Route 63 and Stone Hill Road.
- The remainder of the Town is highlighted as rural or low density residential with medium density uses indicated for a small portion to the north between Route 36 and Interstate 390.

Zoning districts in the Town mirror the future land use map in terms of category/district names and extents with a few exceptions, specifically in the business districts. While the future land use map shows the business area extending out to the Town of Wayland border in the southeast and to the Town of Dansville border to the south, the district boundaries are instead shifted more to the western portion of the Town adjacent to the Village with water infrastructure encouraged to follow the same trajectory.

Town/Village of Nunda

The 2005 future land use map highlighted a few areas for economic growth including.

- Mixed use areas are located in the Village along both sides of NYS Route 408, as well as on both sides of NYS Route 408 in the Hamlet of Dalton.
- Neighborhood-centered uses are encouraged in and around the Village as well as within the Hamlet of Dalton to the south.

The zoning map reflects these same development patterns. The remainder of the Village of Nunda and Hamlet of Dalton is residential and agricultural. The majority of the Town is agriculturally zoned.

Town of Ossian

The Town of Ossian is an agricultural community which has established an Agricultural and Farmland Protection Plan to preserve the farming community and keep agriculture as the primary industry. As of the development of this Study update, the Town is updating its Agricultural Plan as well as developing a dedicated Comprehensive Plan to inform future land use decision-making.

The majority of the Town is agricultural, State forest, residential, and vacant property. Additionally, there are a couple pockets of community service and recreational area.

Town of Springwater

The Town of Springwater's Comprehensive Plan highlighted a few areas for economic development on their future land use map including mixed use or hamlet development in the Hamlet of Springwater and at Webster Crossing. Water infrastructure is limited to these areas, inhibiting any future growth.

Town of Sparta

The Town of Sparta is an agricultural community which has established an agricultural and farmland protection plan to preserve the farming community and remain as the primary industry. Currently there is no future commercial or industrial land use planned with residents and businesses relying on private infrastructure for water and sewer.

The entire Town of Sparta is zoned either as agricultural, residential, and mixed use with the exception of one (1) light industrial area and one (1) commercial area.

Town of West Sparta

A 2006 future land use map highlighted only two (2) areas of potential economic growth including:

- A Mixed-Use government/residential area is located at the intersection of Kysorville-Byersville Road and Red School Road on the northwest and northeast corners.
- A smaller area at the intersection of Kysorville-Byersville Road and Redmond Road is intended for mixed use (commercial and residential) development.

The zoning map differs from the future land use map in that it shows expanded areas of the mixed use district, located at the northern and southern ends of Route 36/I-390, the western end of Rock Spring Hill Road, and the intersections of Kysorville-Byersville Road and Redmond Road and Kysorville-Byersville Road and Stoner Hill Road. The remaining portion of the Town is agricultural/residential zoned. Lack of public infrastructure is likely a factor inhibiting further growth in the Town.

Town of York

The Town of York's 2006 Comprehensive Plan highlighted several areas for economic development in their Future Land Use map as smaller nodes along major corridors or within proximity of the hamlet including:

- Light industrial nodes at NYS Route 20 east of NYS Route 36, NYS Route 36 at Anderson Road, at York Road East, and on the west side of Retsof Road in the Hamlet.
- Industrial areas are found at the southern end of the hamlet of Retsof (American Rock Salt) and in the Hamlet of Piffard to the east, north of NYS Route 63 (Arkema, Inc.).
- Commercial areas are centered in the hamlet of York and at the intersection of NYS Route 20 and NYS Route 36.
- Residential areas are primarily centered around the Hamlets of York, Retsof, and Greigsville and extend north-south along NYS Route 36 between NYS Route 63 and Cowen Road.

The Town zoning map generally reflects the same trends with the addition of some light industrial areas located at a few locations along the railroad running north and south. The remainder of the Town consists of agriculture and residential land uses, mainly agriculture.

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3 Existing Water Systems

This section of the study will provide a review of the existing public water supplies throughout Livingston County. Section 3.1 looks at the larger picture by providing a summary of Federal, State, and County-wide regulations and standards that directly influence water system operations and any regional or County issues that impact community public water systems. Within Livingston County, various water sources/suppliers are utilized with multiple entities operating the treatment and distribution systems. As such, Section 3.2 is organized by water sources and further broken down by each Town and Village or, in the case of the Livingston County Water & Sewer Authority (LCWSA), those communities it services through its utilization of several sources. An assessment of known or identified concerns within each is included. An overview of local water operations including the distribution network and operators, as well as finances relative to each water system are noted in Section 3.3.

In summary:

- 24 of the 26 municipalities in the County have a public water supply that serves a portion or all of the properties.
- These municipalities receive water from seven (7) different sources (noted below) and eight (8) different water treatment plants.
- The sources of public water for the County and portions of the communities they service, as shown in **Map 3-1**, include Chidsey Road reservoir (*Town and Village of Nunda*), Conesus Lake (*Towns of Geneseo, York, and Avon and the Villages of Avon and Geneseo*), Hemlock Lake (*Towns of Livonia, Conesus, Groveland, Lima, and Sparta and the Villages of Lima and Livonia*), Kellogg Road wells (*Town of Springwater*), Mill Creek/Perkinsville well (*Town and Village of Dansville*), Silver Lake (*Towns and Villages of Mount Morris and Leicester*), and Lake Ontario (*Town and Village of Caledonia*).
- 17 water departments provide the operation and maintenance throughout the County.

3.1 Protection of Public Water Supplies

Water from various sources can be used for a public water system including lakes, ponds, rivers, reservoirs, springs, and groundwater wells. The quality of this water can be affected by various factors including, but not limited to, adjacent land uses, the overall quantity of the source water (e.g. more water creates more dilution of elements/substances), use of the water itself, and connecting waterbodies. Management and planning of watersheds, discharge and non-point pollution standards, and other planning and regulatory mechanisms are all available to protect water quality. This section provides an overview of protection regulations

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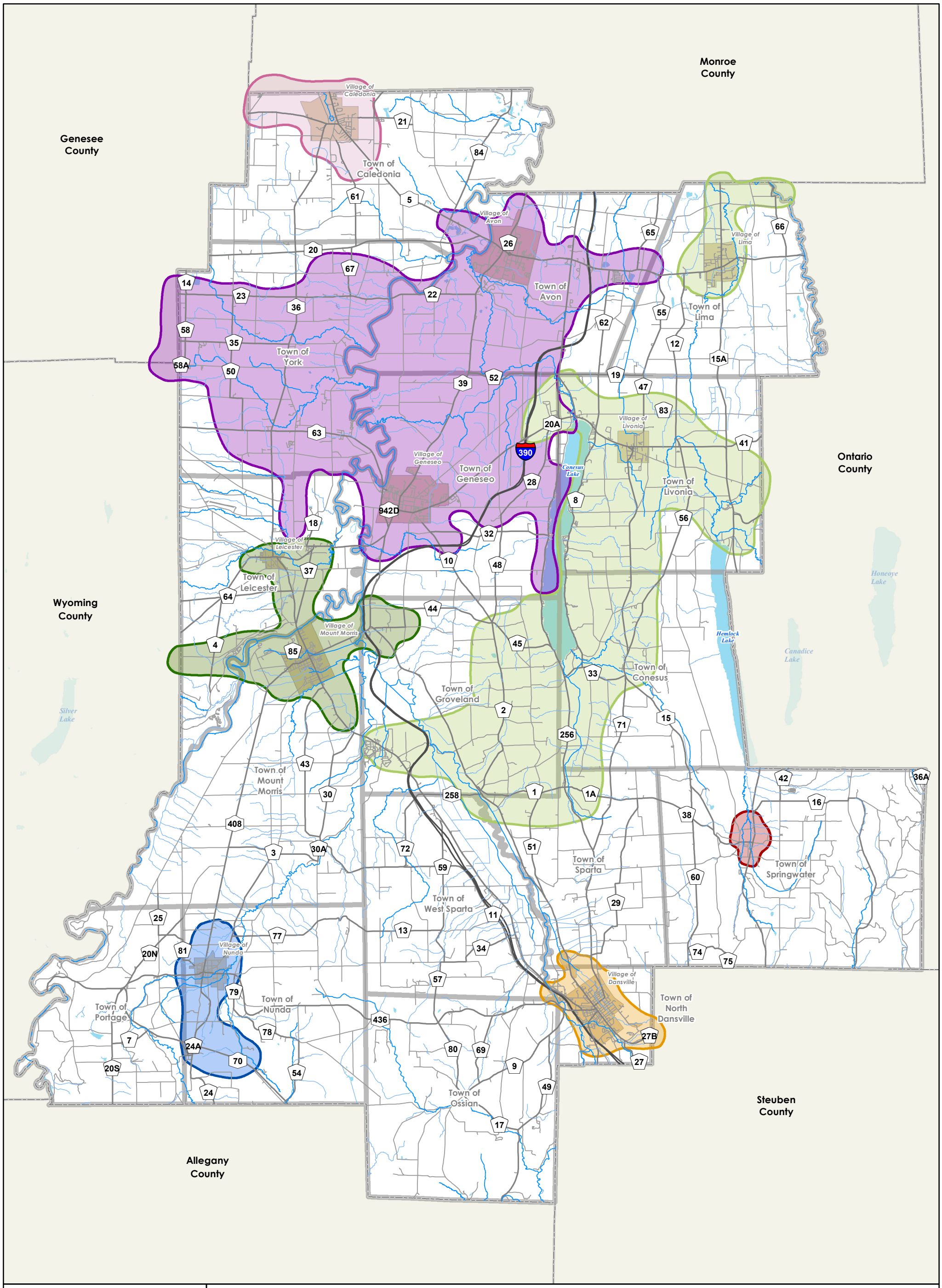

MAP SHEET:

MAP 3-1

MAP TITLE:

Water Supply Service Areas (Generalized)

DATE PREPARED:

AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Chidsey Road Reservoir
- Conesus Lake
- Hemlock Lake
- Kellogg Road Well
- MCWA
- Silver Lake
- Mill Creek-Perkinsville Well

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that are in place at the State, Federal, and local level and also identifies any known issues that pertain to Livingston County water quality.

3.1.1 Safe Drinking Water Act

The original Safe Drinking Water Act was enacted in 1974 to protect public health by regulating the nation's public drinking water supplies. It was subsequently updated in 1986 and 1996 with the latter amendment providing more focus on source water protection, operator training, public information, and funding for system improvements. Together, the Act and its amendments ensure the quality of public water from its source to the faucet. While the treatment and transmission of water is a vital aspect of the overall system, the original source of the water used is equally as critical, setting the stage for overall capacity limits now and in the future as well as the breadth of treatment that is required to provide potable water to users.

3.1.2 America's Water Infrastructure Act (AWIA)

On October 23, 2018, America's Water Infrastructure Act (AWIA) was put into effect. In summary, the law required water systems serving 3,300 or more people to update and/or complete risk and resilience assessments and emergency response plans (ERPs) and established deadlines for completion based on the population served. None of the water systems in Livingston County are required to do the risk assessment or ERP until 2021. The systems that will need to comply by 2021 include the Villages of Avon, Geneseo, and Mount Morris, as well as the Livingston County Water and Sewer Authority. **Table 3-1** below lists the community size and deadlines for the completion of risk and resilience assessments and emergency response plans:

Table 3-1
EPA Certification Deadlines

Population served	Risk and Resilience Assessment	Emergency Response Plan
≥100,000	March 31, 2020	September 30, 2020
50,000 - 99,999	December 31, 2020	June 30, 2021
3,301 - 49,999	June 30, 2021	December 30, 2021

Source: www.EPA.gov

Emergency Response Plans are to be completed no later than six (6) months after the risk and resilience assessment, incorporating all findings. Following the completion and certification of the ERP, the systems must maintain a copy of the risk and resilience assessment and must actively update every five (5) years.

The risk and resilience assessments vary depending on the system and location, but generally include, but are not limited to, natural hazards, resilience of water facilities and infrastructure, monitoring practices, financial systems, chemical storage, operation and maintenance. In doing so, communities can assess the system's current condition and determine where short-term and long-term issues may occur.

Emergency response plans are essential to properly operate a water system. The EPA intends to have these plans in place to reflect the assessments, that are to be updated every five (5) years. Over time, factors effecting a community and their water system can drastically change and therefore frequent updating is being implemented.

3.1.3 Source Water Assessment Program (SWAP)

A source water assessment is a study and report, unique to each water system, that provides basic information about the source water used to supply drinking water. The Safe Drinking Water Amendments (SDWA) of 1996 requires states to develop and implement Source Water Assessment Programs (SWAP) for each of the drinking water sources in the state.

The New York State Department of Health (NYSDOH) recently completed a SWAP for each water source for Livingston County. It is important to stress that these assessments were created using available information and only estimate the potential for source water contamination. Elevated susceptibility ratings do not mean that source water contamination has or will occur for the public water system (PWS). The PWS provides treatment and regular monitoring to ensure the water delivered to customers meets all applicable standards. More information on the SWAP process can be found at the EPA's SWAP website. *(http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/index.cfm)*

3.1.4 Wellhead Protection Program

The Wellhead Protection Program in the 1986 amendments to the Safe Drinking Water Act requires states to protect underground sources of drinking water from contaminants that may adversely affect human health. Groundwater supply is used in the Village of Dansville and Town of Springwater as their primary and/or secondary source of public water but is also used by approximately 36 percent of the County not served by a public supply in the form of private wells. Residential, municipal, commercial, industrial, and agricultural activities all have the potential to contaminate groundwater depending on the level or type of activities undertaken. In the event of contamination, a community or individual drinking water supply can develop poor quality or be lost all together.

Groundwater contamination might not be detected for a long period of time and health problems can occur from drinking contaminated water. Cleanup of a contaminated underground source of drinking water may be impossible or cost prohibitive due to varying levels of complexity. The 1986 amendments to the Safe Drinking Water Act are based on

the concept that it is better to prevent groundwater contamination than try to remediate it. They require identification of the areas that need implementation of control measures to protect public water supply wells from contamination as "wellhead protection areas". The establishment and enforcement of zoning and subdivision regulations can be used to protect drinking water sources; thereby, communities can direct development away from areas that would pose a threat to drinking water sources.

In New York, the Wellhead Protection Program has been included in the Source Water Assessment Program which provides current data on potential contamination threats to any ground or surface water source. Although there are state regulations in place, it is important for County and municipal level governments to monitor actions and development surrounding these well sources. Over the last 30 years, public water sources in the County have leaned towards surface water supply, but the majority of the population in the southern half of the County still heavily rely on ground water in both private and public systems due to the lack of surface water sources.

As noted in Section 2, Livingston County has an extensive agricultural industry in terms of land area and use. Agriculture is a land use which impacts the soil surface and the application of various agricultural chemicals for fertilizers and herbicides is typically connected to surface water quality. It can also impact groundwater. Over time, these chemicals penetrate the soils and slowly leach into groundwater. The permeability of subsoils can limit the extent of this contamination, but groundwater can consist of extensive networks that provide water to significant areas beyond where a single farm is located.

Improvements to agricultural practices have been made at the County and State level in order to reduce agricultural runoff and limit the use of chemicals in operations, but this issue still exists. Continued education, local regulation of stormwater runoff, and best practices will still be needed to minimize contamination from these sources.

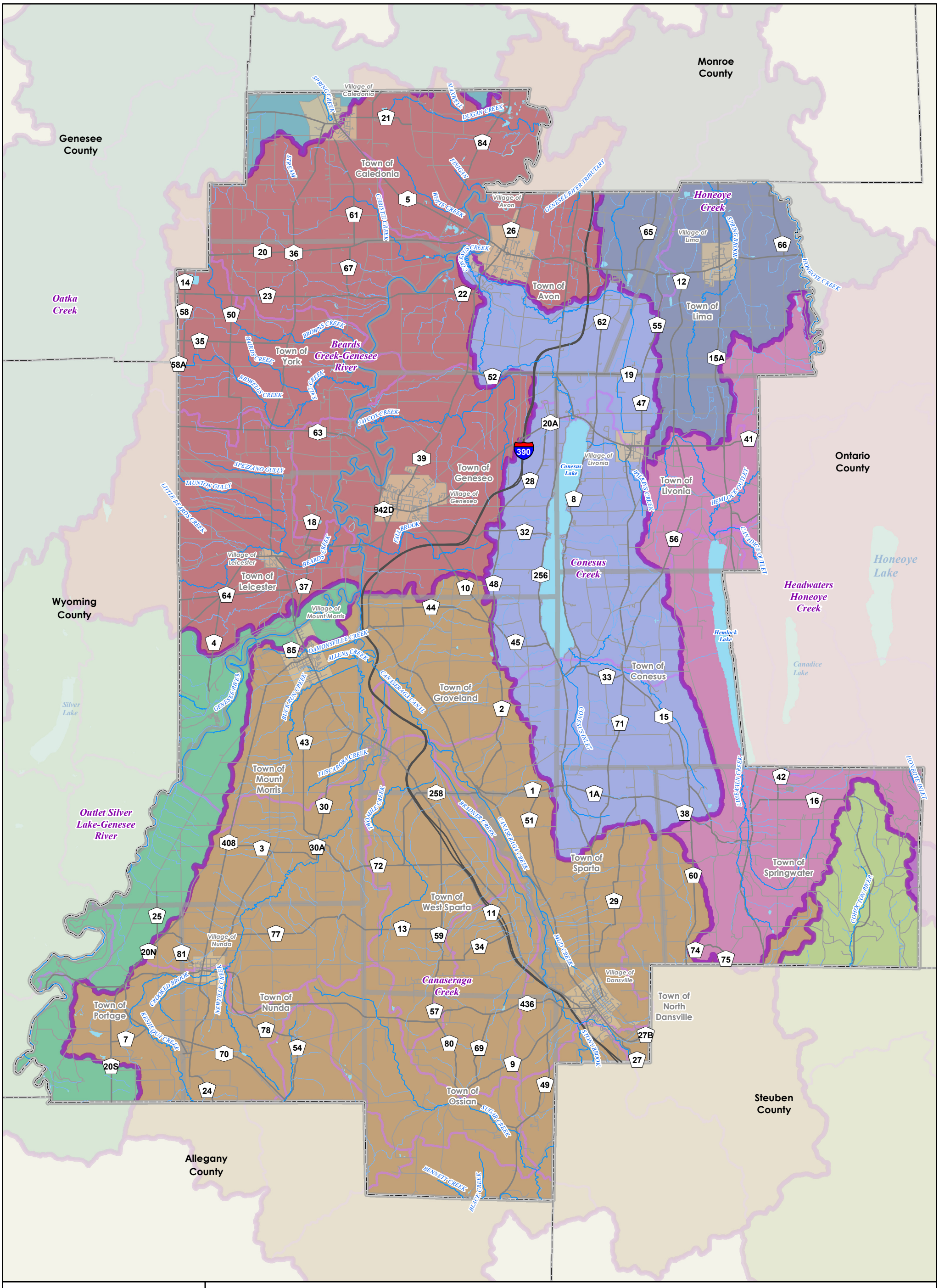
In addition to agricultural operations, residential and some commercial uses may utilize private septic systems as their primary waste removal where public sewer does not exist. According to the United States Geological Survey (USGS), in rural areas such as Livingston County, the most common water quality problem is bacterial contamination from septic systems. This is noted in several instances as a contributing factor in the watershed assessments in Section 3.1.7. Effluent from the systems can seep into groundwater as a result of overflow or leakage and possibly make its way into nearby wells. Though chlorination as part of groundwater well treatment systems can kill any bacteria present, continuous maintenance and monitoring of individual systems including regular pumping, proper disposal techniques, and regular inspections of the entire system (tanks and leach fields) can help to ensure groundwater does not get contaminated.

3.1.5 Livingston County Watershed Assessments

Watersheds, also referred to as drainage basins, are the areas of land that drain streams and other waterbodies as well as rainfall/stormwater to a common outflow point. A watershed consists not only of surface waters but also the groundwater contained within it. Ridges and hills separate watersheds and divide the land into separate sub-watersheds (sub-basins), each draining water from different areas. Since watersheds collect all the water from the surrounding areas, various factors can influence quality such as land cover and use and soil characteristics. This, in turn, can impact surface water quality as well as groundwater that may be used for public water supplies. Public water can be greatly influenced by these watershed basins. Therefore it is essential to be aware of trending impacts and how they may influence water sources.

Livingston County is part of the greater Genesee River drainage basin and **Map 3-2** displays the 10-unit and 12-unit basins that encompass the County. For each of these basins, the NYSDEC publishes a water body inventory/priority list which further breaks them down into sub-basins and their tributaries. In doing so, problematic areas of concern can easily be identified, and preventative practices can be determined. The following is a summary of each of the watershed sub-basins within the County with any potential impacts or impairments noted as of the date of the assessment. Those watersheds that impact public water sources found within the County are noted. Sub-basins within each watershed with *no known impacts,* are *unassessed*, or are not connected to a water source used within the County are not included in the summary. Watershed assessments are categorized into one of five assessment categories according to NYS Section 305(d) Assessment Methodology:

- *Impaired* waters are waterbodies with well documented water quality problems that require restoration measures in order for uses to be supported. These waters are candidates for inclusion on the NYS Section 303(d) List of Impaired/TMDL Waters.
- Waters with *Minor Impacts* are waterbodies where lesser water quality impacts are apparent, but where uses are still considered to be supported. Although water quality improvement is desired, protection – rather than restoration – strategies may be more appropriate for these waters.
- *Threatened Waters* are waterbodies for which uses are not restricted and no water quality problems currently exist, but where additional efforts to protect waters from potential future impacts would be appropriate. Based on declining water quality trends, specific land use in the surrounding watershed, and/or the support of specific uses makes the waterbody more susceptible to water quality threats.
- Waters with Impacts that *Need Verification* are waterbodies that are thought to have water quality impact or impairment, but there is insufficient documentation to justify additional management actions.
- Waters with *No Known Impacts* are waterbodies where monitoring data and information indicate there are no use restrictions or other water quality impacts to uses.



MAP SHEET:

MAP 3-2

MAP TITLE:

Livingston County Watersheds (10-Unit & 12-Unit)

DATE PREPARED:

AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Watersheds (10 unit)
- Watersheds (12 unit)

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- *Unassessed Waters* are waterbodies where adequate water quality information is not available to evaluate the support of any designated uses.

Complete watershed assessments from the NYSDEC are found online through "Chemical and Pollution Control" under the "Water" section (Water Quality Monitoring & Assessment then Waterbody Inventory/Priority Waterbodies List) – the Genesee River WI/PWL drainage basin applies to Livingston County.

Conesus Creek Watershed (Unit Code 0413000301)

**covering Conesus Lake and serving Town of Geneseo, Avon, and York and Villages of Geneseo and Avon.*

Conesus Lake (0402-0004, DEC Assessment 05/01/2018):
This Class AA (drinking water) waterbody is noted as *impaired*. Nutrients (phosphorus) are the major pollutant, but algal growth, invasive species (e.g. Eurasian milfoil), and low oxygen demand were also identified as pollutants. In addition, silt, sediment, and disinfection by-products were suspected to be contributing to the pollution. The majority of these pollutants can be traced back to agriculture land uses (nonpoint pollution) and internal loading (nutrients contained within the sediment of the water). Although it is unconfirmed, on-site wastewater treatment systems are suspected to be an additional source of pollutants. Conesus Lake is on the current (2016) NYS Section 303(d) List of Impaired/TMDL (Total Maximum Daily Load) Waters.

Conesus Creek and Minor Tributaries (0402-0038, DEC Assessment 09/30/2016):
This Class C (general recreation/aquatic life) waterbody is noted as having *minor impacts.* Suspected pollutants are silt, sediment, and nutrients (phosphorus) that can indirectly be traced back to stream bank erosion and agricultural land uses (nonpoint pollution). Recreation and aquatic life are at a stressed impact level.

Canaseraga Creek Watershed (Unit Code 0413000209)
**covering Chidsey Road Reservoir and serving Town and Village of Nunda.*

Canaseraga Creek, Lower, and minor tribs (0404-0001, DEC Assessment 07/09/2015):
This Class C (general recreation/aquatic life) waterbody is noted as having *minor impacts.* Suspected pollutants are silt, sediment, and nutrients (phosphorus) that can indirectly be traced back to stream bank erosion and agricultural land uses (nonpoint pollution). Recreation and aquatic life are at a stressed impact level.

Nunda Reservoir (0404-0030, DEC Assessment 09/01/2019):
This Class A (drinking water) waterbody is noted as *threatened.* While no major pollutants are noted, algal growth and invasive species (e.g. Eurasian milfoil) are known sources. Suspected other pollutants include silt, sediment, and nutrients (phosphorus) that can indirectly be traced back to stream bank erosion and agricultural land uses (nonpoint pollution).

Keshequa Creek, Lower, and Tributaries (0404-0010, DEC Assessment 10/09/2015):
This Class A/C (Class C from mouth to water supply dam, Class A remainder) waterbody is noted as *needing verification.* Limited amount of and age of current sampling requires new samples to verify current conditions. Nutrients and pathogens are unconfirmed pollutants that are suspected, potentially from wastewater discharge at the Groveland Correctional Facility. The Facility has had issues in the past with improperly treated sewage discharge, though in 2001, treatment plant improvements were made in efforts to address this issue.

Keshequa Creek, Middle, and Tributaries (0404-0015, DEC Assessment 07/09/2015)
This Class C (general recreation/aquatic life) waterbody is noted as *needing verification.* Inconclusive results and the age of current sampling requires new samples to verify current conditions. Based on the surrounding land activities and observations, unknown pollutants or biological impacts are suspected to be present due to habitat alteration. All suspect conclusions are unconfirmed and are only educated assumptions.

Keshequa Creek, Upper, and Tributaries (0404-0016, DEC Assessment 10/09/2015):
This Class C (general recreation/aquatic life) waterbody is noted as *needing verification.* Current conditions are inconclusive due to a lack of sampling, but unidentified pollutants are suspected. Similar to the Middle section of Keshequa Creek, habitat alteration is a possible source of pollution.

Bradner Creek and Tributaries (0404-0020, DEC Assessment 05/12/2016):
This Class C (general recreation/aquatic life) waterbody is noted as *needing verification.* Based on limited sampling, recreational water uses are suspected to be stressed and aquatic life is impaired but cannot be confirmed. Sample testing used to make these conclusions is over 10 years old. Pollutant sources are not known, but educated observations conclude that pollutants can be traced back to agricultural practices.

Mill Creek and minor tributaries (0404-0011, DEC Assessment 09/01/2016):
This Class C/TS (general recreation/aquatic life & cold water [trout] fishery) waterbody is noted as *needing verification.* According to the DEC assessment, Mill Creek needs impact verification as past aquatic life samples have indicated impacts near the moderate/impaired threshold. Silt and sediment are suspected to have impacts on aquatic life; respectively, streambank erosion due to water level fluctuation in the creek is the suspect source of silt pollutants. Agricultural land use can also be assumed as a possible source of pollution but cannot be confirmed.

Mud Creek and tributaries (0404-0023, DEC Assessment 05/18/2016):
This Class C (general recreation/aquatic life) waterbody is noted as *needing verification.* Very little data has been collected and analyzed for Mud Creek. As a result, it is only suspected that biological impacts are affecting aquatic life. Pollutants should be verified through additional sampling.

Genesee/Beards Creek Watershed (Unit Code 0413000305)
**not impacting a public water source in the County, private well impacts.*

Christie Creek (0402-0060, DEC Assessment 08/01/2016):
This Class C (general recreation/aquatic life) waterbody is noted as *impaired.* Recreational water uses are stressed and aquatic life is impaired. Biological sampling tests showed significant impacts to the aquatic life, inferring that there may be a direct relationship to recreational uses (fishing and bathing). Identified pollutants included nutrients (phosphorus) and low oxygen demand. Agriculture nonpoint sources are the suspected likely sources of pollutants.

Fowlerville Creek and tributaries (0402-0062, DEC Assessment 09/25/2015):
This Class C (general recreation/aquatic life) waterbody is noted as *threatened.* Silt and sediment pollution are thought to be threatening aquatic life. The NYSDEC emphasized that the Creek should not be used as a water supply or for public bathing. The majority of pollution is suspected to be streambank erosion with the highly erodible soils throughout the Genesee River Basin likely contributing to the sediment load.

Browns Creek and Tributaries (0402-0083, DEC Assessment 09/30/2016):
This Class C (general recreation/aquatic life) waterbody is noted as having *minor impacts.* The impacts associated with Browns Creek are suspected to be due to silt, sediment, and nutrient (phosphorus) pollution. Aquatic life has been evaluated as impaired and water recreation as stressed. In either case, further sampling needs to be completed to confirm these conclusions. Agricultural use is suspected to be the major source of pollution.

Salt/Bidwells Creek and Tributaries (0402-0063, DEC Assessment 09/30/2016):
This Class C (general recreation/aquatic life) waterbody is noted as having *minor impacts.* Recreational water use and aquatic life have both been evaluated as stressed impact levels. It has been confirmed that nutrients, silt, and sediments are the major pollutants present. Agriculture land uses have been directly associated with rising nutrient levels. Stream bank erosion is suspected to be the cause of elevated silt and sediment deposits.

Jaycox Creek and tributaries (0402-0064, DEC Assessment 09/30/2016):
This Class C (general recreation/aquatic life) waterbody is noted as having *minor impacts.* Recreational water use and aquatic life have both been evaluated as stressed impact levels. It has been confirmed that nutrients, silt, and sediment are the major pollutants present. Agriculture land uses have been directly associated with rising nutrient levels. Cow and horse pastures located along the stream bank were associated with nutrient impact in past samples and previous assessments noted manure along the Creek. Stream bank erosion is suspected to be the reason for elevated silt and sediment deposits. Jaycox Creek and tributaries is on the current (2016) NYS Section 303(d) List of Impaired/TMDL (Total Maximum Daily Load) Waters, though proposed for delisting as of the assessment date.

Beards Creek and Tributaries (0402-0037, DEC Assessment 09/30/2016):
This Class C (general recreation/aquatic life) waterbody is noted as *needing verification.* Nutrients are suspected to be present in the current conditions and therefore has elevated the recreation level to stressed and aquatic life to impaired. Chloride and salts are also believed to be present, but no samples have confirmed his. As in many elevated nutrient cases, agriculture practices are suspected to be the major cause and salt impacts from salt mining in the region are concerns.

Oatka Creek Watershed (Unit Code 0413000304)
**not impacting a public water source in the County, private well impacts.*

Oatka Creek, Lower, and Tributaries (0402-0027, DEC Assessment 09/30/2016):
This Class B (public bathing/general recreation/aquatic life) waterbody is noted as having *minor impacts.* Aquatic life has been evaluated as stressed due to nutrient loading that has led to algal and aquatic plant growth. Elevated silt and sediment levels were also observed during sample testing. Agriculture practices and other nonpoint sources as well as municipal wastewater discharge are the source of the nutrients present in the creek. It is suspected that inadequate on-site wastewater systems have also been a large contributor. Streambank erosion, construction/development, inadequate septic systems and urban runoff are contributing nonpoint sources.

Lower Honeoye Creek Watershed (Unit Code 0413000303)
**not impacting a public water source in the County, private well impacts.*

Spring Brook, Lower, and Tributaries (0402-0040, DEC Assessment 09/30/2016):
This Class C (general recreation/aquatic life) waterbody is noted as having *minor impacts.* Impacts associated with Spring Brook are due to stressed aquatic life. Elevated nutrient loading was observed during sampling practices. Surrounding land use, agriculture, municipal (Village of Lima) discharge and inadequate on-site wastewater treatment systems are suspected to be the large contributors. Elevated silt and sediment levels were also suspected to be present in the water due to stream bank erosion.

3.1.6 Conesus Lake Watershed Council

The Conesus Lake Watershed Management Plan (CLWMP) was created in 2003; a guiding document that contains a series of recommended actions designed to improve the quality of Conesus Lake. The Conesus Lake Watershed Council was formed in 2003 to implement the CLWMP. The Council, an intermunicipal organization, includes municipalities with lands within the Conesus Lake Watershed boundaries and water purveyors who use Conesus Lake as a public water supply. Council partners include but are not limited to the Conesus Lake Association, SUNY Brockport & Geneseo, Livingston County Soil & Water Conservation District and Water & Sewer Authority, Cornell Cooperative Extension of Livingston County, Finger Lakes Institute, United States Department of Agriculture (USDA), Natural Resources Conservation Services and NYSDEC on plan implementation. Together, they oversee two key programs: Conesus Lake Watershed Inspection Program (including a Watershed

Inspector in the County Department of Health) and Conesus Lake Watershed Management Program (including a Watershed Manager in the County Planning Department).

The Conesus Lake Annual Report Cards have been developed since 2003 through the combined efforts of the Conesus Lake partners. Using the data obtained for and included in these annual reports, recommendations, action items, and short-term and long-term goals are generated; the Council works to address and implement those recommendations and goals throughout the year. The Conesus Lake Watershed Council is a key asset to preserving one of the major water resources in Livingston County. Additional information regarding the Council along with the most recent (2018) *Report Card* is located in **Appendices B** and **C**.

The development of the *2018 Annual Report Card* highlighted various topics and accomplishments during the year including:

- Continued water quality monitoring in coordination with local schools/colleges and volunteer citizen groups
- Removal of existing and identification of new invasive species in Conesus Lake
- Continued watershed inspection and monitoring
- Monitoring of harmful algal blooms (HABs)
- Education
- Stream restoration and stormwater management
- Agriculture best management practices

Watershed Council has committed to continually seeking opportunities to educate the public on the importance of preserving Conesus Lake; local education being one of the key amendments added to the Safe Drinking Water Act of 1996. Potential water quality concerns arise both in lands immediately adjacent to the lake, as well as, areas further from the lakeshore and within the watershed, including stream and stormwater management, wastewater management, and agricultural impacts. In 2019, 15 community education programs for the public that highlighted the importance of Conesus Lake in the community and how each individual can contribute to its preservation were held at the newly constructed Watershed Education Center, located in Vitale Park at the north end of Conesus Lake.

Harmful algal blooms, further outlined below, is a high priority item outlined in recent Watershed Council reports. The *2018 Annual Report* highlighted elevated amounts of harmful algal blooms and compared them to most recent years, indicating that these occurrences are mainly found in the northern and northwestern regions of the Lake. The Clean Waters Act required the development of a Total Maximum Daily Load (TMDL) for Conesus Lake; the TMDL defines the maximum amount of total phosphorus that Conesus Lake can receive while continuing to meet water quality standards. The TMDL also allocates the maximum allowable total phosphorus load between point and nonpoint sources. Studies

have shown that about 80 percent of the phosphorus in the Lake is related to legacy phosphorus stored in the bottom sediments that is released into the water column (internal loading). The remaining 20 percent comes from runoff from the watershed (external loading). The 80 percent of internal loading can occur through aerobic sediment release and anaerobic sediment release – it is preferred to have a balance between the internal and external loads in waterbodies to minimize long term phosphorus build up that come from higher internal loads. The TMDL recommends a reduction in each load allocation of 57 percent to achieve the targeted water quality standards.

Although the Conesus Lake Annual reports discuss several findings and issues, the most concerning issues outlined include, but are not limited to:

- Increased sodium and chloride levels in treated water at the Village of Avon and Village of Geneseo water treatment plants. High levels of these minerals in water can be a concern to public health especially those on salt-restricted diets as well as interfering with general taste and increase the corrosivity of water, negatively impacting plumbing systems. Additional treatment methods and/or chemicals are necessary to provide safer levels.
- Increased HABs occurrences and resulting advisories, impacting public health and use of the Lake, requiring additional monitoring for occurrences, and potentially additional treatment measures at plants.
- Changes in weather patterns consisting of an increase number and duration of drought periods, more intense rain fall events, and more frequent snow thaws.

Conesus Lake is the drinking water supply for over 19,000 residents (34 percent) in Livingston County. Looking into the future, these issues will need to be addressed to avoid a public health concern and continue to provide water to Conesus Lake's current users.

3.1.7 Silver Lake Association

Similar to the Conesus Lake Watershed Council, the Silver Lake Association (Wyoming County) was created to "protect and improve the environmental quality of Silver Lake and its watershed, and the quality of life around the lake…." The primary difference between these two organizations is that membership in Silver Lake Association consists of residents and business-owners within the watershed and is community-based, though elected officers lead the group and the business end is managed by directors; Livingston County supports the efforts of this organization but is not actively involved.

As the Silver Lake Association is community-based, the extent of the lake monitoring, assessment, and water quality improvements is scaled down, though the Association has credited the following activities and initiatives to their on-going efforts:

- Perry Public Beach renovations

- Community clean up days
- Water quality plantings at Silver Lake State Park (started in 2017)
- Continued water testing and sampling
- Soil testing
- Dredging
- Lake temperature array
- Continuing development of CLEAN (Citizen-Led Environmental Action Network, a 501c3)
- Community education on water quality and watershed protection efforts

Through the Silver Lake Association and in conjunction with the Wyoming County Soil and Water Conservation District, a 2017 water quality assessment was developed that continued to make the case for dredging on the north end of the lake as well as note other water quality concerns such as the presence of HABs, invasive species, and an increase in organic matter (internal loading and external sources). The Association has documented that strategic dredging would be beneficial to remove nutrient rich sediment in the lake which has, in turn, contributed to an increase in invasive species growth and ion of HABs. Though this is a matter for Wyoming County to address, as Silver Lake provides public water to numerous communities in Livingston County, continued cooperation and coordination on water quality improvements will be mutually beneficial to water users in both counties.

3.2 Water Source & Treatment – Quality & Quantity

Approximately 64 percent of Livingston County residents are served by public water, with the remaining 36 percent served by private systems, primarily individually owned wells. Public water supplies consist of various sources, including surface waters such as lakes, reservoirs, and creeks, as well as groundwater wells or springs. Each water system in the County, regardless of the water source, is issued a water system permit and water system ID from New York State. The State Department of Environmental Conservation (NYSDEC) monitors many of these supplies and allocates a set amount of daily water withdraw; local treatment plants are limited in their capabilities by this allocation as well as the individual plants design treatment capacity. In several instances, a single water source is used by several water suppliers (responsible for treatment and transmission), in turn providing water to not only the immediate community but also to outside users ("out of district") or through expansions to the service district.

The water supply sources that are available to serve Livingston County are shown in **Table 3-2** and further outlined on the following pages, including water quantity/capacity and quality, with any known or identified quality/quantity concerns noted based on the most recent assessments, and water treatment measures undertaken. **Map 3-1** provides a

generalized indication of the extent of the service areas that each water supply provides raw to, based on watermains and water districts. Hydraulic grades for each water source and corresponding service area are shown in **Map 3-3**, providing the elevation for gravity-fed water storage tanks and regulated water withdrawal sites are shown in **Map 3-4**. A summary of all of this information, including the municipalities each treatment facility serves, is found in **Table 3-3**.

Table 3-2
Water Source and Allocation

Source	NYSDEC Permitted Allocation (MGD)
Springwater Wells	0.20
Chidsey Reservoir (Newville Creek)	0.38
Village of Nunda Secondary Wells	0.11
Silver Lake	
Village of Mount Morris Allocation	1.5
Perry Allocation	2.0
Required flow for Perry WWTP	0.70
Emerling Farms/Ed Rechberger *(former LeRoy Allocation)*	2.0
Total Allocation	***6.15***
Mill Creek	Entire Flow of Creek
Perkinsville Wells (2 Wells)	Combined 2.0 (not to exceed 200,000,000 gal/year)
Conesus Lake:	
Village of Avon Allocation	3.5
Village of Geneseo Allocation	3.0
Required flow for Lakeville WWTP	6.46
Total Allocation	***12.96***
Hemlock and Canadice Lakes:	
City of Rochester Allocation	44.0
LCWSA Agreement with the City of Rochester	3.0
Town of Livonia Agreement with the City of Rochester	0
Village of Lima Agreement with the City of Rochester	0.275

Table 3-2
Water Source and Allocation

Source	NYSDEC Permitted Allocation (MGD)
Town of Lima (Water Districts #1 & #3) Agreement with the City of Rochester	0.050
Total Allocation	***48.00***
Lake Ontario:	
Monroe County Water Authority (MCWA):	200.0
Village of Caledonia Agreement with MCWA	MCWA Purchase Agreement
Total Allocation	***200.00***

Springwater Wells

The Town of Springwater's water sources are groundwater wells - groundwater is drawn from two drilled wells approximately 30-foot deep which are located off Kellogg Road. The wells draw from an unconfined aquifer with unknown hydraulic conductivity. The SWAP assessment has rated these wells as having a medium susceptibility to microbial, nitrate, pesticides, solvents, and other contaminants.

The 0.07 mgd treatment plant has filters and the water is chlorinated prior to distribution. The approximate cost to produce and treat the water is $2.79 per 1,000 gallons. The water treatment plant has approximately 10-20 years before any major upgrades are required.

Chidsey Reservoir (Newville Creek)

The Village of Nunda water source is a man-made impoundment reservoir on Chidsey Road in the Town of Nunda, holding an estimated 13 million gallons of water and was completed in the early 1960's. The Village also has a secondary well source for emergency purposes, capable of producing 0.43 mgd with a maximum daily withdrawal allocation of 0.11 mgd. In an event in which the well would need to be utilized, all raw water would be sent to the Village of Nunda water treatment facility. The secondary well is tested monthly for maintenance purposes.

For the reservoir on Chidsey Road, the SWAP assessment found an elevated susceptibility to contamination for this source of drinking water. The amount of agricultural lands in the assessment area results in elevated potential for protozoa and pesticides contamination. No permitted discharges are found in the assessment area. There is also considerable contamination susceptibility associated with other discrete contaminant sources, including mines. Finally, it should be noted that hydrologic characteristics (e.g. basin shape and flushing rates) generally make reservoirs highly sensitive to existing and new sources of

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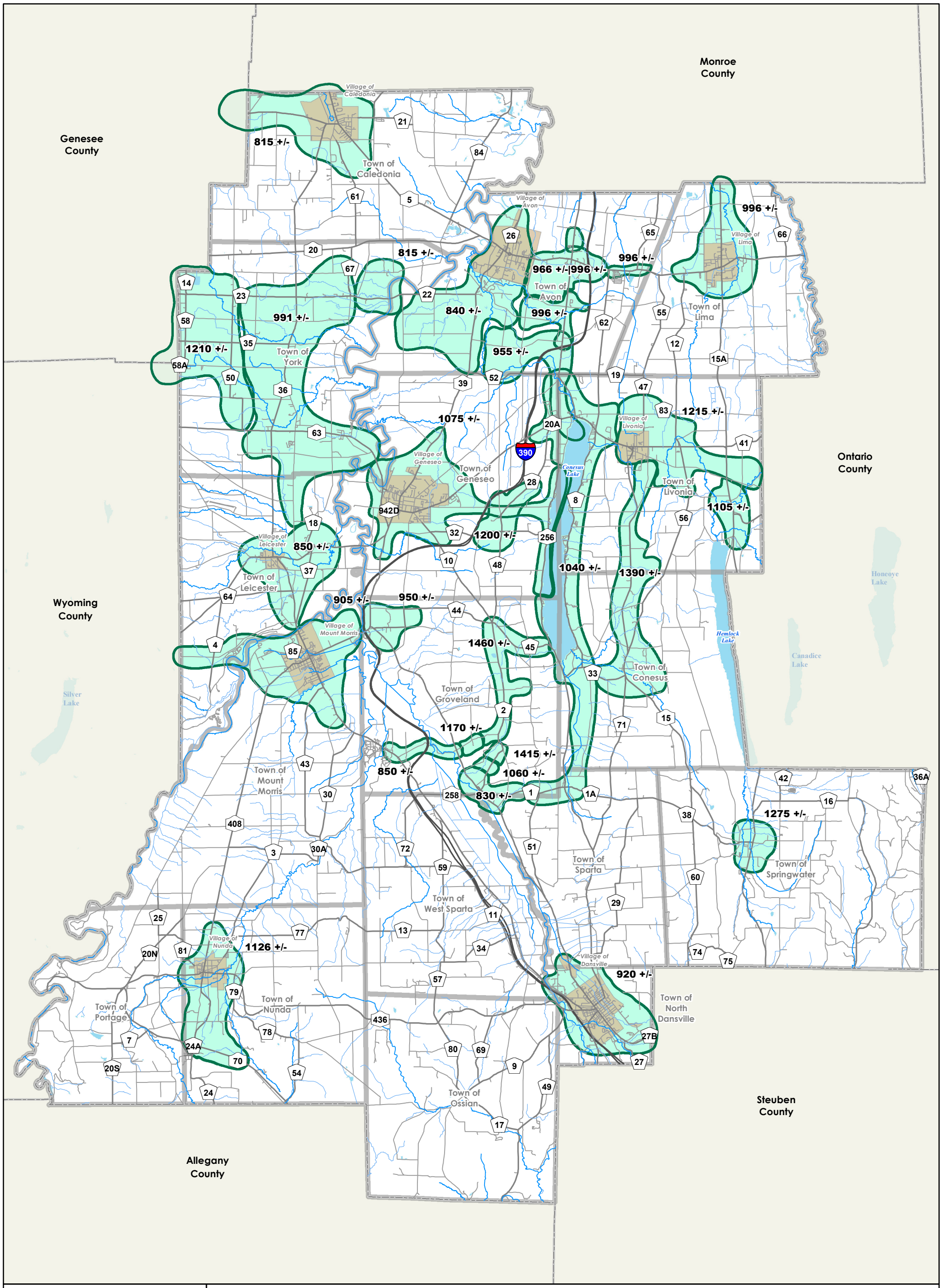

MAP SHEET:

MAP 3-3

MAP TITLE:

Hydraulic Grade Levels (Generalized)

DATE PREPARED:

AUGUST 20, 2020

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PLANNING
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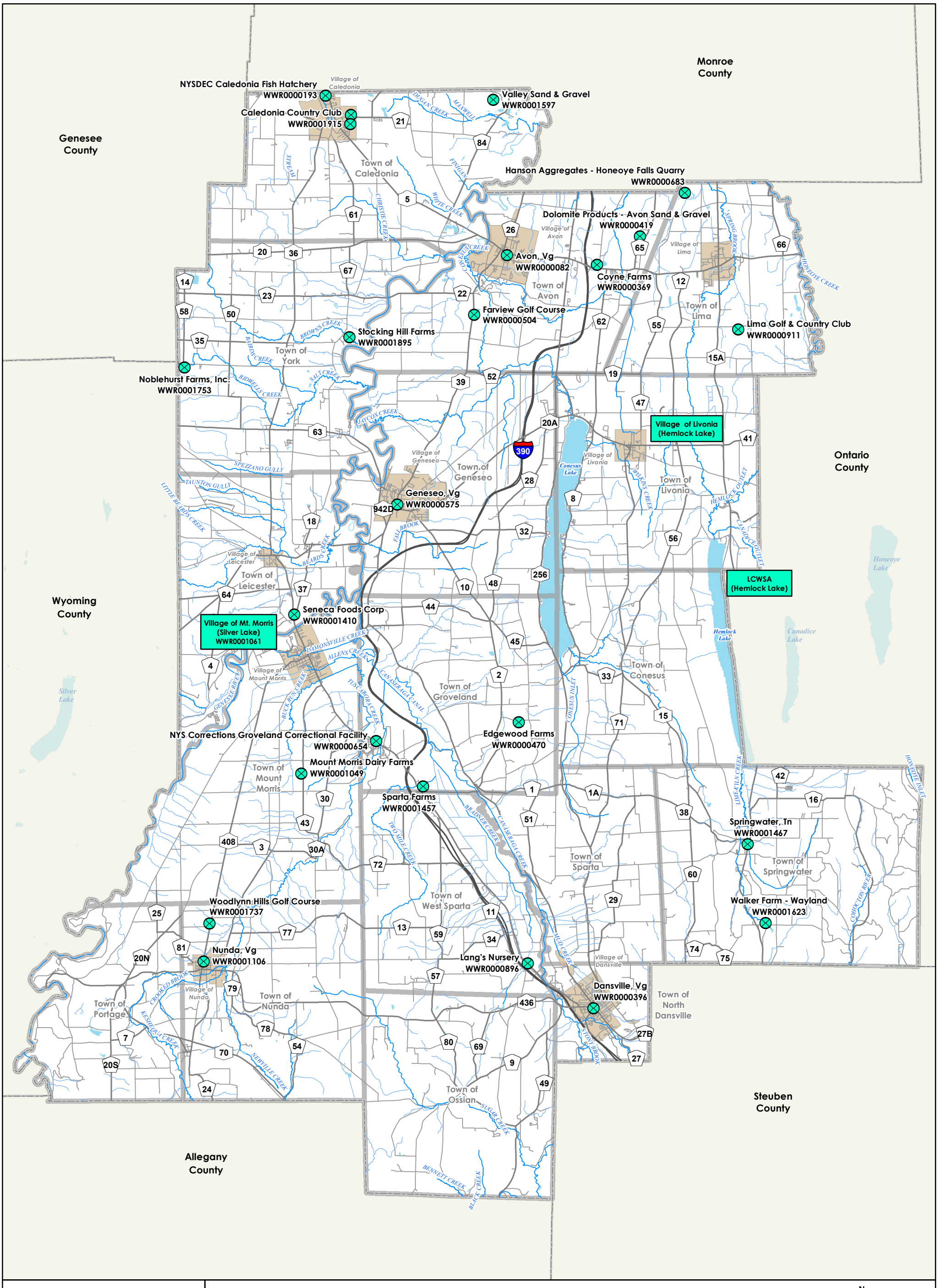

MAP SHEET:
MAP 3-4

MAP TITLE:
NYSDEC Regulated Water Withdrawal Sites

DATE PREPARED:
AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies

N W E S

0 0.5 1 2 Miles

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phosphorus and microbial contamination. Recently, the Village of Nunda has had to pre-chlorinate raw water prior to the treatment plant due to algal growth in the reservoir during the months of August and September. Although there are no health concerns at this time, the Village has taken efforts to monitor algal growth during the late summer months.

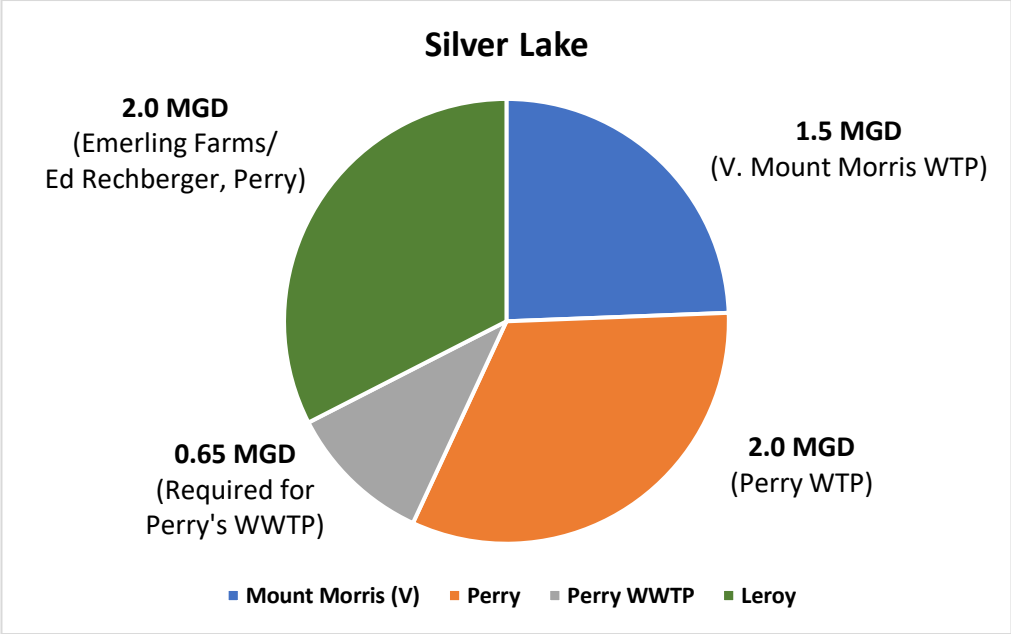
The 0.13 mgd treatment plant includes two clarification tanks, where a coagulant is added to optimize settling. Gravity-fed multimedia filters then remove the finer organic and inorganic matter with the final stage of treatment consisting of disinfection with chlorine. Ortho-phosphates are also added for corrosion control in the distribution system. The approximate cost to produce and treat the water is $3.13 per 1,000 gallons. The water treatment plant has approximately 10-20 years before any major upgrades are required.

Silver Lake

Silver Lake, located in Wyoming County, is currently used as a source of potable water by the Village of Mount Morris, as well as the Village of Perry in Wyoming County. Within Livingston County, the Village of Mount Morris provides water not only to the Village and portions of the Town but also portions of the Town and Village of Leicester. In addition, there is also a water supply permit that was turned over from the Village of LeRoy to Emerling Farms/Ed Rechberger in Perry. A small number of Wyoming County residents along the lake shore have private individual intakes in the lake. A downstream release requirement of 0.646 mgd exists for the Perry wastewater treatment facility located on the Silver Lake Outlet.

The total combined maximum daily allocated withdrawals from Silver Lake permitted by the NYSDEC are 6.15 mgd - 2 mgd for Perry, 1.5 mgd for Mount Morris, 0.646 mgd (1 cfs) for the Perry WWTP, and 2 mgd for Emerling Farms/Ed Rechberger in Perry (former LeRoy allocation). Based on information contained in the 1991 Water Study, the safe yield of Silver Lake has been estimated to be 5 mgd. Given that Silver Lake allocated withdrawals exceed the estimated safe yield, further increases in allocated withdrawals are unlikely. **Figure 3-1** below, represents the maximum daily allocated withdrawals from Silver Lake:

Figure 3-1: Silver Lake Water Withdraw Allocations



The SWAP (Source Water Assessment Program) assessment found an elevated susceptibility to contamination for this source of drinking water. The amount of agricultural lands in the assessment area results in elevated potential for pesticide, Disinfection Byproducts precursors, and microbial and phosphorus contamination. In addition, the elevated density of CAFO's (Concentrated Animal Feeding Operations) in the assessment area (see **Map 2-3**) very likely adds to the potential for contamination. No permitted discharges are found in the assessment area and there are no noteworthy contamination threats associated with other discrete contaminant sources (i.e. point source pollution). Additional sources of potential contamination include an active railroad system and a golf course.

The Village of Mount Morris' pump station near the Silver Lake outlet delivers raw water from two 15-hp pumps, through a 10-inch transmission main, to a 5-million gallon reservoir at the 1 mgd water treatment plant. The raw water transmission main has approximately 5 years or less before any major upgrades are required.

Although late summer algae blooms create some taste and odor removal problems, the quality of raw water is very good. Turbidities (cloudiness of water) of around 1.0 NTU (nephelometric turbidity units) and pH ranges of around 8.00 are optimal for their treatment processes. As water is withdrawn from the Lake, copper sulfate is injected to the raw water to discourage algae growth as well as periodically injecting sodium hypochlorite to discourage zebra mussels prior to being pumped to the reservoir.

Water from the reservoir then enters the treatment plant and undergoes various processes including coagulation, using a solution of aluminum chloride hydroxide sulfate (a

coagulant); clarification; mixed media filtration (anthracite, sand, garnet); corrosion control using blended phosphates; and disinfection using sodium hypochlorite. The Village has plans to make improvements to the water treatment plant in 2019 and 2020. These improvements include: air scour system for the intake, mixing and aeration system in the treatment plant reservoir, replacement of weirs, construction of a third filter, replace valve on backwash pumps, addition of a vacuum priming system, addition of new controls, replacement of sludge equipment, baffling in the clearwell to increase chlorine contact time and instrumentation improvements to improve flow rate. The approximate cost to produce and treat the water is $1.73 per 1,000 gallons.

Finished water turbidities varied between 0.02-0.28 NTU's – EPA limits are no higher than 1 NTU and less than/equal to 0.3 NTU in at least 95 percent of samples in any month. An acceptable level of free chlorine (or chlorine residual) is maintained in the clear well (storage tank) and throughout the entire distribution system to prevent recontamination and ensure inactivation of giardia lamblia cysts and bacteria. The treatment process is completed as water exits the 1 million gallon clear well and enters the distribution system.

Mill Creek and Perkinsville Wells

The Village of Dansville obtains its water from two sources - a surface supply and a backup well site with two wells. The surface supply, the primary source of raw water for the Village, is the Little Mill Creek, which is located southeast of the Village. An impounding reservoir approximately 15 acres in area is located three miles east of the Village on Reservoir Road in the Town of Wayland, Steuben County. The outflow from this reservoir flows into Little Mill Creek, to the surface water intake located on the creek approximately two miles southwest of the impounding reservoir and approximately two miles southeast of the Village. The water is diverted to the intake by a small concrete dam, which creates a shallow impoundment. Two sets of manually cleaned screens remove large materials from the water which then enters a 12-inch and 6-inch transmission main. The water is conveyed by gravity flow to the existing treatment facility. The maximum daily withdraw allocation is the entire flow on Little Mill Creek.

While the Little Mill Creek supply is currently the main source of water for the Village of Dansville, the Perkinsville wells are used to supplement the water supply when the quality of the creek water drops below the treatment plant's ability to treat it (i.e. during storm runoff periods).

The Village well site is located off County Route 91 in the Town of Wayland in Steuben County just north of the Hamlet of Perkinsville. There are two wells at the site, both of which were installed in 1964. The water is conveyed to the treatment site by a 12-inch water main that runs west from the well site to an abandoned railroad right-of-way then north to the treatment site. The maximum daily withdraw allocation for the Perkinsville wells is a combined total of 2.0 mgd but cannot exceed 200,000,000 gallons per year. These sources

provide water through the Village of Dansville to portions of the Town as well as the Town of West Sparta.

The SWAP assessment for this drinking water source contains no discrete potential contaminant sources, but the amount of agricultural land in the watershed for this drinking water source poses a variety of risks to drinking water quality due to nonpoint stormwater runoff. The greatest risks are associated with microbial contaminants, followed by pesticides, phosphorus, and Disinfection-Byproduct precursors.

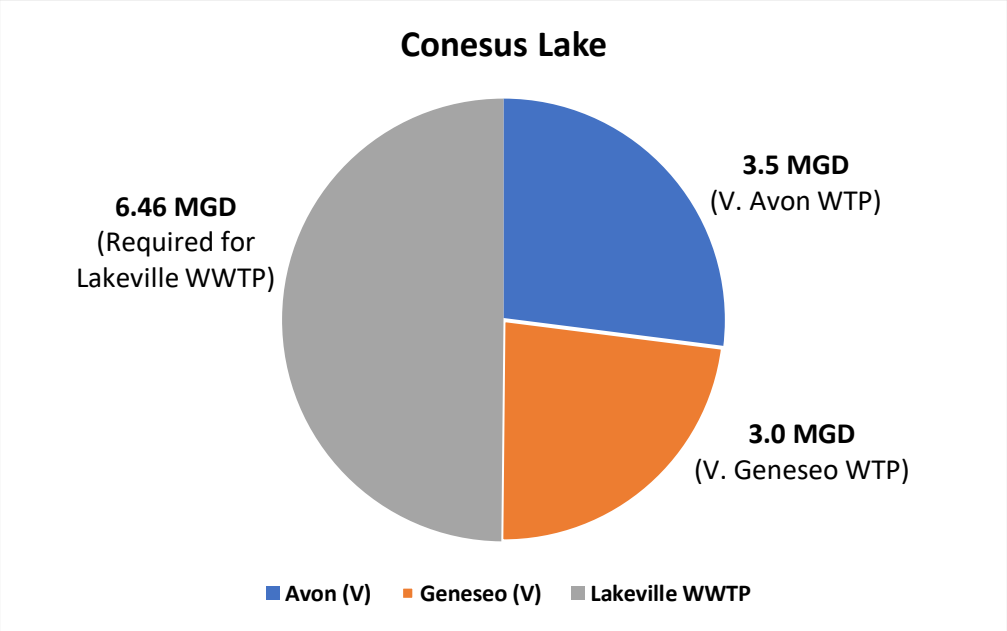
The 3 mgd Dansville Water Treatment Plant was constructed in 2001 and is located at 9880 Highland Avenue, just east of the Village. Prior to distribution, the water is treated using coagulation and filtration, liquid chlorination, fluoridation, and a sequestering agent for lead and copper corrosion control. The approximate cost to produce and treat the water is $2.53 per 1,000 gallons. The water treatment plant has approximately 5-10 years before any major upgrades are required.

Conesus Lake

Conesus Lake is a source of potable water for the municipal water systems within the Villages of Avon and Geneseo, the Towns of Avon and York, and a majority of the Town of Geneseo. The Village of Geneseo also supplies water to portions of the Town of Leicester and the Village of Avon supplies water for portions of the Town of Caledonia. In addition to a potable water supply, Conesus Lake is used for a variety of other purposes including recreation (including boating and swimming), flood control, fish spawning, and a downstream release requirement for the LCWSA wastewater treatment facility located on Conesus Lake Outlet.

The maximum daily withdrawal allocations from Conesus Lake, determined by the NYSDEC, include the Village of Avon at 3.5 mgd, the Village of Geneseo at 3.0 MGD and the downstream release of 6.46 mgd (10 cfs) for dilution of the LCWSA wastewater treatment plant effluent discharge in Conesus Lake Outlet. This results in a maximum day yield for the lake of 12.96 mgd. **Figure 3-2** represents the maximum daily allocated withdrawals from Conesus Lake:

Figure 3-2: Conesus Lake Water Withdraw Allocations



The safe yield of Conesus Lake was evaluated three separate times, in a 1970 report completed by Teetor-Dobbins, in a 1987 report completed by Weston, and in 1994 by the Bureau of Water Resources Division of Water. These studies reported a dependable safe yield of Conesus Lake as 12.0 mgd, 10.7 mgd, and 7.8 mgd respectively, which is 1.0 mgd, 2.3 mgd, and 5.2 mgd less than the maximum day yield (water demand) of 12.96 mgd noted above. With a 6.46 mgd downstream release requirement for LCWSA, the maximum water supply yield would be approximately 1.3 mgd based on these past reports, indicating that the lake is over-allocated.

As part of the water quality reporting, Conesus Lake SWAP assessments were generated for both the Village of Geneseo and Avon, as they are individual community water systems though drawing from the same source. In each assessment, there is an increased susceptibility to contamination, primarily due to agricultural stormwater runoff, though the assessments for each municipality differ in their susceptibility levels – Geneseo is rated as "elevated" and Avon is "moderate." The amount of agricultural lands within the watershed increase the potential for microbial and phosphorus contamination (Geneseo) and pesticides (Avon). In both assessments, there are no noteworthy contamination threats associated with other discrete contaminant sources (i.e. point source pollution). The Avon assessment notes that while lakes are not generally considered to have a high natural sensitivity to phosphorus in SWAP, Conesus Lake already has algae problems; therefore, additional phosphorus contribution would likely result in further water quality degradation.

As noted in Section 3.1, specifically 3.1.5 (Conesus Lake Watershed Council), and 3.1.7 (Livingston County Watershed Assessments), the water quality of Conesus Lake is an on-

going concern and one which is actively being monitored and addressed through the actions of the Conesus Lake Watershed Council. HABs (harmful algal blooms) were identified as one of the primary water quality concerns, with an increase in observed occurrences being recorded since reporting became more regular beginning in 2014. Changes in weather patterns, such as an increase and duration of drought periods, more intense rain fall events, high levels of internal phosphorus loading, and more frequent snow thaws also have been noted as conditions which impact water quality of the lake. The NYSDEC watershed assessment from Section 3.1.7 notes that Conesus Lake is on the 2016 NYS Section 303(d) List of Impaired/Total Maximum Daily Load (TMDL) Waters. Additional details regarding HABs in Conesus Lake can be found in Section 3.2.1.

In terms of treatment of raw water from Conesus Lake, takes place at two facilities – in the Village of Geneseo (serving the Village and Town of Geneseo and Town of York) and the Village of Avon (serving the Village and Town of Avon). The treatment at each of these facilities is outlined below.

Village of Geneseo

Water is drawn into the 2 mgd treatment plant, located along Blue Heron Drive in the Town of Geneseo, through an intake line that extends into Conesus Lake. After filtration, disinfection, fluoridation, and corrosion control processing, the treated water flows into a clear well to achieve the proper chlorine contact time and is then pumped to the distribution system. The depth of the water intake pipe for the Village of Geneseo is at an elevation of approximately 794 feet above sea level. The approximate cost to produce and treat the water is $1.80 per 1,000 gallons. The water treatment plant has approximately 5-10 years before any major upgrades are required.

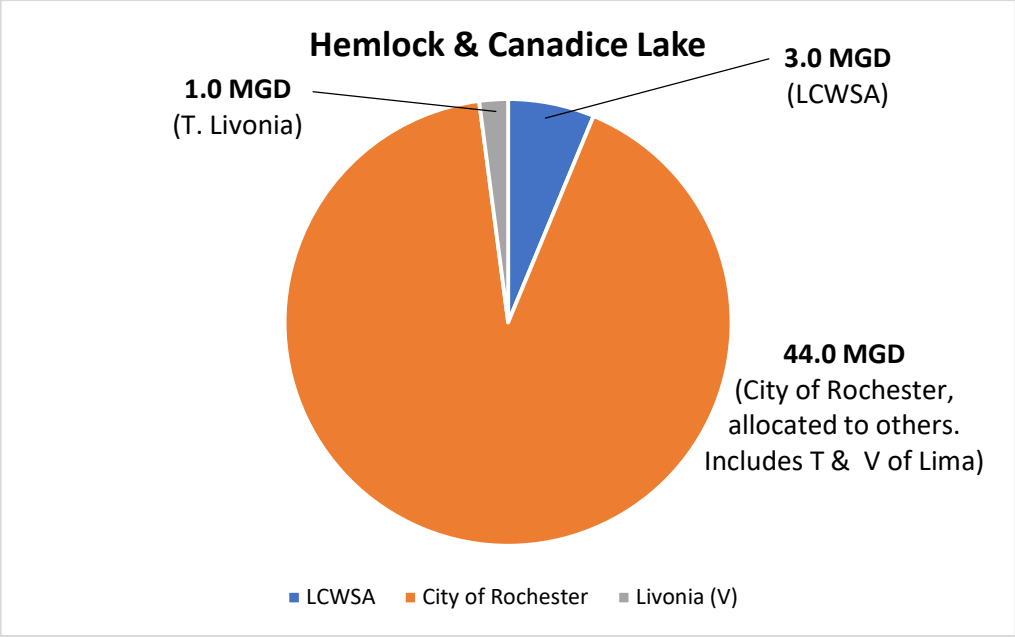
Village of Avon

Water from Conesus Lake is pretreated with chlorine to control zebra mussels and then pumped from their pumping facility in Lakeville to their 1 MGD treatment plant at 3262 NYS Route 256. A coagulant is added to remove organic material and the water is then filtered, chlorinated, fluoridated, and corrosion control treatment is added prior to distribution. Prior to being pumped into the distribution system water is stored in a 70,000 gallon clear well in Lakeville. The depth of the water intake pipe for the Village of Avon is located on the north side of the lake at an elevation of approximately 803 feet above sea level. The approximate cost to produce and treat the water is $1.86 per 1,000 gallons. The water treatment plant has approximately 5-10 years before any major upgrades are required.

Hemlock and Canadice Lakes

Since 1876, Rochester residents have relied upon Hemlock and Canadice Lakes for their drinking water supply. Though these are two separate physical lakes, they are connected through conduits to the Hemlock Filtration Plant and act as one single water source (each are protected and are undeveloped greatly decreasing risk of contamination). The average annual allowable daily demand from Hemlock and Canadice Lakes is 37 MGD with a maximum daily demand of 48 MGD. Records from a 1944 Proposed Improvement/Extension Report (Robert E. Horton) indicate a dependable safe yield of 40 MGD based on the then present sources of supply (both lakes) as well as the conduits and dam in place. A subsequent Fiscal Year 1945-1946 New York State Department Report (Volume 66) notes a yield of between 37 and 47 MGD, but an "original combined capacity" of 40 MGD. **Figure 3-3** on the following page represents the maximum daily allocated withdrawals from Hemlock and Canadice Lakes.

Figure 3-3: Hemlock and Canadice Lake Water Withdraw Allocations



The Hemlock Filtration Plant is a direct filtration plant with a capacity of 48 million gallons per day and employs processes involving pH adjustment, coagulation, filtration, disinfection, and fluoridation. The approximate cost to produce and treat the water is $0.44 per 1,000 gallons.

During coagulation, chemicals are added to untreated water causing the natural particulates to clump together into larger particles called floc. The floc is removed by filtration and the water is then disinfected with chlorine.

Carbon dioxide is used to adjust water pH as part of the corrosion control strategy. A pH range of 7.7 – 8.0 is maintained to ensure water in the distribution system is stable and not corrosive to pipes. This is also one of the many New York water utilities providing drinking water with a controlled low level of fluoride for consumer dental health protection. According to the U.S. Centers for Disease Control, fluoride is very effective in preventing cavities when present in drinking water at an optimal level of 0.7 mg/L.

Water treated at the Hemlock Filtration Plant flows to the City of Rochester by gravity through three large pipelines. Along the way, water is sold wholesale to water districts in the Town and Village of Lima, Livingston County Water and Sewer Authority (LCWSA), and Monroe County Water Authority (MCWA) – see **Map 3-1** (Water Supply Service Areas). LCWSA provides water to portions of the Towns of Conesus, Groveland, Livonia, and Sparta along with the Village of Livonia. LCWSA has a maximum daily withdraw allocation of 3.0 mgd, including 0.50 mgd designated to the Village of Geneseo and 0.75 mgd to DOCCS, and the Town of Livonia has a separate water withdraw allocation of 1.0 mgd. LCWSA's Hemlock pump station supplies water to the services area described above. The Hemlock pump station has approximately 20-30 years before any major upgrades are required. The Village of Lima has their own pump station that supplies the Village of Lima and a portion of the Town of Lima. The Village of Lima pump station has approximately 10-20 years before any major upgrades are required.

The treated water is stored in the City's three reservoirs—Rush Reservoir, Cobbs Hill Reservoir, and Highland Park Reservoir. It is disinfected again as it exits each reservoir and enters a complex grid (over 550 miles) of water mains that distribute the water to City customers. Lake Ontario water from MCWA is pumped into the City distribution system at the Mount Read Boulevard pump station near West Ridge Road. Some areas of the City receive either Hemlock Lake or Lake Ontario water—or a mixture of both—depending on the season.

The SWAP assessment identified several potential sources of contamination, none particularly noteworthy. The government's ownership and control of a large amount of property surrounding the lakes, couple with its routine surveillance and testing programs, helps assure on-going protection of this resource. Testing of these pristine lakes performed to date confirms that contamination from human activity is negligible.

Lake Ontario

The Monroe County Water Authority (MCWA) services Monroe County and portions of each of the five surrounding counties. Their service area includes over 50 towns, villages, cities, and other water authorities. The Authority presently serves approximately 200,000 separate retail, wholesale, and other customer accounts. (See **Map 3-1**, Water Supply Service Areas and **Map 3-6**, Regional Water Systems)

MCWA's primary source of water is Lake Ontario. The water is treated at the 150 MGD Shoremont water treatment plant in the Town of Greece, and the 50 MGD Webster water treatment plant in the Town of Webster. MCWA's other major source of water consists of water purchases from the City of Rochester pursuant to an existing exchange agreement. This water comes from Hemlock and Canadice Lakes in Livingston County south of Monroe County.

MCWA can also purchase water from the Town of Ontario, Wayne County; the City of Batavia, Genesee County; and the Eric County Water Authority. These sources are minor in relation to the overall water system and are for convenience or pursuant to terms of agreements when MCWA became the provider of water.

The Shoremont and Webster water treatment plants employ the direct filtration process using Lake Ontario as their source of supply. The main components of each plant are the raw water intake, pumping and transmission, chemical addition, rapid mixing, contact basins, filtration, residuals disposal, clearwell storage, and high lift pumping. The entire water supply receives the same chemical process, coagulation, filtration, carbon absorption, and disinfection. Water is pumped from the treatment plants to storage facilities and customers in the water system service area through approximately 3,300 miles of transmission and distribution mains, ranging in diameter from 2" to 60". The water system operates 51 pumping stations to provide the pressure to distribute water to storage facilities and customers. The system includes two reservoirs and 49 other storage facilities with an aggregate capacity of 140 million gallons. The approximate cost to produce and treat the water is $0.59 per 1,000 gallons.

The MCWA water system supplies several Towns and Villages in Monroe, Livingston, Genesee, Orleans, Wayne and Ontario Counties with interconnections in place with the Genesee County Water Resources Agency as well. Within Livingston County, the Village of Caledonia is the only community receiving water from MCWA through a connection and pump station in the Town of Wheatland. This pump station in the Town of Wheatland (Caledonia/Mumford pump station) has recently been built in 2020 has approximately 30 years or more before any major upgrades will be required. Other water interconnections exist with the Genesee County Water Resources Agency in the Town of LeRoy to the west, using the Village's transmission mains that lead to the abandoned treatment plant in Pavilion. As of the development of this study, Genesee County is investing in its system (Phase 2 and 3) which will increase supply within their borders. Utilization of MCWA/Genesee County water within Livingston County will require some level of investment by the County to build on the above-mentioned phases, expand infrastructure, make improvements to existing facilities, or some by some other means as guided by this study update.

The Great Lakes' watershed is exceptionally large, and it is beyond the scope of the SWAP to inventory and describe susceptibility to all the potential sources of potential contamination. Overall, the quality of drinking water collected from the Great Lakes is

considered to be excellent due to their overall volume and the high level of oversight and regulation set forth for these large fresh waterbodies. Some of the general concerns for Great Lakes public drinking supplies include storm generated turbidity, wastewater, toxic sediments, shipping related spills, and problems with exotic species (e.g. zebra mussels – intake clogging and taste and odor problems). It is important to note that raw drinking water quality is most often determined by the lake's overall quality with near shore impacts being widely diluted in the Great Lakes. It has been determined that this intake is not directly impacted by activities on the nearby shoreline. Therefore, drinking water concerns are determined by overall quality of Lake Ontario.

Table 3-3
Livingston County
Existing Water Sources and Capacity

Source	Water Treatment Facility *Municipality Served*	NYSDEC Water Allocation (MGD)	Treatment Capacity (MGD)	Average Water Usage 2017-2019 (MGD)	Max Water Usage 2017-2019 (MGD)	Available Water Capacity (MGD)
Springwater Wells	Town of Springwater WTP *Springwater (T)*	0.2	0.288	0.034	0.070	0.13
Chidsey Reservoir	Village of Nunda WTP *Nunda (V)* *Nunda (T)*	0.38/0.11	0.2	0.134	0.226	No Capacity
Silver Lake	Village of Mount Morris WTP *Mount Morris (V)* *Mount Morris (T)* *Leicester (V)* *Leicester (T)* *LCWSA (ARS Service Area)*	1.50	0.9	0.514	0.800	0.100
Mill Creek/ Perkinsville Wells	Village of Dansville WTP *Dansville (V)* *North Dansville (T)* *West Sparta (T)*	Unlimited/ 2.0 (Combined)	2.0	0.483	0.865	1.135
Conesus Lake	Village of Avon WTP *Avon (V)* *Avon (T)* *Caledonia (T)*	3.5	1.0	0.746	1.103	No Capacity

Table 3-3
Livingston County
Existing Water Sources and Capacity

Source	Water Treatment Facility *Municipality Served*	NYSDEC Water Allocation (MGD)	Treatment Capacity (MGD)	Average Water Usage 2017-2019 (MGD)	Max Water Usage 2017-2019 (MGD)	Available Water Capacity (MGD)
Conesus Lake	Village of Geneseo WTP *Geneseo (V)* *Geneseo (T)* *Leicester (T)* *York (T)*	3.0	2.0	0.949	2.192	No Capacity
Hemlock/ Canadice Lakes	LCWSA - Consolidated District *Conesus (T)* *Geneseo (T)* *Groveland (T)* *Sparta (T)* *Livonia (T)* *Livonia (V)*	3.0 (not including Livonia) 1.0	3.0	0.119 0.403	0.254 0.840	0.656 (including Livonia)
	Village of Lima *Lima (V) – Lima (T) WD#2* *Lima (T) – WD #1 & #3*	0.275 0.050	0.667	0.187	0.637	No Capacity
Lake Ontario	MCWA - Village of Caledonia *Caledonia (V)* *Caledonia (T)*	Purchase Agreement	0.450	0.212	0.445	No Capacity

Source: All data was gathered from each Village and Township in Livingston County, New York State Department of Environmental Conservation and the Livingston County Department of Health

It should be noted that the available water capacity in **Table 3-3** is the difference between the water withdraw allocation or treatment capacity, whichever is the lower value, and the maximum day water usage. Maximum day water usage is used for determining the available capacity because although the average day usage may be substantially less than the maximum day usage, the water system still needs to provide enough water to meet the maximum day usage to avoid a water shortage during that time period.

3.2.1 Regional Water Quality Protection Concerns

Water source protection concerns within the County are noted below, taken from the watershed assessments from the NYSDEC, as well as the annual assessments obtained from the Conesus Lake Watershed Council and Silver Lake Association.

3.2.1.1 Harmful Algal Blooms (HABs)

Harmful Algal Blooms (HABs) are rapid growths of cyanobacteria (also referred to as blue-green algae), in a body of water. Several types of cyanobacteria have the potential to produce toxins or other harmful compounds. Cyanobacteria are naturally present in low numbers in most marine and freshwater systems, but under certain conditions, these organisms may multiply rapidly and form blooms (HABs). According to the NYS Department of Environmental Conservation (NYSDEC), HABs are likely triggered by a combination of water and environmental conditions that may include excess nutrients (phosphorus and nitrogen), low-water or low-flow conditions, calm water, warm temperatures, and sunlight.

Based on the NYSDEC Conesus Lake HABs Action Plan, the primary factors that contribute to HABs in Conesus Lake include internal loading of legacy phosphorus from in-lake sediments (up to 80 percent of the phosphorus load is already present in lake sediments), nonpoint source nutrient inputs, including nitrogen, in the watershed (from land uses such as agriculture and residential), and phosphorus inputs associated with septic system discharges.

In addition, wastewater treatment discharge and septic systems can contribute to phosphorus and nitrogen loading. Public sewer is not available for the majority of the County; Conesus Lake has a sanitary sewer system servicing the periphery of the lake. Generally, the only alternative for those properties without access to public sewer in these communities is to install septic systems which, without proper maintenance, can contaminate soils leaving the potential to be carried to natural waterways during storm events.

Harmful algal blooms can produce toxins that pose a major threat to not just humans, but also to animals and many aspects of the environment. According to the US Environmental Protection Agency (EPA), several dogs and livestock deaths have been reported after exposure to cyanotoxins in water. In terms of environmental and ecosystem impacts, dead zones can occur with the presence of large algal blooms (overgrowth), including HABs, in waterbodies. These dead zones are areas where algal overgrowth blocks sunlight from penetrating the water which prevents photosynthesis from oxygenating the water making it nearly impossible for aquatic life, plants and animals, to survive. When the algae blooms start to die off, bacteria begin to consume the algae which depletes the water of oxygen. Dead zones are generally caused by significant nutrient pollution and can be an issue for lakes as they receive nutrient input from within the watershed (e.g. agricultural and residential fertilizer runoff).

Most importantly, harmful algal blooms can pose a concern on drinking water and greatly impact any industries relying on clean surface water. When HABs impact source water, drinking water treatment facilities need to alter their treatment processes by increasing filtering and chemical treatment. As a result, operation costs rise which directly affects consumer costs. HABs in drinking water sources can affect floc formation (chemical clumping of particulates in the raw water) and filtration where increased disinfection is required. Organic matter from HABs and increased disinfection can lead to disinfection by-product (DBP) precursor formation (see Section 3.9 for DBP).

Conesus, Silver, Hemlock, and Canadice Lakes all provide raw water for various Livingston County communities and have had HAB events occur in the past few years. Some of the more recent events and actions that have or are being undertaken to address them are outlined below. Although the Monroe County Water Authority (MCWA) provides water to other communities in the County, Lake Ontario is not included in this analysis because of the depth of the intake structures that MCWA has in the Lake (far below the range in which HABs form and can impact water quality).

Conesus Lake

Conesus Lake has historically experienced small, isolated HABs according to local accounts from the NYSDEC. One offshore HABs occurred in fall 2014 with elevated levels of cyanotoxins reported. With more consistent reporting since 2014, HABs have been observed on multiple occasions in most years. In 2018, the first HAB observed was on June 22 and the last was October 19. Over the course of the year, Conesus Lake was listed on the NYSDEC HABs notifications page a total duration of eight (8) weeks. Although there have not been any major treated water quality issues, the proximity of these algal blooms to the water intake pipes continues to be closely monitored.

The NYSDEC has established the Conesus Lake HABs Action Plan to manage and help reduce HABs. This plan includes three (3) recommended priority projects, each including short-term (3 years), mid-term (3-5 years) and long-term (5-10 years) actions and goals to reduce phosphorus loading. The NYSDEC has noted that implementation of the recommended actions is contingent on factors including but not limited to application requirements (including landowner permission/participation, feasibility studies, financial or in-kind match, engineering plans), award of funding, and timeframe to complete implementation.

- Recommended Action/Priority Project 1 included but is not limited to: stream bank stabilization, establishing vegetation buffers for runoff, installing water circulation units at various parts of the lake, hydrodynamic modeling and engineering assessments, hypolimnetic aeration and oxygenation, and limnological study and application of nutrient inactivant.

- Recommended Action/Priority Project 2 included but is not limited to: implementing multiple stormwater best management practices (BMPs), installing retrofits to replace existing stormwater management facilities, stabilizing riparian habitat with vegetative plantings and stream stabilization structures and implementing a plan to evaluate BMPs for external loading purposes.
- Recommended Action/Priority Project 3 includes but is not limited to: continuing to promote watershed stewardship and use of BMPs, pursue engineering studies to evaluate additional treatment and disinfection of drinking water, establish programs to reduce nutrient input from human waste and implement multiple water quality improvement BMPs to reduce impacts from residential, industrial and commercial development.

Evaluating watersheds and implementing a watershed management plan was also part of the NYSDEC Conesus Lake HABs Action Plan. This plan included: emphasizing phosphorus source control in storm water planning, implementing Agricultural Environmental Management (AEM) plans, stop or reduce herbicide application to the right-of-way and stream banks, review existing Concentrated Animal Feeding Operation (CAFO) plans, evaluate forest pests that affect tree species that assist with watershed stabilization, and evaluate opportunities to enhance, restore and create wetlands within watersheds.

Silver Lake

Comparative to the rest of the Finger Lakes, Silver Lake is shallow in depth and relatively short in length making it susceptible for HABs. Since 2012, the worst year was in 2017 where it was on the NYSDEC notifications page for twelve (12) weeks, six (6) weeks with updates.

In 2018, the first HAB listing was on August 31 and the last listing was September 14. Over the course of the year, Silver Lake was listed on the NYSDEC notifications page a total of three (3) weeks, one (1) week with updates.

Unlike Conesus Lake, Silver Lake does not have a designated NYSDEC HABs Action Plan. Monitoring and testing procedures do not change and are still completed regularly. Some actions have taken place by individuals along the lake and the surrounding communities such as regular septic system pumping, growing buffers of native plants near connecting water bodies, reducing shoreline erosion and boat inspection prior to launching and after loading. Silver Lake will continue to be monitored in the event emergency actions need to take place.

Hemlock and Canadice Lakes

Residential development has been eliminated around Hemlock and Canadice Lakes, as well as the closely surrounding areas to prevent pollution and contamination.

Over the past 3 years there has been a report each year of algal blooms. None of the algal blooms posed a threat to the drinking water supply and they occurred at large distances from the intake pipe. According to the NYSDEC, Hemlock Lake had at least two confirmed HABs in 2019. HABs in the lakes should be closely monitored and observed regularly.

There are no confirmed causes of these algal blooms, but given the surrounding agricultural land uses, it can be assumed that nutrient loadings and warm summer temperatures are contributing.

3.2.1.2 Disinfection Byproducts

Disinfection byproducts (DBP) are a result of chemical disinfection treatment reacting with organic and inorganic matter during water treatment and distribution. In general, disinfection byproducts exceed the *maximum contaminant level* (MCL) because of high doses of chlorine injection to reach acceptable chlorine residual at the furthest locations in a water distribution system. There are several byproducts that can be produced during the treatment process, but the most common include: trihalomethanes (THMs), Haloacetic acids (HAAs) chlorite and bromate.

THMs and HAAs are formed during chlorine disinfection when free chlorine reacts with organic matter in the source water. Water sources with higher levels of organic matter are at a higher risk of THM formation; therefore, higher quality raw water that utilizes less treatment and chemicals could potentially reduce incidences of higher THM levels. As water ages throughout the distribution system, disinfection chemicals, primarily chlorine, and organic matter react for a greater period of time, which raises the contaminant levels in the distribution system (shown in **Table 3-5**). It is common for disinfection byproducts to exceed the maximum contaminant level (MCL) at the furthest locations in a water distribution system.

Long-term exposure to THMs can increase risk for nervous system, kidney, liver and reproductive system complications, as well as several different types of cancer. Long-term exposure to HAAs leads to increased risk of cancer. **Table 3-4** below shows the EPA's maximum contaminant levels for the regulated byproducts mentioned above:

Table 3-4
EPA Regulated Disinfection Byproducts

Regulated Contaminants	MCL (mg/L)	MCL (ug/L)
TTHM	0.08	80.0
HAA	0.06	60.0
Bromate	0.01	10.0
Chlorite	1.00	1000.0

Source: www.EPA.gov

Total THM (TTHM) monitoring for 2018-2019 for each water source/supplier in the County is shown in **Table 3-5** on the following page.

THM levels have been a common issue in Livingston County, with the majority of the systems dealing with elevated levels. Some specific examples where the EPA issued a consent order are provided below.

In June of 2019, the EPA issued a consent order to the LCWSA for exceeding the MCL for THMs for three quarters consecutively. The third and fourth quarter of 2018 and the first quarter of 2019 recorded 81.25 ug/L, 86.0 ug/L and 84.75 ug/L respectively. The test location of this data was in Groveland Station, the furthest location in the system from the source.

Similar to LCWSA, the Town of Leicester (receiving water from Silver Lake and treated in the Village of Mount Morris) also received a consent order from the EPA for exceeding the THM maximum contaminant level. In 2016 and 2017 the THM levels exceeded the allowable limit a total of five (5) quarters, four (4) quarters consultatively with THM levels reaching 98 ug/L, 84 ug/L, 87 ug/L and 125 ug/L respectively.

Addressing elevated levels of THMs is especially difficult for municipalities that purchase treated water wholesale, as they don't have any control over the treatment and source water.

Table 3-5
Livingston County TTHM Monitoring Results 2018-2019

Source (Supplier)	**Municipality (Service Area, Sampling Location)**	**LRAA (µg/L)** [1]	**Quarterly Samples Above MCL (µg/L)** [2]
Springwater Wells	Springwater (T) *(8079 South Main St)*	26 - 52	-
Chidsey Reservoir	Nunda (V) *(9006 NYS Route 408)*	43 - 56	-
	Nunda (T)	-	-
Silver Lake	Mount Morris (V) *(Village of Mount Morris WWTP)* *(117 Main St)*	53.75 - 68.67 51.5 - 57	- -
	Mount Morris (T) *(3279 Mount Morris Geneseo Rd)*	64.75 - 73.67	86 (8/14/18) 99 (8/20/19)

Table 3-5
Livingston County TTHM Monitoring Results 2018-2019

Source (Supplier)	Municipality (Service Area, Sampling Location)	LRAA (µg/L) [1]	Quarterly Samples Above MCL (µg/L) [2]
Silver Lake	Leicester (V) *(52 South Parkway)*	60.5 - 68.67	96 (8/13/19)
	Leicester (T) *(Town District, 4830 Upper River Rd)*	77 - 88.25	93 (8/14/18) 83 (11/13/18) 99 (8/12/19)
	LCWSA *(ARS, 3746 East Groveland Rd)*	63.75 - 78.33	102 (8/17/18) 89 (8/15/19)
Mill Creek/Perkinsville Wells	Dansville (V) *(9350 Main St)* *(14 Clara Barton St)*	42.75 - 61 27.67 - 9.25	86 (7/9/18) -
	North Dansville (T)	-	-
	West Sparta (T)	-	-
Conesus Lake	Avon (V) *(11 Farmers Rd)*	62 - 73.25	108 (7/9/18)
	Avon (T) *(2140 Sackett Rd)*	62 - 68	88 (7/12/18)
	Caledonia (T) *(WD #3, 4294 AGL)*	68.25 - 84	102 (8/17/18) 108 (8/16/18)
	Geneseo (V) *(275 Riverside Dr)* *(3 Highland Rd)*	56.25 - 64 55.25 - 62.33	- -
	Geneseo (T) *(WD #3, NYS Route 20A)* *(WD#2, 5504 West Lake Rd)*	62 - 70 55.5 - 63.5	- -
	York (T) *(Town Consolidated District, 3351 Fowlerville Rd)*	64.5 - 77.67	93 (8/20/19)
	Leicester (T) *(York-Leicester District, 4656 Caledonia Rd)*	69.75 - 75	99 (8/12/19)

Table 3-5
Livingston County TTHM Monitoring Results 2018-2019

Source (Supplier)	Municipality (Service Area, Sampling Location)	LRAA (µg/L) [1]	Quarterly Samples Above MCL (µg/L) [2]
Hemlock/ Canadice Lakes	Livonia (V) *(4213 South Livonia Rd)*	51.25 - 68.67	89 (8/17/18) 90 (8/15/19)
	Livonia (T)	-	-
	Lima (V) *(7024 West Main St.)*	65.25 - 72.5	108 (8/7/18) 93 (8/6/19)
	Lima (T) *(1175 Bragg St.)*	49.5 - 62.67	-
	Conesus (T) *(Consolidated District, 6170 East Lake Rd)*	50.25 - 76	85 (8/17/18) 110 (8/15/19)
	Sparta (T)	-	-
	Groveland (T) *(Consolidated District, 7161 Groveland Hill Rd)*	69.75 - 86.67	100 (8/17/18) 85 (11/14/18) 88 (2/20/19) 106 (8/15/19)
Lake Ontario	Caledonia (V) *(3350 Brown Rd)*	43.25 - 51.67	85 (8/6/19)
	Caledonia (T) *(WD #1, 672 Sylvan Ct)*	44.75 - 70.67	99 (8/16/19)

(1) LRAA = Locational Running Annual Average – average of sampling results from particular location during previous four calendar quarters.
(2) MCL – Maximum contaminant levels. MCL for TTHMs is 80 µg/L

Source: All data gathered from Livingston County Dept. of Health.

3.2.1.3 Retsof (Town of York) Salt Mine Collapse

The Retsof Salt Mine was started in 1885 in Livingston County. The mine, with a footprint of 10 square miles and a depth of 1,200 feet, was owned by Akzo Nobel, Inc. and headquartered in Retsof, a Hamlet in York. On March 12, 1994, a underground collapse occurred when the ceiling of a 500 by 500 foot chamber gave way, causing an earthquake that registered 3.6 on the Richter Scale took place in the area, according to the U.S. Geological Survey (see **Figure 3-4**).

As a result of that collapse, methane and hydrogen sulfide gases escaped and ground water flowed into the collapsed area from an aquifer several hundred feet above. By the end of 1995, the mine was full of water highly saturated with salt. Since that time, the weight of rock above the mine has been squeezing it shut, forcing the brine out and upward through two openings that came into existence after the collapse. This process is expected to continue for hundreds of years. USGS geologists warned in the early 2000's that the rising salt water could seep into an aquifer several hundred feet above the mine, ruining it as a potential source of drinking or irrigation water. This event did, in fact, occur as a USGS study (#2013-1174) indicated that wells within an 8-mile vicinity of the collapse experienced increased dissolved gas, brine water, or a decline in water levels within existing water wells. Within a quarter mile of the collapse, the lower confined aquifer that crossed the mine experienced a 350-foot water-level decline with aquifer decline experienced further away as well (see **Figure 3-4**).

State officials, whose role in the wake of the mine collapse included protecting New York's natural resources, warned Akzo Nobel Inc. that contamination of the aquifer would constitute a violation of water quality standards and create a public nuisance. In 2014, NYSDEC, the State Attorney General's office and Livingston County signed a $20 million Memorandum of Understanding with Akzo Nobel Inc. to deal with the environmental problems stemming from the 1994 collapse of the Retsof Salt Mine.

Among other things, the recently approved Memorandum of Understanding "provides that the settlement funds will be divided into four separate accounts: water supply infrastructure improvements, surface water and water supply improvements, monitoring of groundwater and subsidence within the area affected by the collapse and the development of a contingency fund," according to NYSDEC documents. Under the terms of the Memorandum of Understanding with the State, the $20 million paid by Akzo Nobel Inc. is deposited into different accounts, $17 million which are held by Livingston County, and $3 million which are held by the NYSDEC:

- $11,000,000 dedicated to surface water and water supply infrastructure, repair and maintenance (Livingston County).
- $5,000,000 dedicated to surface water and water supply improvement projects to protect the drinking water sources for the communities impacted by the mine collapse (Livingston County).
- $1,000,000 will provide a contingency fund to address potential future harm related to the collapse (Livingston County).
- $3,000,000 dedicated to monitoring groundwater and subsidence within the affected area (NYSDEC).

As shown in **Figure 3-4**, the water-level decline and groundwater quality was impacted in the Town of York, Geneseo, and Avon to the north, as well as Leicester and Mount Morris to the south. **Figure 3-5** highlights additional surface disturbances from these locations and

others. Monies from this Settlement could be utilized to address the effects of the mine Collapse in Livingston County.

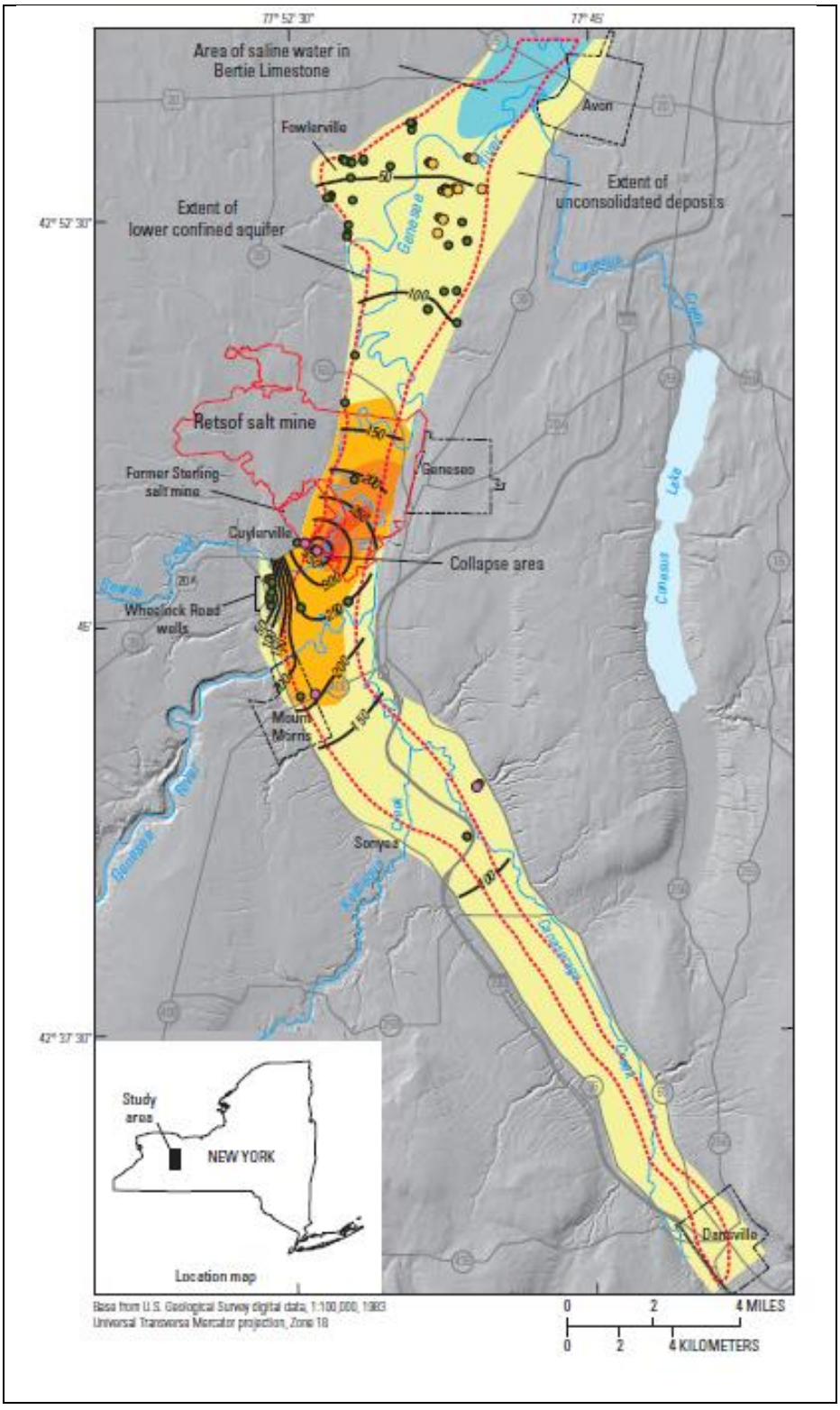
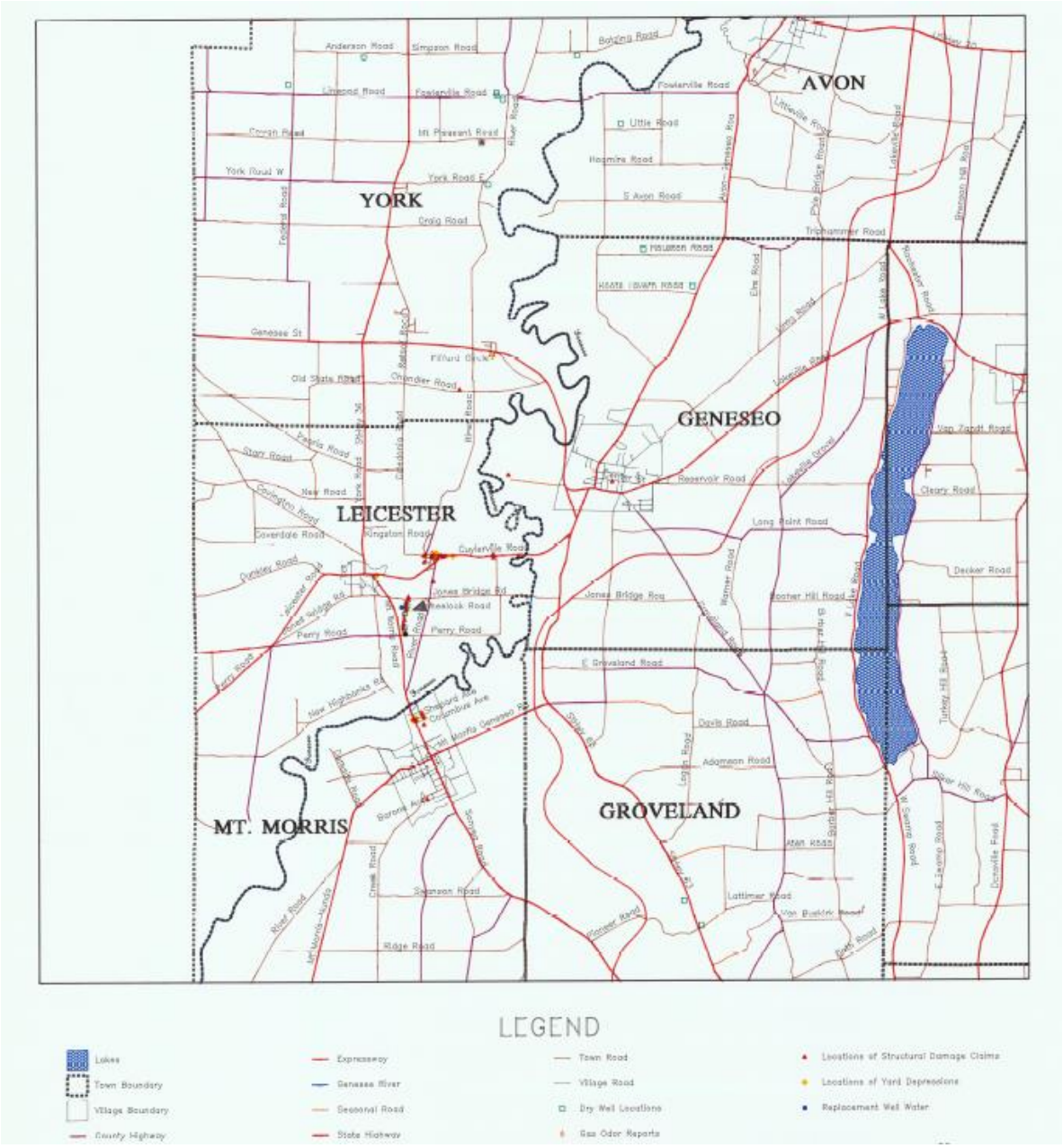


Figure 3-4
Retsof Salt Mine Collapse

The mine is shown in red with impacted wells shown with the colored dots. The aquifer color variation indicates the amount of land subsidence (red equal to more than 35 feet) and the black lines highlight the aquifer water-level decline. (Excerpt from USGS 2013-1174 study)

Figure 3-5
Reports of Surface Disturbances (1995)



3.3 Water Operations & Finances

In addition to water sources and treatment facilities, public water systems also include storage, a distribution network, and operators to manage and maintain the system. This section of the report provides a brief summary of these aspects, referred to as "water operations," categorized by the water source. A general overview of the financial aspects of each water system in terms of rates structures and investments (i.e. capital improvements bonds) is also included. The water treatment plants (WTP), watermains (transmission and distribution), and associated storage tanks are highlighted in **Map 3-5** (Countywide) as well as detailed maps in **Maps 3-7.1** through **3-7.16** for each municipality. Other maps that highlight operations and finances within the County includes **Map 3-8**, Public Water System Billing Service Areas and **Map 3-9**, Livingston County Local Water Operations Areas.

3.3.1 Distribution Network

*(see **Maps 3-5 and 3-7.1-16**)*

Springwater Wells

Town of Springwater WTP servicing the Town of Springwater

The Town of Springwater's distribution system includes one Town water district. The district includes a small area of distribution main and a 60,000 gallon water storage tank that feeds the system by gravity. The Town of Springwater is currently working to replace all water meters. At the end of 2018, approximately 75 percent of the existing water meters had been replaced.

The Town is working towards replacing caulking at the base of the water storage tank following a previous repair in 2018 per Livingston County Department of Health requirements. In addition, the Department of Health requested that the exterior of the tank be repainted. As of this study, the tank has not been repainted. The Town is seeking funding for this work which needs to be addressed to meet compliance. The Department of Health has also suggested installing a secondary water storage tank to provide proper fire protection.

Chidsey Reservoir (Newville Creek)

Village of Nunda WTP servicing the Village of Nunda

The Village of Nunda distribution system piping consists of mainly cast iron, ductile iron, and PVC pipe. The system includes a 500,000 gallon steel water storage tank and a 300,000 gallon glass lined water storage tank, both located at the treatment facility on Nunda Dalton Road. The Village has replaced approximately 59 residential water meters out of a total of 760 service connections. This process will continue over the course of the next few years until all meters have been replaced.

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Monroe County

Genesee County

Ontario County

Wyoming County

Allegany County

Steuben County

Town of Caledonia

Village of Caledonia

Town of Avon

Village of Avon

Town of Lima

Village of Lima

Town of York

Town of Geneseo

Village of Geneseo

Town of Livonia

Village of Livonia

Town of Leicester

Village of Leicester

Town of Mount Morris

Village of Mount Morris

Town of Conesus

Town of Groveland

Town of Sparta

Town of Springwater

Town of West Sparta

Town of Nunda

Village of Nunda

Town of Portage

Town of North Dansville

Village of Dansville

Town of Ossian

Conesus Lake

Hemlock Lake

Canadice Lake

Honeoye Lake

Silver Lake

SPRING CREEK
MCMAHELL
DUGAN CREEK
STREAM
FINGAR
CHRISTIE CREEK
WHITE CREEK
GENESEE RIVER TRIBUTARY
CONESUS CREEK
SPRING BROOK
HONEOYE CREEK
BROWNS CREEK
BAIRDS CREEK
BIDWELLS CREEK
SALT CREEK
JAYCOX CREEK
SPEZZANO GULLY
TAUNTON GULLY
LITTLE BEARDS CREEK
FALL BROOK
BEARDS CREEK
WILKINS CREEK
HEMLOCK OUTLET
CANADICE OUTLET
DAMONSVILLE CREEK
ALLENS CREEK
BUCK RUN CREEK
GENESEE RIVER
CANASERAGA CANAL
SOUTH MC MILLAN CREEK
CONESUS INLET
TUSCARORA CREEK
TWO MILE CREEK
BRADNER CREEK
CANASERAGA CREEK
LINE RUN CREEK
HONEOYE INLET
COHOCTON RIVER
MUD CREEK
CROOKED BROOK
KEISHEQUA CREEK
NEWVILLE CREEK
STONY BROOK
SUGAR CREEK
BENNETT CREEK
BLACK CREEK

MAP SHEET:
MAP 3-5

MAP TITLE:
Livingston County Public Water Systems

DATE PREPARED:
NOVEMBER 19, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Water Storage Tanks
- Water Treatment Facilities
- Watermains
- Under design/Construction

N W E S

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Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Monroe County

Uplands Supply Conduits

Genesee County

Ontario County

Wyoming County Water Resources Agency System

Wyoming County

Steuben County

Allegany County

Village of Caledonia

Town of Caledonia

Village of Avon

Town of Avon

Village of Lima

Town of Lima

Town of York

Village of Geneseo

Town of Geneseo

Village of Leicester

Town of Leicester

Village of Mount Morris

Town of Mount Morris

Town of Groveland

Village of Livonia

Town of Livonia

Town of Conesus

Town of Sparta

Town of Springwater

Town of West Sparta

Village of Nunda

Town of Nunda

Town of Portage

Village of Dansville

Town of North Dansville

Town of Ossian

Silver Lake

Conesus Lake

Hemlock Lake

Canadice Lake

Honeoye Lake

SPRING CREEK
MAXWELL CREEK
DUGAN CREEK
STREAM
FINGAR CREEK
WHITE CREEK
CHRISTIE CREEK
CONESUS CREEK
SPRING BROOK
HONEOYE CREEK
BIDWELL CREEK
BAIRDS CREEK
SALT CREEK
JAYCOX CREEK
BROWNS CREEK
SPEZZANO GULLY
ZAUNTON GULLY
LITTLE BEARDS CREEK
FALL BROOK
BEARDS CREEK
WILKINS CREEK
KINNEY CREEK
HEMLOCK OUTLET
CANADICE OUTLET
DAMONSVILLE CREEK
ALLENS CREEK
BUCK RUN CREEK
GENESEE RIVER
CANASERAGA CANAL
CONESUS INLET
TUSCARORA CREEK
TWO MILE CREEK
BRADNER CREEK
CANASERAGA CREEK
LIMEKILN CREEK
HONEOYE INLET
COHOCTON RIVER
CROOKED BROOK
KESHEQUA CREEK
NEWVILLE CREEK
MUD CREEK
STONY BROOK
MILL CREEK
BENNETT CREEK
BLACK CREEK
SUGAR CREEK

MAP SHEET:
MAP 3-6

MAP TITLE:
Regional Water Systems

DATE PREPARED:
NOVEMBER 19, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Watermains
- Under design/Construction

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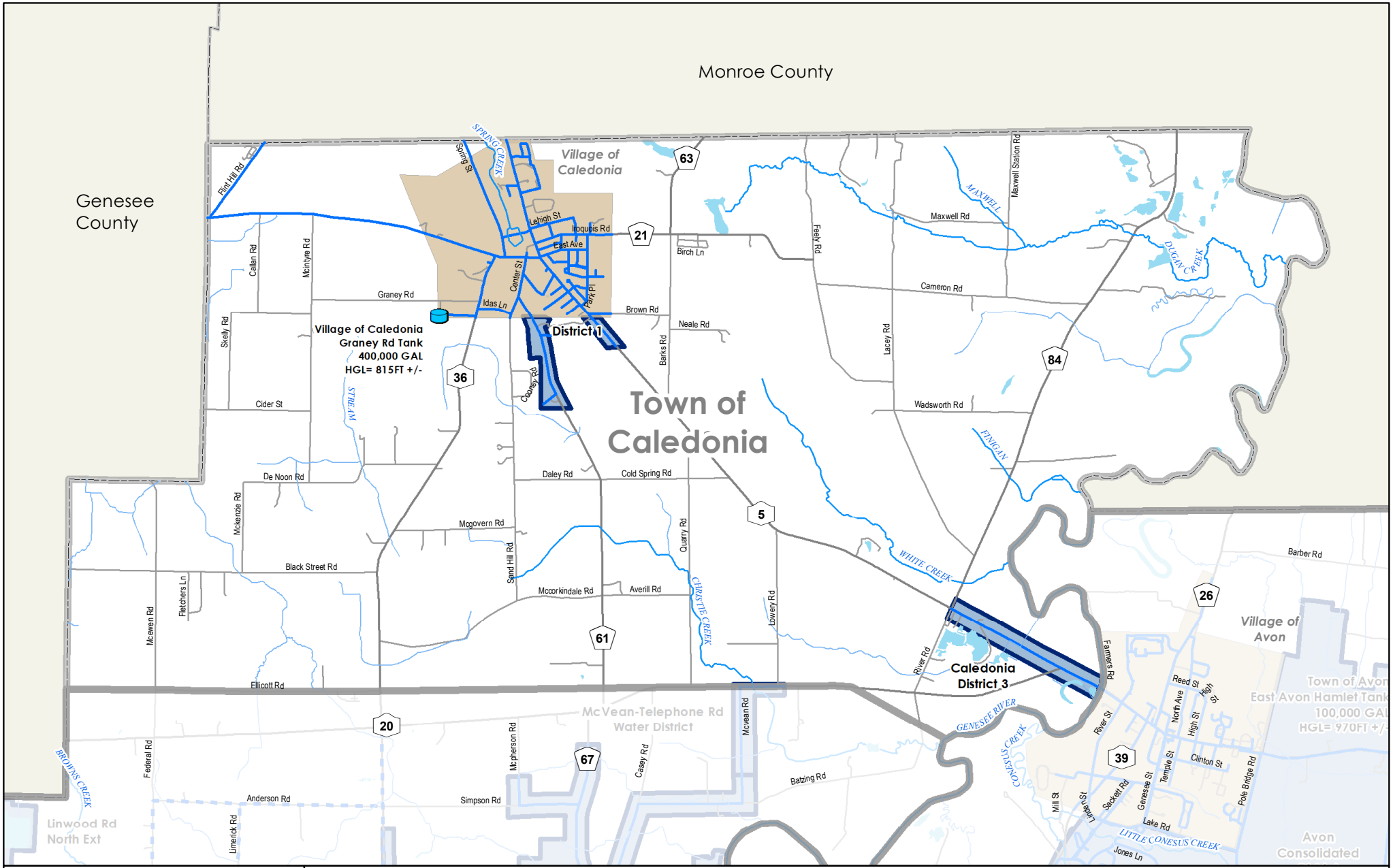
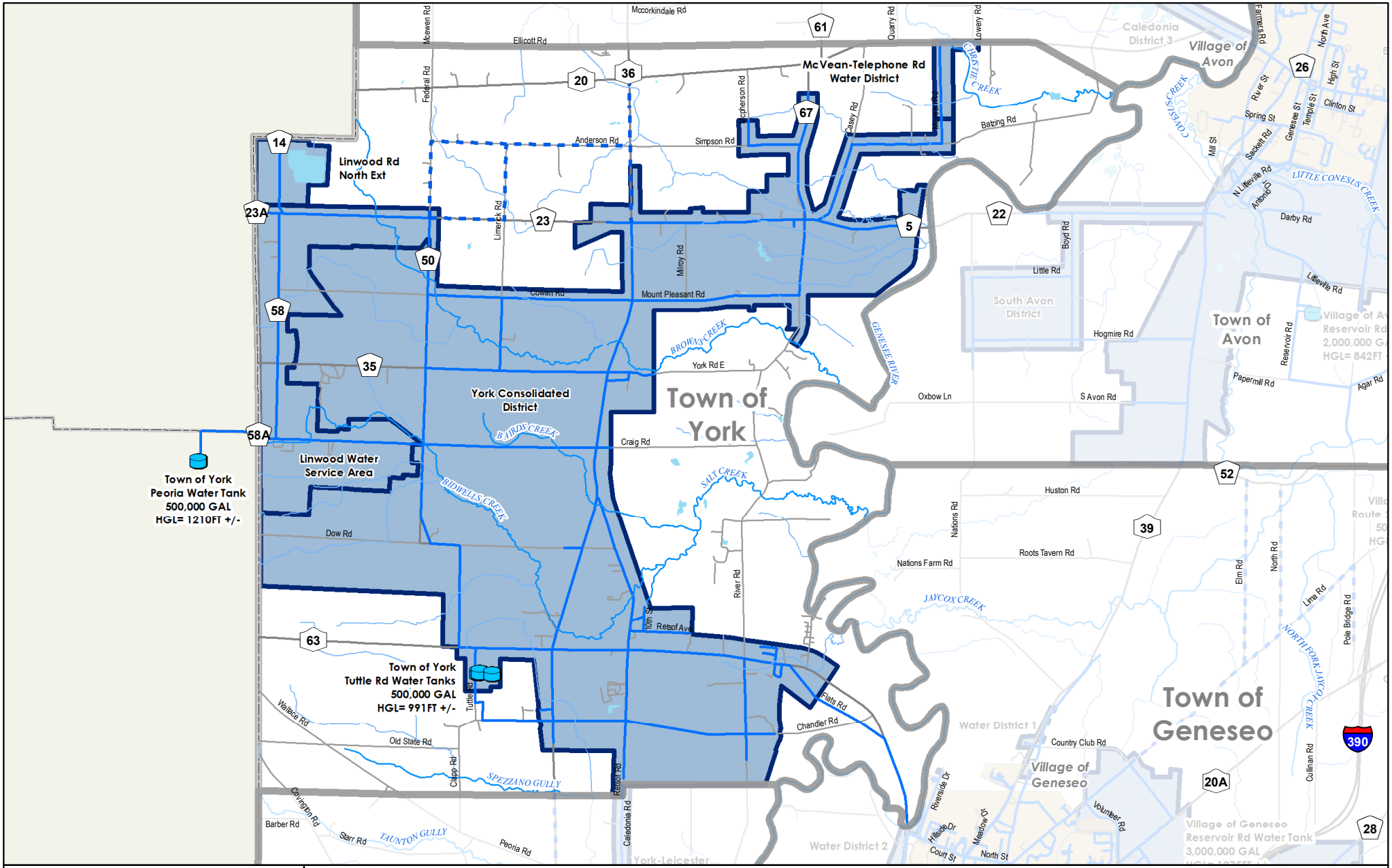


MAP SHEET:
FIGURE 3-7. 1

MAP TITLE:
Caledonia Water System

DATE PREPARED:
DECEMBER 23, 2020



MAP SHEET:
FIGURE 3-7. 2

MAP TITLE:
York Water System

DATE PREPARED:
DECEMBER 23, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

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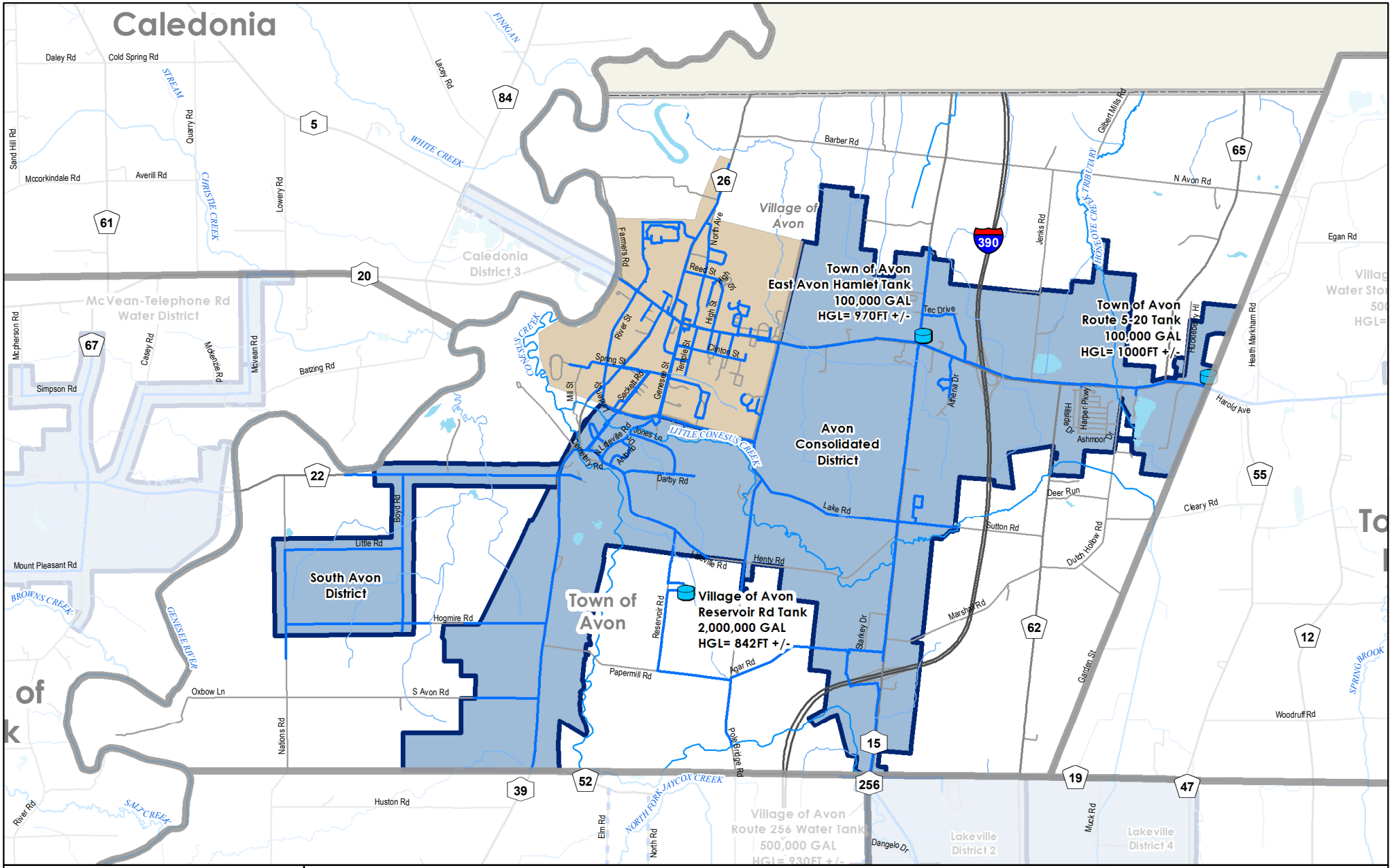
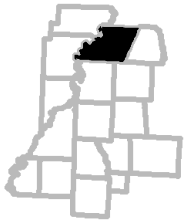


MAP SHEET:
FIGURE 3-7. 3

MAP TITLE:
Avon Water System

DATE PREPARED:
DECEMBER 23, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

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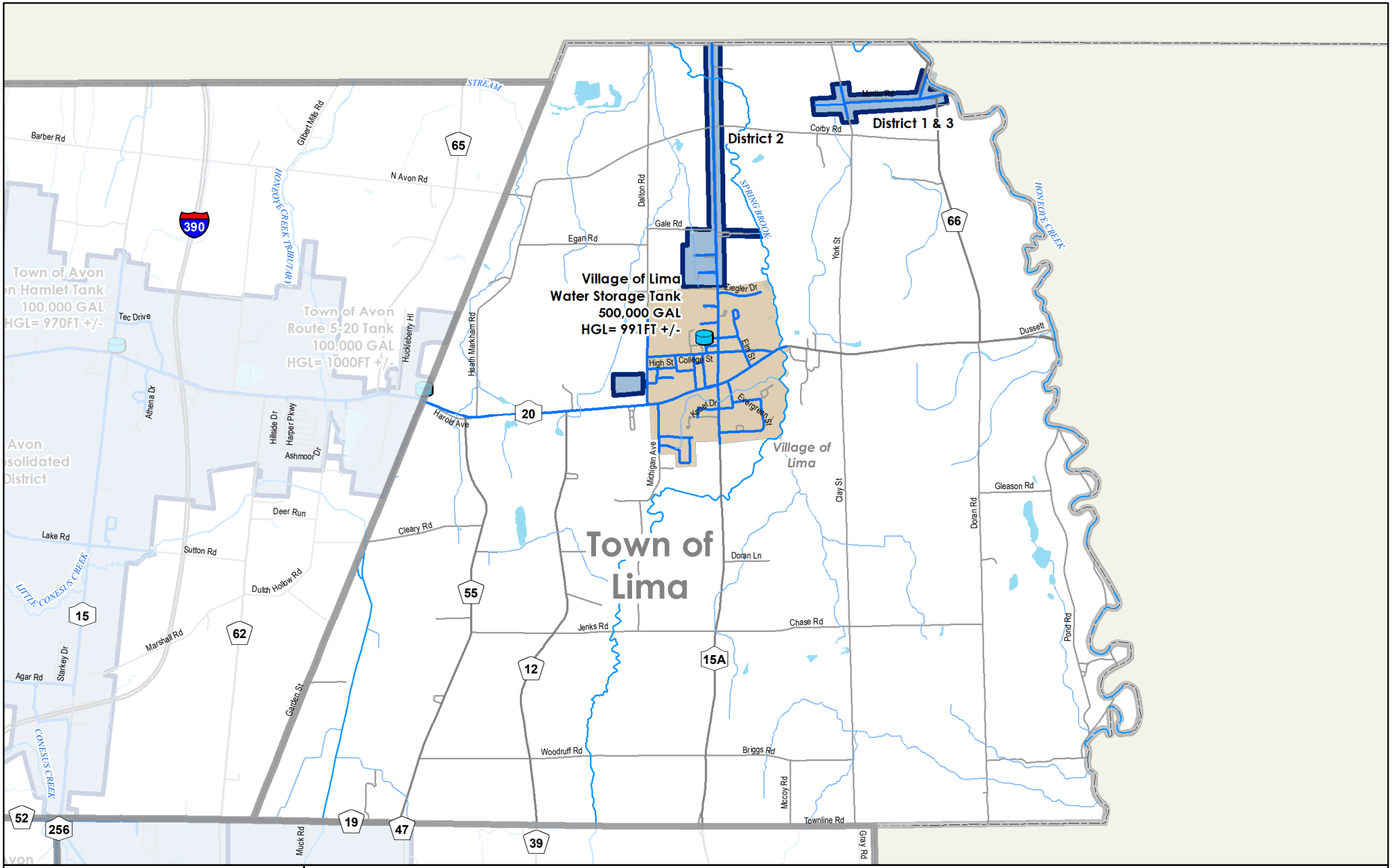
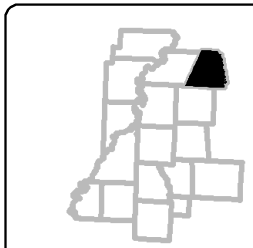


MAP SHEET:
FIGURE 3-7. 4

MAP TITLE:
Lima Water System

DATE PREPARED:
DECEMBER 23, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

0 0.25 0.5 1 Miles

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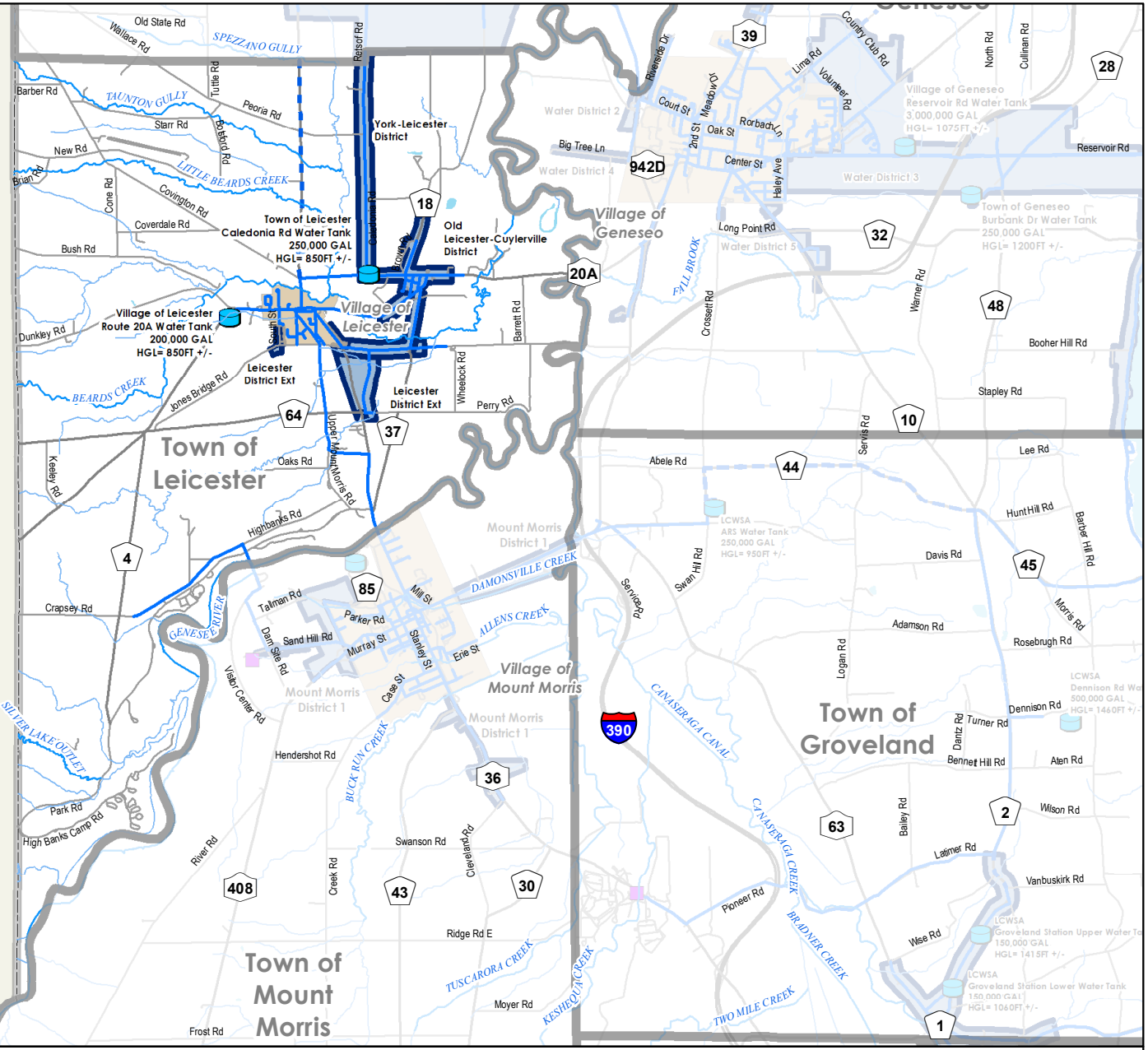

MAP SHEET:
FIGURE 3-7. 5

MAP TITLE:
Leicester Water System

DATE PREPARED:
DECEMBER 23, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

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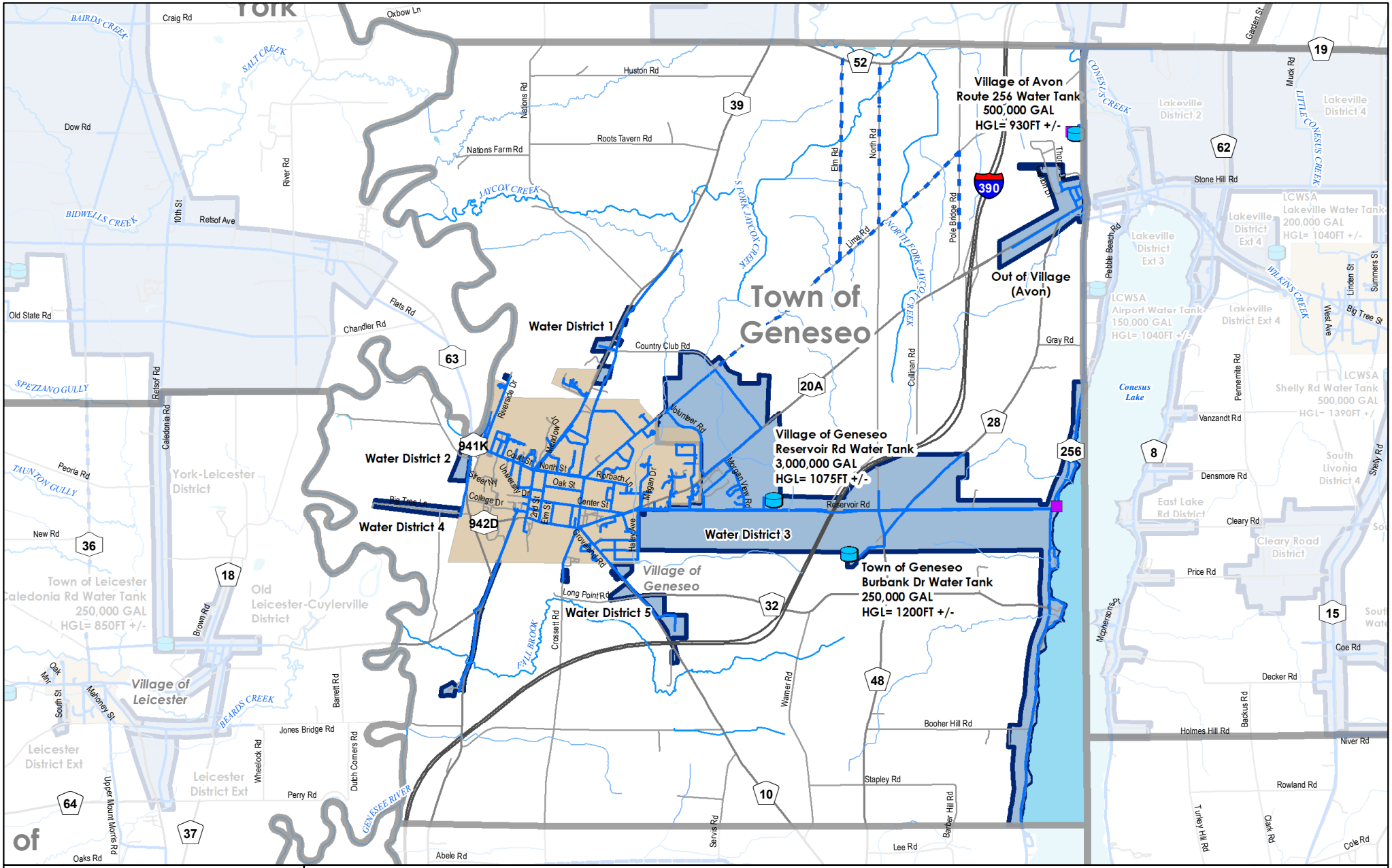
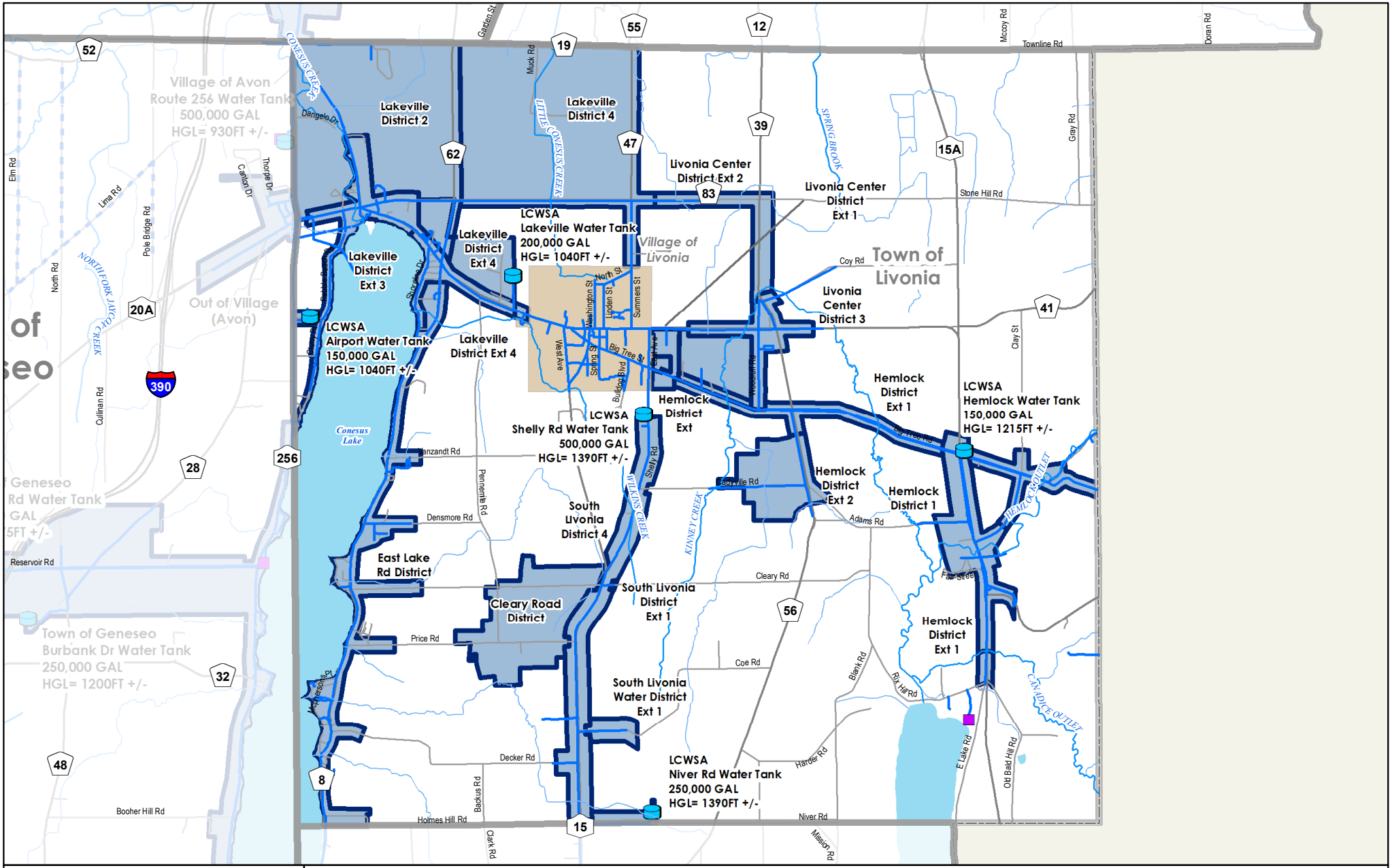


MAP SHEET:
FIGURE 3-7. 6

MAP TITLE:
Geneseo Water System

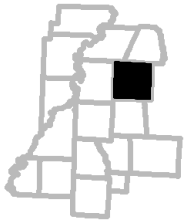
DATE PREPARED:
DECEMBER 23, 2020



MAP SHEET:
FIGURE 3-7. 7

MAP TITLE:
Livonia Water System

DATE PREPARED:
DECEMBER 23, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

0 0.25 0.5 1 Miles

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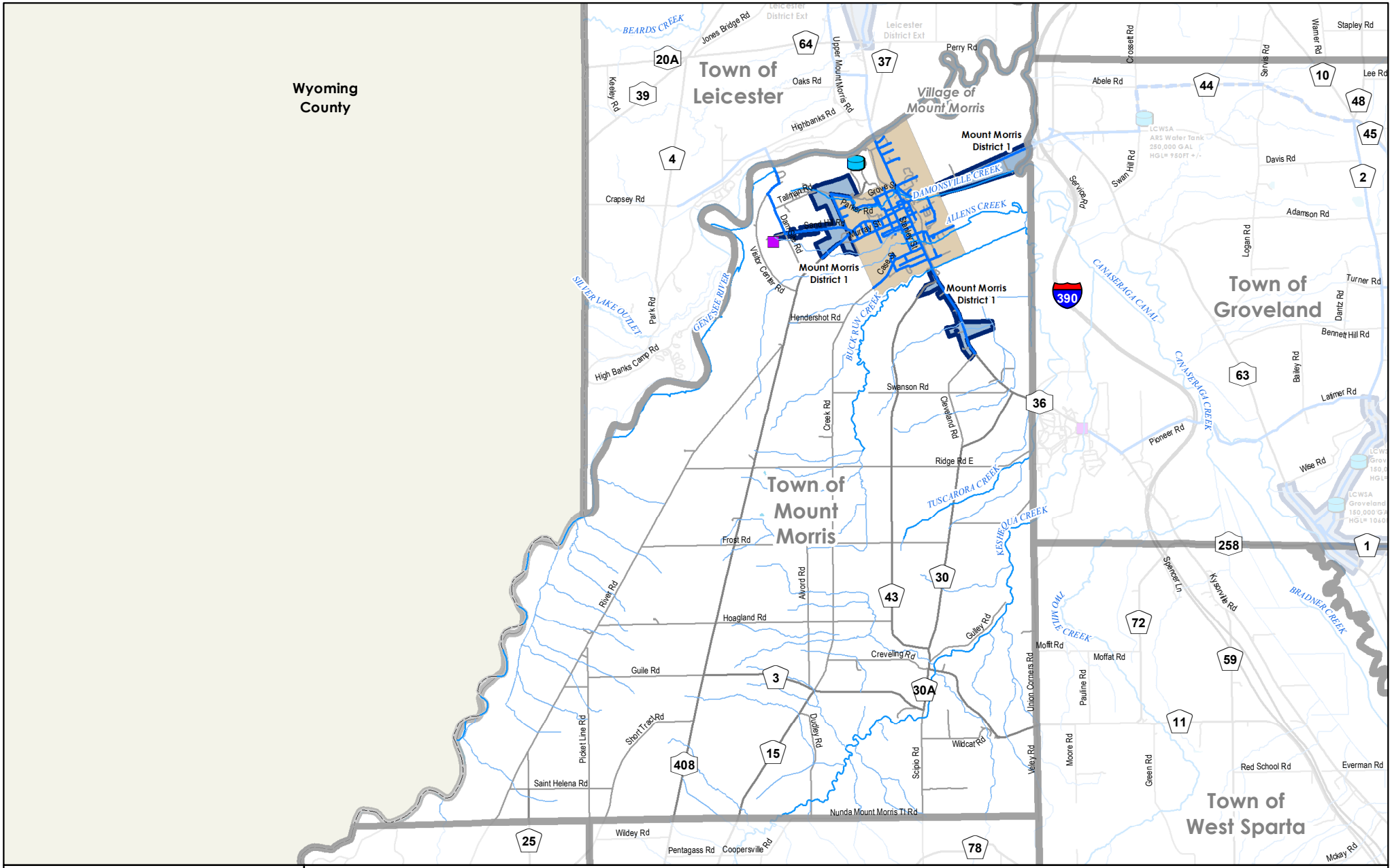

MAP SHEET:
FIGURE 3-7. 8

MAP TITLE:
Mount Morris Water System

DATE PREPARED:
DECEMBER 23, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Storage Tanks
- Watermains
- Water Treatment Facilities
- Under design/ Construction

N W E S

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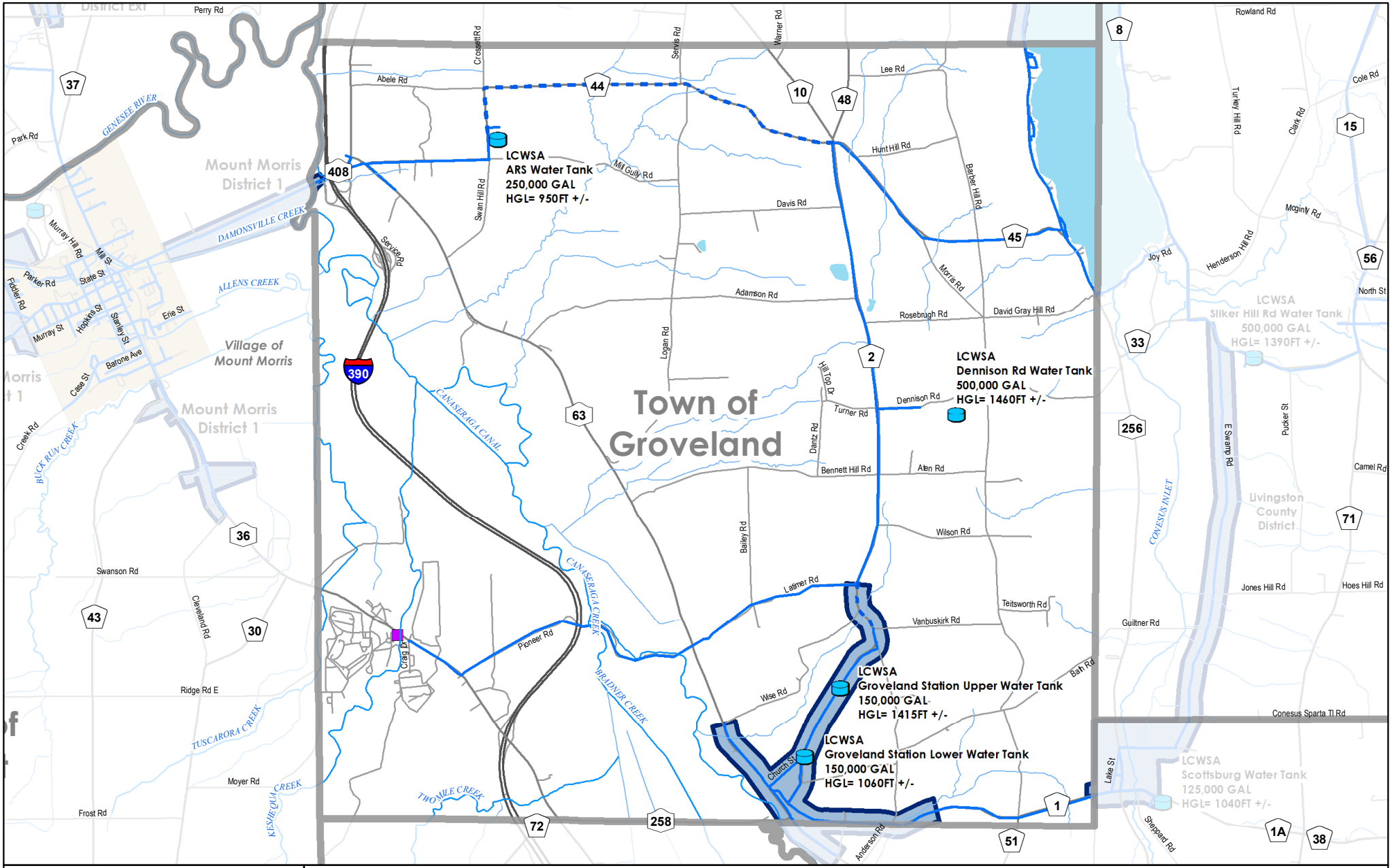
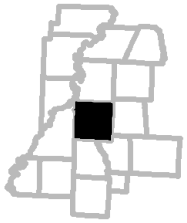


MAP SHEET:
FIGURE 3-7. 9

MAP TITLE:
Groveland Water System

DATE PREPARED:
DECEMBER 23, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

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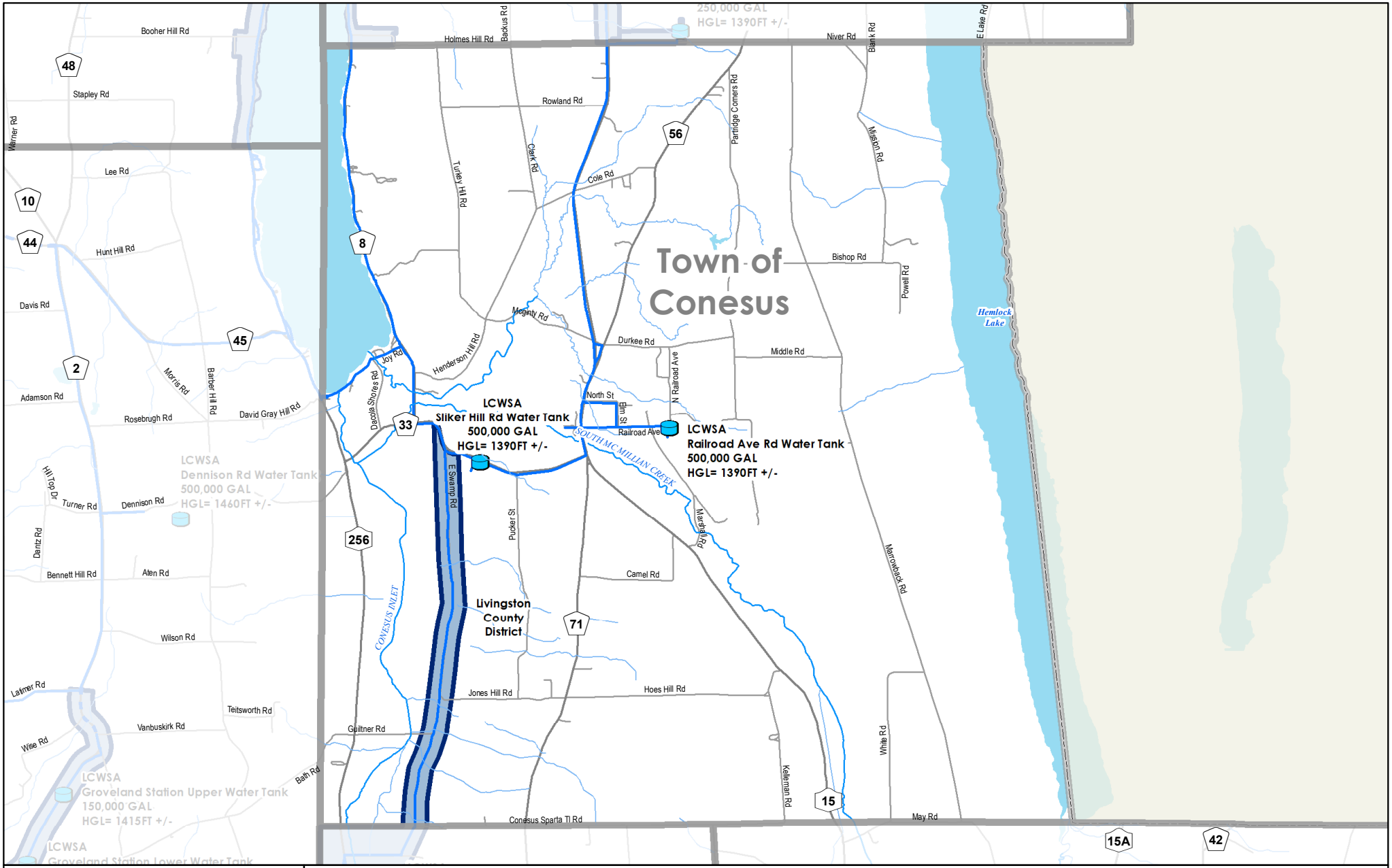
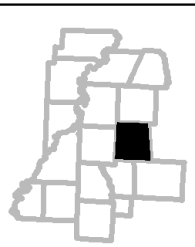


MAP SHEET:
FIGURE 3-7. 10

MAP TITLE:
Conesus Water System

DATE PREPARED:
DECEMBER 23, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

Miles
0 0.25 0.5 1

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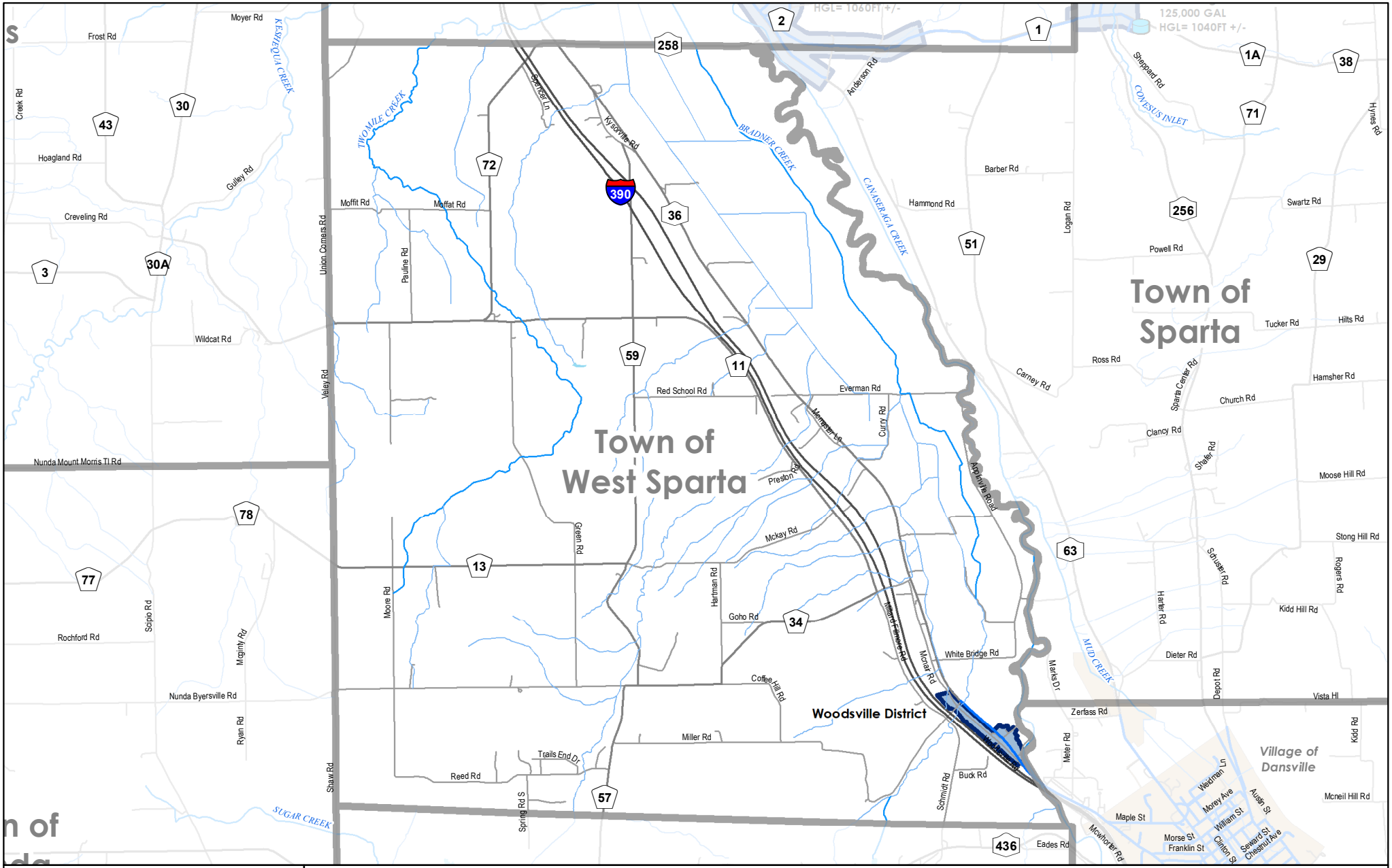
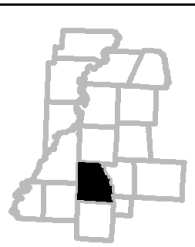


MAP SHEET:
FIGURE 3-7. 11

MAP TITLE:
West Sparta Water System

DATE PREPARED:
DECEMBER 23, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

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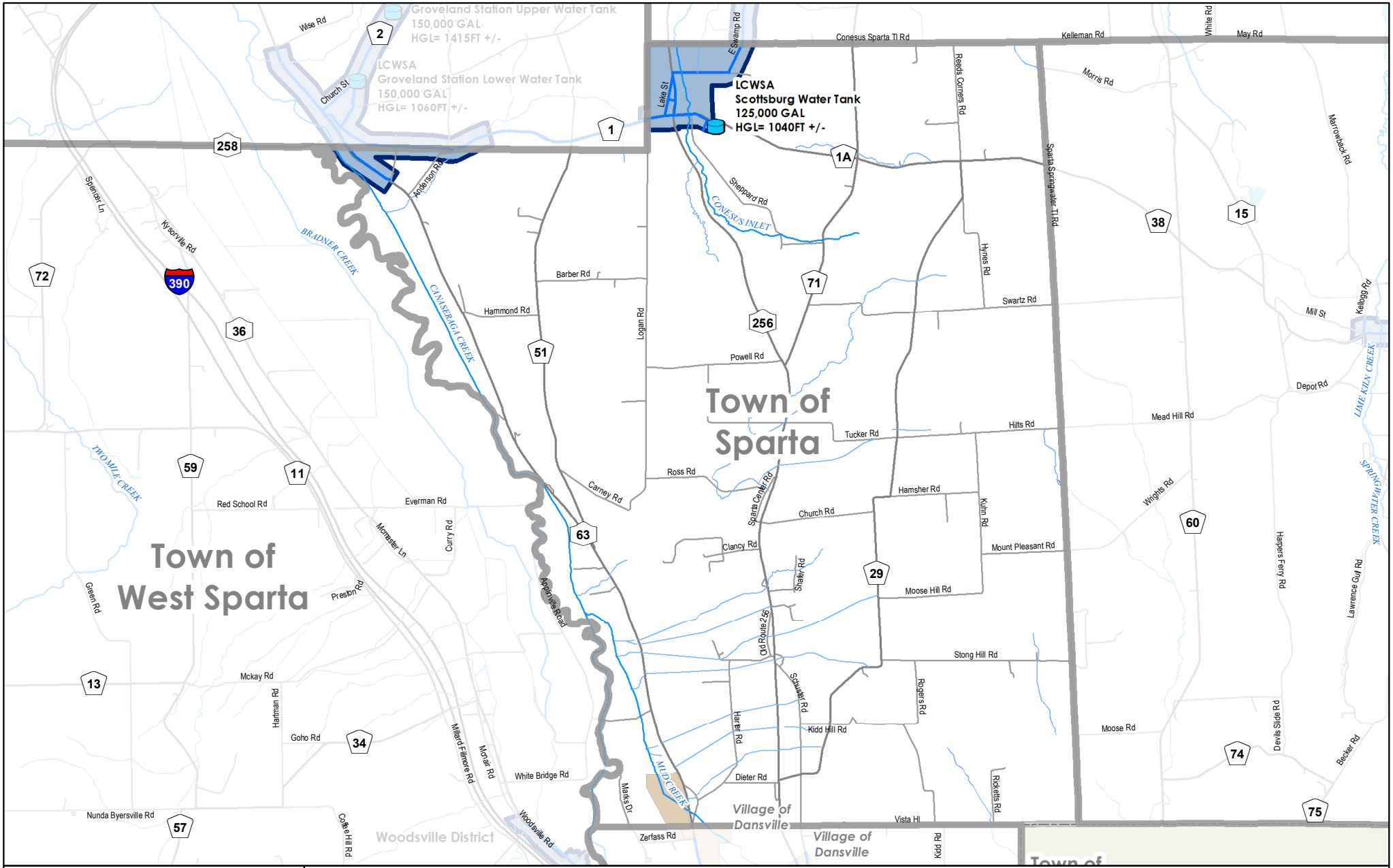
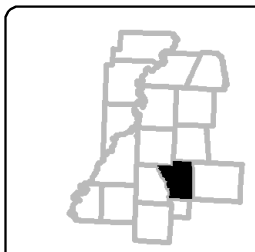


MAP SHEET:
FIGURE 3-7. 12

MAP TITLE:
Sparta Water System

DATE PREPARED:
DECEMBER 23, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

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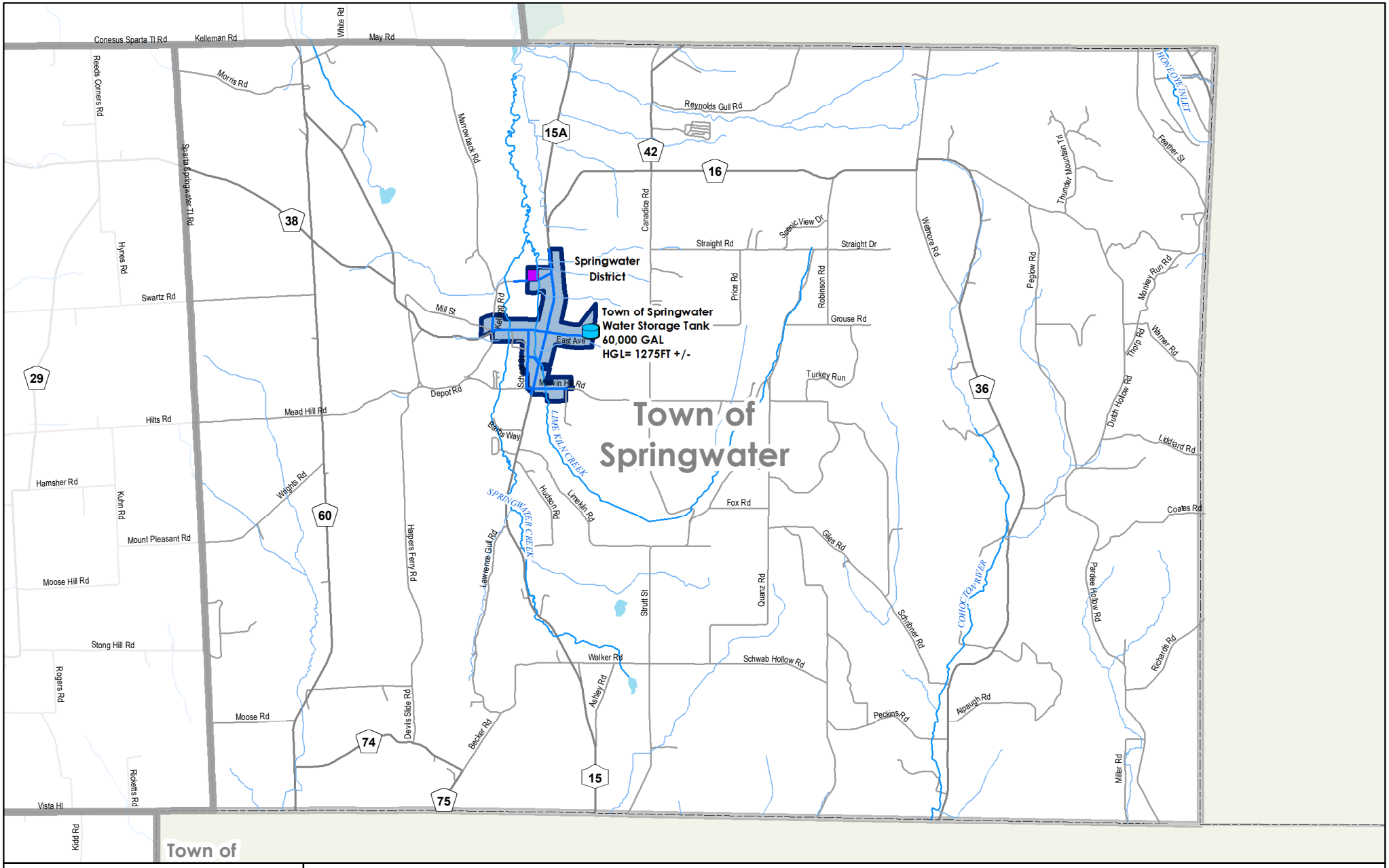
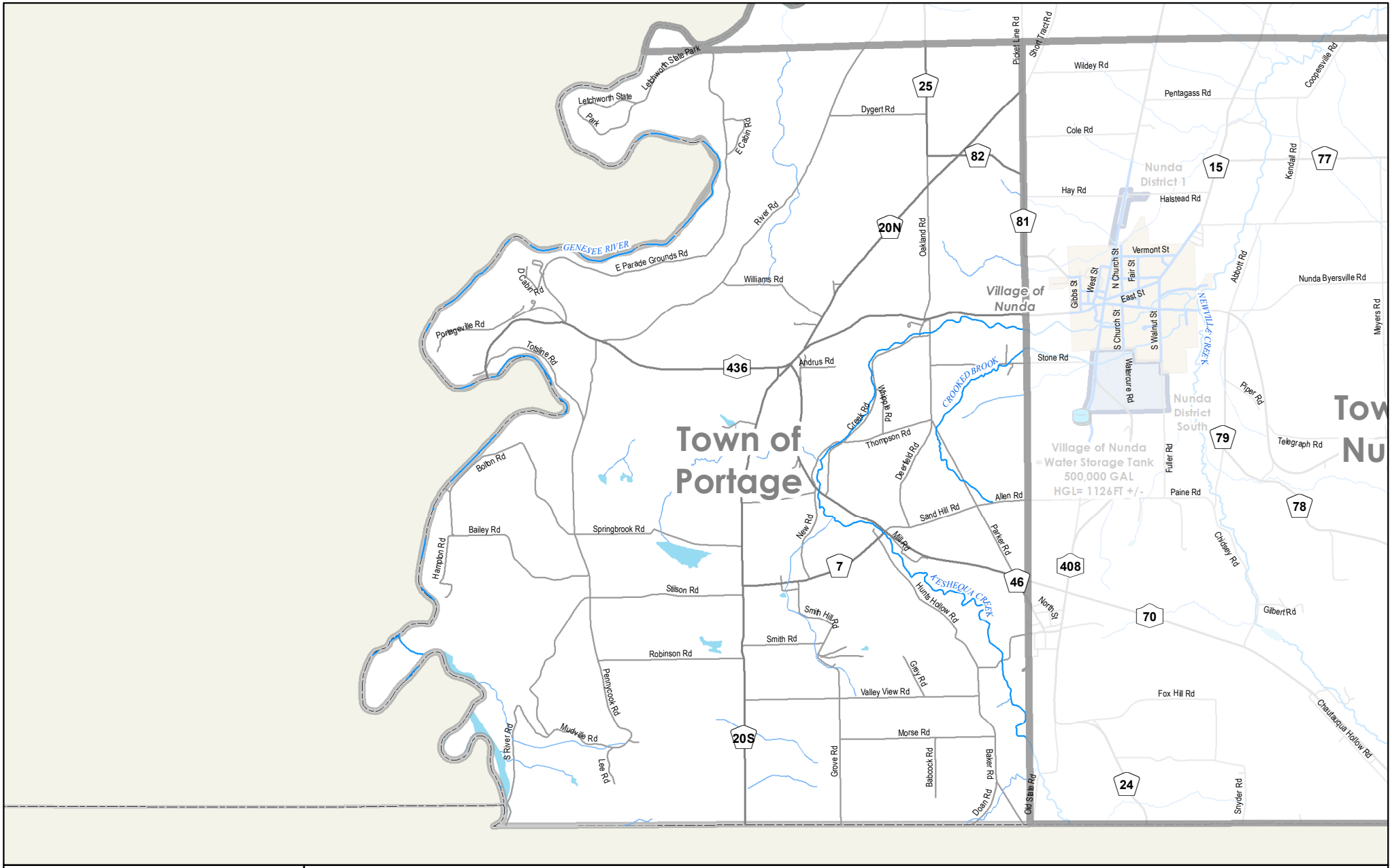


MAP SHEET:
FIGURE 3-7. 13

MAP TITLE:
Springwater Water System

DATE PREPARED:
DECEMBER 23, 2020



MAP SHEET:
FIGURE 3-7. 14

MAP TITLE:
Portage Water System

DATE PREPARED:
DECEMBER 23, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

0 0.25 0.5 1 Miles

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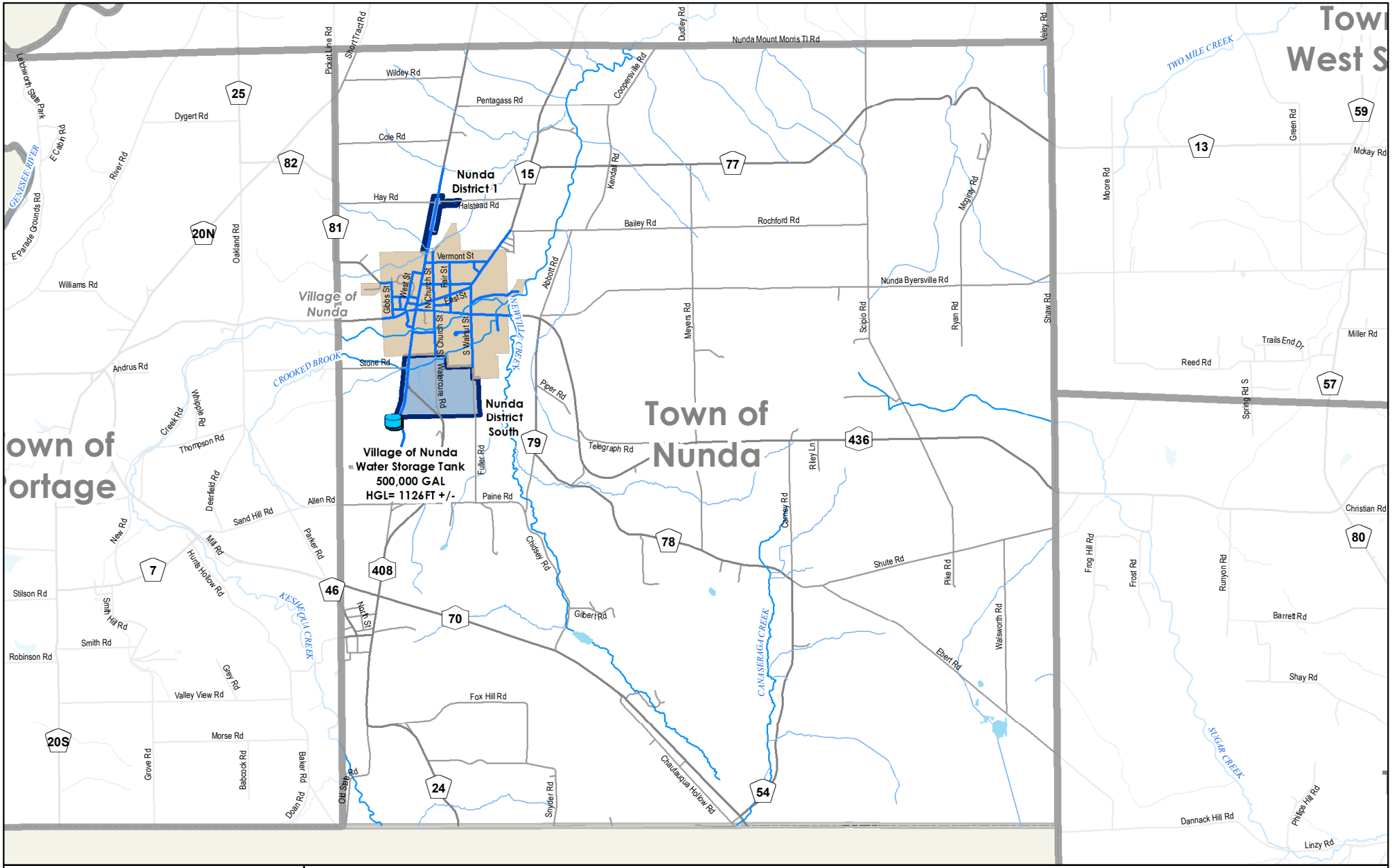
Nunda District 1
Nunda District South
Village of Nunda Water Storage Tank 500,000 GAL HGL= 1126FT +/-
Village of Nunda
Town of Nunda
Nunda Mount Morris Tl Rd
Wildey Rd
Pentagass Rd
Cole Rd
Hay Rd
Halstead Rd
Bailey Rd
Rochford Rd
Nunda Byersville Rd
Vermont St
Gibbs St
West St
Fair St
East St
N Church St
S Church St
S Walnut St
Waterloo Rd
Stone Rd
Piper Rd
Telegraph Rd
Paine Rd
Fuller Rd
Allen Rd
Sand Hill Rd
Thompson Rd
Andrus Rd
Williams Rd
Dygert Rd
Cole Rd
Picket Line Rd
Short Tract Rd
Dudley Rd
Veley Rd
Coopersville Rd
Kendall Rd
Meyers Rd
Abbott Rd
Scipio Rd
Ryan Rd
Shaw Rd
Moore Rd
Green Rd
Mckay Rd
Miller Rd
Trails End Dr
Reed Rd
Spring Rd S
Christian Rd
Riley Ln
Carney Rd
Chidsey Rd
Shute Rd
Pike Rd
Walsworth Rd
Frog Hill Rd
Frost Rd
Runyon Rd
Barrett Rd
Shay Rd
Ebert Rd
Gilbert Rd
Fox Hill Rd
Chautauqua Hollow Rd
Dannack Hill Rd
Phillips Hill Rd
Linzy Rd
Snyder Rd
Old State Rd
Dean Rd
Baker Rd
Babcock Rd
Grove Rd
Morse Rd
Valley View Rd
Grey Rd
Robinson Rd
Smith Rd
Smith Hill Rd
Stilson Rd
Mill Rd
Hunts Hollow Rd
New Rd
Parker Rd
Deerfield Rd
Whipple Rd
Creek Rd
Oakland Rd
River Rd
E Cabin Rd
E Parade Grounds Rd
Letchworth State Park
GENESEE RIVER
CROOKED BROOK
NEWTILLEY CREEK
KESHEQUA CREEK
CANASERAGA CREEK
SUGAR CREEK
TWO MILE CREEK
25
82
20N
81
15
77
79
436
78
408
46
70
7
20S
24
54
59
13
57
80
MAP SHEET:
FIGURE 3-7. 15
MAP TITLE:
Nunda Water System
DATE PREPARED:
DECEMBER 23, 2020
Legend
County Boundaries
Town Boundaries
Villages
Local Roads
County Roads
Interstate
State Routes
Waterbodies
Major Streams
Minor Streams
Water Districts
Water Treatment Facilities
Water Storage Tanks
Watermains
Under design/ Construction
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MAP SHEET:
FIGURE 3-7. 16

MAP TITLE:
Ossian Water System

DATE PREPARED:
DECEMBER 23, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

0 0.25 0.5 1 Miles

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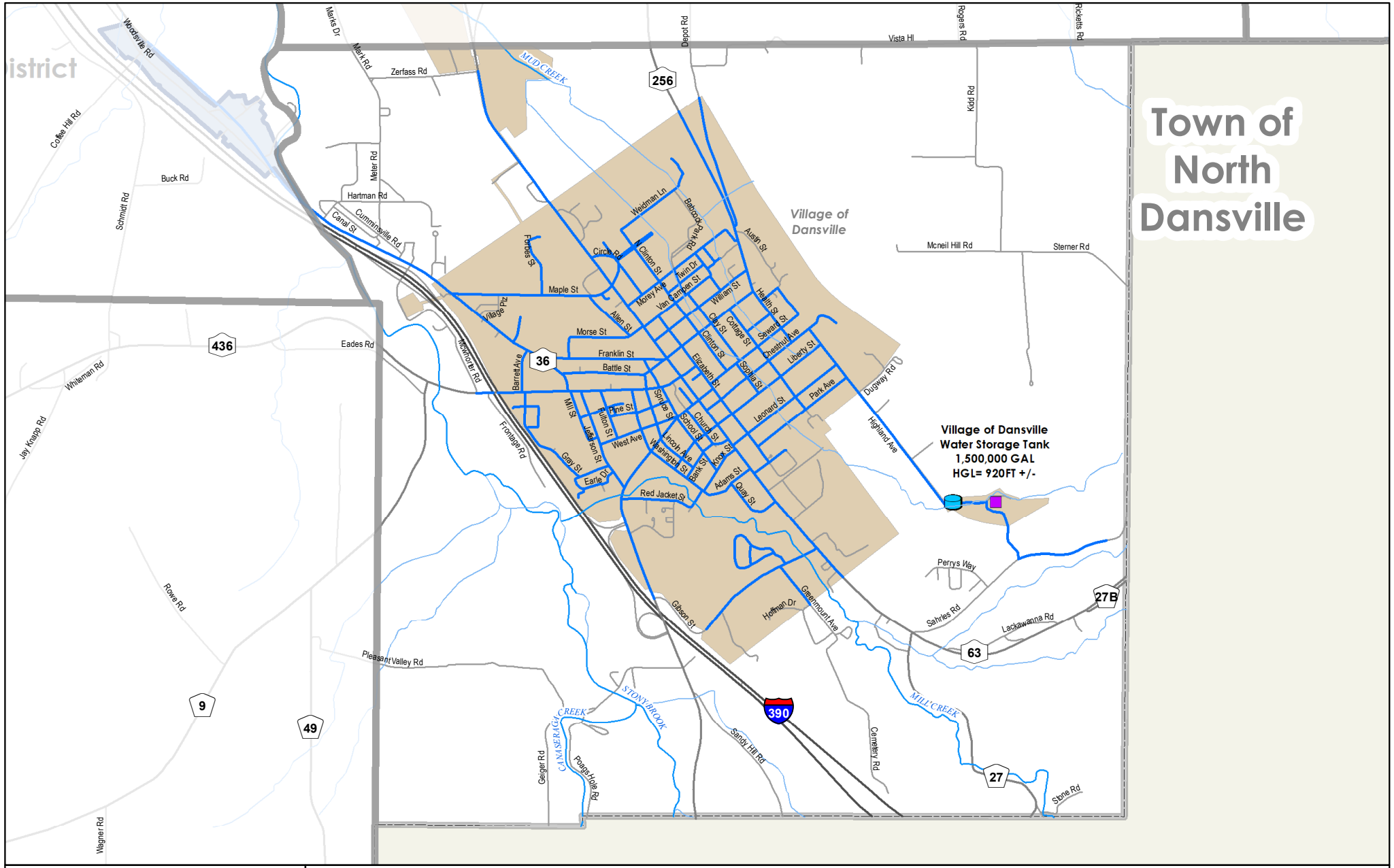
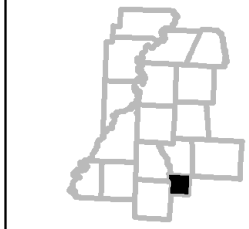


MAP SHEET:
FIGURE 3-7. 17

MAP TITLE:
North Dansville Water System

DATE PREPARED:
DECEMBER 23, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Water Districts
- Water Treatment Facilities
- Water Storage Tanks
- Watermains
- Under design/ Construction

N W E S

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In 2017, the Village of Nunda put forth efforts to identify leaks and make repairs throughout their system. As a result, they reduced their water loss by approximately 11 percent and lowered their unaccounted water to approximately 34 percent. The Village of Nunda has continued these efforts and expects to see a further reduction.

The 500,000 gallon steel water storage tank shows signs of aging and needs to be repainted and resealed. The Village has been required to drain the tank and test the interior paint for lead contamination. In addition, a structural member at the top of the tank has caved and, as of the publication of this report, structural integrity is a concern.

Village of Nunda WTP servicing the Town of Nunda

The Town of Nunda supplies water to Water District #1 just north the of the Village of Nunda along NYS 408 and a portion of residents on the south side of the Village (Nunda District South). The distribution mains in the Town of Nunda are a combination of cast iron, ductile iron, and PVC pipe. All distribution mains in the Town of Nunda are gravity fed from the Village of Nunda's water storage tanks. All operation and maintenance procedures in the Town of Nunda are performed by the Village of Nunda.

As of the publication of this report, there have been concerns and reports of contaminated wells in the Hamlet of Dalton. A major contributor to the contamination is failing septic systems in the surrounding area.

Silver Lake

Village of Mount Morris WTP servicing the Village of Mount Morris

The Village of Mount Morris stores raw water at their water treatment plant in a 5,000,000 gallon reservoir. Water is pumped from Silver Lake via a 10-inch transmission main through Letchworth State Park to the treatment facility. A 1,000,000 gallon clear well is located below grade at the treatment plant to store the treated water. The distribution system is fed by gravity from the clear well. In the past 5 years, the Village of Mount Morris has replaced 98 percent of the water meters in the Village and Town Mount Morris.

The transmission main from Silver Lake to the treatment plant is aged, dating back to 1914. The Village of Mount Morris is constantly battling leaks and making repairs along this main due to its age. Predominantly corrosive soils contribute to deteriorating pipe conditions. Leaks are repaired with new PVC or ductile iron pipe. The entire transmission main needs to be replaced. It is likely that the Lake intake pipe is also in similar condition.

Village of Mount Morris WTP servicing the Town of Mount Morris

The Town of Mount Morris water system consists of Water District #1, as well as non-district users connected to the ARS/Groveland transmission main. The Village of Mount Morris

operates and maintains Water District #1. LCWSA owns, operates, and maintains a transmission main in the Town of Mount Morris along NYS Route 408, connecting the Village of Mount Morris to the ARS Service area in the Town of Groveland. The Town of Mount Morris owns the services along the transmission main within Town limits. All water users in Water District #1 are gravity fed from the Village of Mount Morris treatment plant as well as LCWSA's 250,000 gallon ARS water tank. The Town of Mount Morris is in the process of upgrading and replacing its water meters which will be read using a drive-by recording system. All hydrants and valves along NYS Route 36 have been replaced.

The Town of Mount Morris has very limited resources for operating and maintaining the system on their own, utilizing Highway Department employees or the Village of Mount Morris if work exceeds their capabilities. Most maintenance procedures involve assistance from neighboring municipalities. The Town has discussed the possibility of turning their system over to another entity.

Village of Mount Morris WTP servicing the Village of Leicester

The Village of Leicester has a connection to the Village of Mount Morris water system on NYS Route 36, where water is pumped into Leicester through a 6-inch transmission main. A 200,000 gallon water storage tank located on Leicester Road (NYS Route 20A) feeds Leicester by gravity and provides fire flow. All water meters have been replaced within the past five (5) years and are now read using a drive-by system. The Village Leicester is udner contract with the Village of Mount Morris until 2026.

The Village of Leicester is planning for replacement of their primary transmission main, which supplies all Town and Village of Leicester users. The section of water main on NYS Route 36 has been recently replaced. The water main on Pleasant Street and Upper Mount Morris Road are aged and should be replaced. As of the publication of this report, the Village of Leicester is working on funding for this replacement.

The Village (and Town) of Leicester can meet demands throughout the year under current circumstances (i.e. extent of businesses/housing), but there is concern during the summer and fall months due to increased operations at Seneca Foods on NYS Route 36. During this time, crop harvesting is higher and water demand at the facility increases and water distribution operations within the Village can be difficult because of pressure drops throughout the Village.

Other water operation concerns include:

- Limited, to no access to the water storage tank for emergency and maintenance purposes;
- The pump station on Route 36, the only supply point for the Village of Leicester, does not have an emergency backup power connection.

Village of Mount Morris WTP servicing the Town of Leicester

The Town of Leicester consists of several water districts. The Old Leicester-Cuylerville District is supplied from the Village of Mount Morris (Silver Lake) along with several district extensions. The York-Leicester District along Caledonia Road is supplied from the Town of York (Conesus Lake). The Town of Leicester system includes a 250,000 gallon water storage tank off Caledonia Road and four (4) master meters located on South Street, York Road, Cuyler Road, and Jones Bridge Road which monitor flows to the sections of water main with dead ends.

Village of Mount Morris WTP servicing the LCWSA (American Rock Salt/ARS Service Area)

LCWSA operates and maintains the ARS/Groveland transmission main along NYS Route 408 from the Town of Groveland to the Village of Mount Morris, purchasing water from the Village of Mount Morris to serve properties in the Town of Groveland. A combination of one pump station (ARS pump station) located on NYS Route 408 and a 250,000 gallon water storage tank (ARS tank) located on East Groveland Road provide water to users in the service area. The plan to switch water sources from Silver Lake (Village of Mount Morris WTP) to Hemlock Lake (LCWSA's Hemlock Pump Station) is currently in design. Construction is estimated to be completed by the end of 2021.

Mill Creek and Perkinsville Wells

Village of Dansville WTP servicing the Village of Dansville

A 1,500,000 gallon water storage tank and an additional 250,000 gallon clear well for treated water are located at the Village of Dansville water treatment facility. All treated water flows by gravity through the Village's distribution system. In 2012, the Village of Dansville replaced all water meters, including all commercial/industrial meters, and implemented a drive-by recording system (approximately 2,380 meters). Replacing the meters contributed to decreasing unaccounted water to approximately 25 percent. Currently, the Village is working on several water system improvements including approximately 35,000 linear feet of water main.

The Village's water system operators have identified leaking hydrants as being a major contributing factor to the 25 percent water loss in their system. Over a six (6) year period beginning in 2013, about 20 percent of the hydrants have been replaced. Some areas of the water system are over 100 years old and are likely contributing to the water loss. The 12-inch transmission main connecting the Mill Creek source to the treatment plant is leaking at several locations, exacerbating water loss.

The concrete tank at the plant needs to be resealed and painted to address minor aging on the exterior surface. According to a 2018 sanitary survey completed by the Livingston County

Department of Health (DOH), it was required that the exterior be sprayed with bleach and water to kill mildew growth – to date, the Village has not completed this task.

Almost the entire Village has copper water services, except for a few streets with lead services. These lead services need attention soon to reduce the risk of health hazards.

Village of Dansville WTP servicing the Town of North Dansville

There are limited portions of the Town of North Dansville that are served by public water, but those that have public water are served from the Village of Dansville distribution system by gravity. All operation and maintenance procedures are completed through contract with the Village of Dansville.

Most of the distribution mains in the Town of North Dansville are at least 50 years old and will need to be evaluated in the near future due to age and pipe materials.

Village of Dansville WTP servicing the Town of West Sparta

The area of West Sparta serviced by the Village of Dansville is referred to as the Woodsville District. The Village of Dansville owns and operates this service area.

Conesus Lake

Conesus Lake provides water to several communities in Livingston County including the Village and Town of Avon, the Village and Town of Geneseo, select portions of the Towns of Caledonia, Leicester, and York.

Village of Avon WTP servicing the Village of Avon

The entire Village of Avon is serviced by public water. The distribution system consists of a 2,000,000 gallon storage tank and a 270,000 gallon storage tank located on Reservoir Road and the water treatment plant on Route 256, respectively. Water is fed throughout the system by gravity from each tank location. The Village of Avon water system serves Barilla America and Kraft Foods, two major food processing facilities that require large demands of 30,000 GPD and 80,000 GPD, respectively.

Several improvements have been made to the Village of Avon water system over the past several years including water meter replacement, meter reading technology upgrades, and water main replacement. The distribution mains have been upgraded to PVC in most of the system, with some asbestos and cast-iron pipe remaining. All meters in the Village have been replaced with Badger meters operating on a drive-by recording software. As a result of these improvements, the Village of Avon has reduced water loss to 14 percent. Additionally, in 2019 the Village of Avon started a joint water study with the Town of Avon to analyze

existing conditions and identify problematic areas. The Village also recently completed an interconnection with the Village of Lima for backup and emergency purposes.

Noted water system concerns include the need for evaluation and inspection of the discharge pipe located beneath the Pebble Beach intake pump station due to its age and the uncertainty of its structural integrity. This piping is the only supply for the Village and Town of Avon and Town of Caledonia Water District #3. If the pipe was to fail, no water could be supplied to the system until a temporary bypass was put in place.

Village of Avon WTP servicing the Town of Avon

The Town of Avon consists of one (1) consolidated water district and the South Avon water district. The South Avon district is operated and maintained by LCWSA and the consolidated district is operated and maintained by the Town of Avon. The South Avon district was completed due to the Retsof salt mine collapse, as the properties in the area lost their groundwater supplies. The Town of Avon storage facilities include two (2) storage tanks—the Town Line 500,000 gallon tank off NYS Routes 5&20 and the East Avon 100,000 gallon tank in the Hamlet of East Avon.

The Town of Avon water storage tank requires improvements. In the 2018 water supply inspection report conducted by the Livingston County Department of Health (DOH), the following observations were made at the East Avon elevated storage tank: exterior needs to be re-painted, the roof vent needs to be repaired or replaced, and the exterior safety equipment is not up to current code and should be replaced. The Town Line tank was last painted in 2007 and at a minimum is in need of paint touch ups, interior and exterior. The Village and Town of Avon are currently working on a joint water study which will include addressing the concerns with the East Avon water tank.

Village of Avon WTP servicing the Town of Caledonia (Caledonia District #3)

The LCWSA purchases water from the Village of Avon to serve properties along NYS Route 5 in the Town of Caledonia. This area is referred to as Caledonia District #3. There are only 12 service connections, serving approximately 160 customers.

Since Caledonia District #3 is served through the Village of Avon treatment system, they are susceptible to any concerns within the Village of Avon system.

Village of Geneseo WTP servicing the Village of Geneseo

A pump station located at the Village of Geneseo water treatment plant pumps treated water to a 3,000,000 gallon concrete water tank located on Reservoir Road, which is owned and operated by the Village. The remainder of the distribution system after the water storage tank is served by gravity. In 2018, the Village of Geneseo replaced 25 water meters, decreasing water loss to 4.4 percent. The Village of Geneseo has an agreement with LCWSA in which

LCWSA would supply up to 0.5 mgd to the Village in the event of an emergency through an interconnection on West Lake Road at the Livonia/Geneseo town line.

The Village of Geneseo has been directed by the Department of Health to install a chlorine residual monitor after the Reservoir Road water storage tank in order to monitor the residual levels to ensure that they are maintained at long distances and not exceeding by-product standards. The chlorine contact time in the system varies depending on the temperature. During the warmer season there is enough contact time in the clear well at the treatment plant to meet chlorine residual requirements, but in the colder months the transmission main and water storage tank are needed for proper chlorine contact time.

Village of Geneseo WTP servicing the Town of Geneseo

The Town of Geneseo water system is made up of Water Districts #1 through 5. Water Districts #1, 2, 4 and 5 are supplied from the Village of Geneseo and District #3 is served by LCWSA. The distribution system in Districts #1, 2, 4 and 5 is served by gravity from the Village of Geneseo 3,000,000 gallon water storage tank located on Reservoir Road with the exception of a portion of Water District #2 that is served by the Town of Geneseo's 250,000 gallon water storage tank located on Burbank Drive. The Burbank Drive water storage tank operates on a higher hydraulic grade than the remainder of the Town of Geneseo system due to the higher ground elevation in the surrounding area.

Additional water main is under design (2019) for sections of Lima Road, Elm Road, North Road, and Pole Bridge Road.

Village of Geneseo WTP servicing the Town of Leicester

The Town of Leicester's York-Leicester District along Caledonia Road is supplied from the Town of York. Water users within this District are served by gravity from the Town of York. Water within the Town of Leicester district does not mix with the remainder of the Town of York, as a closed valve exists at the south end of Caledonia Road keeping sources separate.

Village of Geneseo WTP servicing the Town of York

The Village of Geneseo provides water to the Town of York through a transmission main on State Route 63. The Town of York distribution system has expanded and improved in the last five (5) years since 2014 to include a consolidated district with additional service areas and extensions. A new high-pressure zone service area was added to the system as part of the 2016 Water Systems Improvements project that was driven by Noblehurst Farms and WNY Cheese Enterprise high water demands. As a result of this project, new water main was installed along Craig Road, Stewart Road, and Linwood Road (County Road 23). In addition, the new Tuttle Road pump station was installed to fill the new Peoria (500,000 gallon) water storage tank located near Orrs Corner which feeds the new high-pressure zone. Two pressure reducing valves were also installed at the high-pressure zone connections on

Craig Road and Linwood Road. The remainder of the system is served by gravity through the two (2) Tuttle Road (500,000 gallon) water storage tanks.

Additional water main is being designed (2019) for sections of Anderson Road, Federal Road, Limerick Road, and Main Street (NYS Route 36). A new pressure reducing valve will be installed as part of the project to separate the high- and low-pressure zones.

Hemlock and Canadice Lakes

LCWSA Consolidated District

LCWSA purchases water from the City of Rochester, which draws water from Canadice and Hemlock Lakes. Water is then distributed throughout LCWSA's Consolidated District which includes the Towns of Avon, Caledonia, Conesus, Groveland, Livonia, and Sparta. Specific distribution details are below.

LCWSA - Town of Conesus

This District ("Livingston County District") serves East Lake, East Swamp, and South Livonia Roads from the Town of Livonia to the Hamlet of Conesus. Two (2) master meters, located at the Livonia-Conesus Town line on East Lake Road and South Livonia Road, monitor the flow to the Town of Conesus for billing purposes. Water is provided to the Town of Conesus through connecting transmission mains at these meters, running through the Town of Livonia.

Water users in the Town of Conesus are served by gravity via a combination of three (3) water storage tanks connected to the distribution network. These tanks include the Niver Road tank (250,000 gallons), the Railroad tank (160,000 gallons), and the Sliker Hill tank (500,000 gallons). As part of the recently completed Department of Corrections and Community Supervision (DOCCS) project (*See LCWSA – Town of Groveland section below for details*), the Railroad tank was elevated 10-feet to match the hydraulic grade of the Niver Road tank for operation purposes.

LCWSA - Town of Groveland

In 2019, LCWSA completed the DOCCS water project which connected West Lake Road to Maple Beach Road and extended to the Livingston County Correctional Facility in the Town of Groveland with approximately 50,000 linear feet of 12-inch water main. The water main is supplied through the new Maple Beach pump station, located just off West Lake Road on Maple Beach Road. As a result, users along West Lake Road in the Town of Groveland, previously served by the Town of Geneseo, are now serviced by LCWSA, though no formal district exists at this time. In addition to the water main, a new 500,000 gallon water storage tank (Dennison Road tank) and two (2) pressure reducing valves were installed to maintain proper pressure through the new transmission main.

Groveland Station is served from LCWSA's Consolidated District through Scottsburg in the Town of Sparta. Two 150,000 gallon water storage tanks, the Upper and Lower Groveland Station tanks, with the combination of two pump stations, supplies Groveland Station and up Groveland Hill Road. Residents served by LSWCA are part of LCWSA's Consolidated District.

LCWSA - Village of Livonia

The Village of Livonia is supplied by LCWSA's Consolidated District through 10-inch and 16-inch water mains running parallel along Big Tree Road/State Route 20A. The 16-inch water main was installed as part of the DOCCS project to allow additional flow in the system. The Hemlock pump station and the Shelly Road water storage tank (500,000 gallon capacity) feed the Village of Livonia, which creates a higher-pressure zone within the distribution network; the portion in the Town of Livonia, west of the Village, is a lower-pressure zone. The Village's distribution system operates by a combination of gravity and pumping operations to provide adequate pressures. The water system in the Village of Livonia is a standalone water district from the LCWSA Consolidated District referred to as the Village of Livonia District. Meadow Drive is under design as of 2019 to address a low-pressure issue, with construction set to begin shortly thereafter.

According to current, available records from the Village of Livonia, water meters are aged and contributing to a higher percentage of unaccounted water, an issue which will need to be addressed.

LCWSA - Town of Livonia

The Hemlock pump station, located in the Hamlet of Hemlock, feeds the entire LCWSA Consolidated District in the Town (*sub-district names noted on Map 3-7.7 for clarity*) and Village of Livonia District. The pump station is located off Big Tree Road/State Route 20A in the Town of Livonia at the connection to the Hemlock transmission mains. A 150,000 gallon water storage tank, referred to as the Hemlocktank, is located at the intersection of NYS Route 20A and Big Tree Road. This tank specifically serves the area south of Big Tree Road along NYS Route 20A with a pressure reducing valve and control valve located outside of the Hemlock tank to reduce pressure for this service area. Just south of Big Tree Road, along Shelly Road, is the Shelly Road pump station and the 500,000 gallon Shelly Road water storage tank. As part of DOCCS project, the Shelly Road pump station was upgraded to include two (2) 20 HP vertical turbine pumps.

On the west side of the Village of Livonia are two (2) pressure reducing valves on Big Tree Road and Stone Hill Road. The Town of Livonia water system west of the Village of Livonia is on a lower pressure zone with two (2) additional water storage tanks servicing this area. The Lakeville tank on NYS Route 20A has a capacity of 200,000 gallons and the Airport

tank has a capacity of 150,000 gallons. A master meter is installed on East Lake Road at the Town of Conesus Town line for billing purposes.

The Shelly Road water storage tank cycles 5-10 times a day. A larger tank size is being considered by LCWSA to improve system efficiency.

The Niver Road tank, located on the north side of Niver road, has a 250,000 gallon capacity that continues to feed water into the Town of Conesus.

LCWSA - Town of Sparta

LCWSA owns and operates the 125,000 gallon Scottsburg water storage tank. Customers served prior to the Scottsburg water storage tank are served by gravity from the Sliker Hill tank in the Town of Conesus. A control valve is located near the Town of Conesus Town line to monitor the flow rate to ensure the Scottsburg water storage tank cycles. The Scottsburg tank provides water to users downstream from the tank and feeds water to Groveland Station on Groveland Scottsburg Road.

LCWSA - Town of Geneseo (Water District #3)

LCWSA provides water to the Town of Geneseo Water District #3 by gravity through two (2) water storage tanks in Livonia—the Lakeville and Airport (Pebble Beach Road) water storage tanks. These tanks have the capacity for 200,000 and 150,000 gallons of water, respectively.

An asbestos concrete water main is located in a portion of Water District #3 along NYS Route 20A. The Livingston County Health Department reported that a sample test taken in 2018 measured 2 million fibers/liter (MFL); the maximum contaminant level for asbestos is 7 MFL. Other portions of the distribution network utilize modern water main materials (i.e. PVC, ductile iron).

City of Rochester servicing the Village of Lima

The Village of Lima owns a pump station at the northern Town of Lima line along NYS Route 15A. This pump station supplies water to the Village of Lima and fills their 500,000 gallon storage tank at the north end of the Village. The rest of the system is then fed by gravity from the storage tank. The Village is in the process of replacing all residential water meters with approximately 600 of 700 meters already replaced. All new water meters will be read remotely from a new operating system. This improvement has contributed to a 15.4 percent water loss.

The Village of Lima received a $2,400,000 grant from the New York State Water Infrastructure Improvement Act for system-wide improvements in 2019. These improvements include renovating/painting of the water storage tank, replacement of water

main and appurtenances along several Village roads, and a new supplemental interconnection to the East Avon system for emergency and back-up purposes only.

Water capacity in the Village of Lima is restricted by the existing connection point on NYS 15A. Overall, the water storage tank and distribution system are aged and many areas of the system need attention.

City of Rochester servicing the Town of Lima

The Town of Lima receives water from the City of Rochester. There are four (4) water districts in the Town; Water Districts #1, 2, 3, and 4. The majority of the water main running along NYS Route 15A is 12-inch ductile iron, with the exception of a small portion near Slocum Road where the water main reduces to 8-inch ductile iron. This area is referred to as water District #2. Water usage for District #2 is not metered directly; approximately 12 percent of the metered amount at the connection on NYS Route 15A is purchased by the Town of Lima. Water Districts #1 and 3 are located along the following roads: Ideson Road, Martin Road, York Street, and Bromley Road. Districts #1 and 3 have a separate connection directly to the City of Rochester's Hemlock Lake transmission mains.

As of the publication of this report, the Town approved and budgeted water meter replacement throughout the Town with a cellular or drive-by reading system—both being considered as options. Unaccounted for water in the Town of Lima is currently at approximately 25 percent but could greatly be decreased with the upgraded meters.

Due to increasing development and future planned development, new distribution water main is being considered along Heath Markham, Dalton, Egan, Gale and South Lima Roads. Due to a growing number of homes with no water service at all, new distribution water main is being considered on Pond, Gleason, Doran, Clay and Chase Roads.

The Town of Lima is concerned with the condition of the water mains in District #1 due to their age, dating back to approximately the 1980's. Another problematic area is the out-of-district users east of the Village of Lima. This area is upwards of 100 years old and in need of replacement.

The Town of Lima has very limited labor in the water department and has interest in turning the system over to the Livingston County Water and Sewer Authority in the future.

Lake Ontario

MCWA servicing the Village of Caledonia

The Village of Caledonia receives water from MCWA through the Lehigh Valley service area along NYS Route 5. MCWA operates and maintains this main along Flint Hill Road, NYS Route 5 and Spring Street through the Town and Village of Caledonia. The remainder

of the system is operated and maintained by the Village of Caledonia. Water is distributed throughout the Village system with a 400,000 gallon water storage tank located on Gas Light Lane, off Graney Road. Over the last few years, the Village of Caledonia has replaced approximately one-third of residential water meters and is updating their reading technology. As the Village of Caledonia continues to replace water meters, unaccounted water will likely decrease; approximately 19 percent of water purchases is unaccounted for.

Genesee County is working jointly with MCWA on increasing the supply from MCWA's water system. This project will change the direction of flow into the Village of Caledonia. After construction is complete, MCWA will supply the Village of Caledonia from the hamlet of Mumford through a new pump station located on NYS Route 36. The Route 5 connection will be maintained for emergency purposes.

The Village of Caledonia's water storage tank off NYS Route 5 is aged and in need of major improvements. Due to the cost of multiple repairs, the decision was made to abandon the tank and remove it in the near future. The structural integrity of the tank will be an issue as time progresses. The Village does not require additional storage with this tank being taken offline; the Graney Road tank provides sufficient storage.

Village of Caledonia (MCWA) servicing the Town of Caledonia

The Town of Caledonia Water District No. 1 is connected to the Village of Caledonia system. The main is fed by gravity from the Village of Caledonia storage tanks. There are 30 service connections, serving approximately 93 customers. Water District #1 is operated and maintained by LCWSA.

Private Water Systems

Many residents in Livingston County are served by private water supplies, especially the Towns of Portage and Ossian where there is no public water. Specific concerns or issues regarding water quality or quantity come to light when residents using private wells bring them to the attention of local leaders, resulting in the expansion or creation of public water districts. Typical private well issues can consist of the following:

- *Insufficient quantity* requiring residents to conserve water by alternating shower days, alternating laundry days, or not washing clothes in their residences at all.
- *Poor water quality* requiring residents to either boil water for consumption or purchase bottled water for cooking and consumption.
- *High cost* to operate and maintain existing well supplies. Residents must purchase chemicals for softening and treatment systems and may have to replace plumbing system components due to corrosion of their fixtures.
- *Fire protection* for residents and businesses. This is especially important if there are no significant bodies of water in the vicinity to provide an alternative supply of water

for fire protection (i.e. dry hydrants), requiring fire departments to rely on dedicated tankers and pumpers for firefighting needs.

As of the publication of this report, the Town of Caledonia has experienced private well water concerns along portions of Banks Road, Graney Road, and Black Street. There have been reports of elevated levels of iron, sulfur, and nitrate. Town of Caledonia areas west of the Village of Caledonia primarily consist of extremely shallow bed rock.

3.3.2 Water System Operators

Water system operators are a critical component to providing an adequate and safe supply of water to users from the treatment plant through distribution. These operators are responsible for treating raw water with the use of disinfection chemicals, monitoring filtration equipment, conducting inspections of pipes/meters, and conducting water sample tests to ensure water quality compliance and standards. Operator classes are based on the size of the treatment system and the water source type.

- Class IA – Water treatment plant greater than 2.5 mgd surface water or GWUDI* of surface water that provides filtration
- Class IIA – Water treatment plant less than or equal 2.5 mgd surface water or GWUDI of surface water that provides filtration
- Class IB – Water treatment plant greater than 2.5 mgd of groundwater (excluding GWUDI of surface water) or surface water system with filtration avoidance without facilities for clarification
- Class IIB – Water treatment plant less than or equal 2.5 mgd of groundwater (excluding GWUDI of surface water) or surface water system with filtration avoidance without facilities for clarification
- Class C – Water treatment plant or distribution system serving less than or equal to 1,000 people
- Class D – Distribution system serving greater than 1,000 people or purchasing water system (A Class D certification is needed along with Class A or B for operating a plant and distribution system serving greater than 1,000 people.)

**GWUDI: Ground Water Under Direct Influence. A portion of the groundwater source that is in close enough proximity to a surface water source to be recharged by it and therefore considered at risk from pathogens that are not typically found in groundwater.*

Table 3-6 below and on the following page provides an overview of the water operators within each community, as applicable. The length of experience, if known or provided by each community and the County Department of Health (DOH) is shown as well. This information provides some insight, though limited, into gaps in institutional knowledge among older and newer operators, and the potential loss of that knowledge as a result of retirement.

Table 3-6
Livingston County Water System Operators

Municipality	Number of Operators	Operating Class				Experience (Years)
		IIA	IIB	C	D	
Avon (T)	1				■	
	2			■	■	
Avon (V)	1			■		
	2	■			■	
Caledonia (T)	N/A					
Caledonia (V)	1		■		■	
	2				■	
	3				■	
	4				■	
	5				■	
Conesus (T)	N/A					
Geneseo (T)	1				■	
Geneseo (V)	1	■		■	■	29
	2	■		■	■	6
	3	■		■	■	32
	4	■		■	■	12
	5	■		■	■	2
Groveland (T)	N/A					
Leicester (T)	1			■	■	
Leicester (V)	1			■		
Lima (T)	1				■	
	2				■	
Lima (V)	1		■	■	■	
	2				■	
	3		■	■	■	
Livonia (T)	N/A					
Livonia (V)	N/A					
Mount Morris (T)	1				■	
Mount Morris (V)	1	■		■	■	20
	2	■		■	■	3
	3	■		■	■	3
North Dansville (T)	N/A					
Dansville (V)	1	■			■	8
	2	■		■	■	1
	3					In Training

Table 3-6
Livingston County Water System Operators

Municipality	Number of Operators	Operating Class				Experience (Years)
		IIA	IIB	C	D	
Nunda (T)	N/A					
Nunda (V)						
	1					17
	2					8
	3					12
Ossian (T)	N/A					
Portage (T)	N/A					
Sparta (T)	N/A					
Springwater (T)	1					
	2					
West Sparta (T)	N/A					
York (T)	1					
	2					
	3					
LCWSA	1					25
	2					23

3.3.3 Finances

Many of the communities in the County, as well as LCWSA, maintain their own billing and finances for their water system, whether it includes a treatment plant or just a distribution system or both. Rates include a minimum annual or quarterly charge based on a usage range that varies among them as well as an additional rate charge for water beyond the initial usage range, which varies as well. As such, rates cannot be equally compared across each municipality except in terms of charges to those within a water district or outside of a district in a Town or Village. **Table 3-7** on the following pages provide a summary of water rates as of 2019 for each water source and community serviced.

Table 3-7
Livingston County Water Systems
Existing Water Rates

Source	Municipality	Town Billing		Village Billing	
		In-District	Out-of-District	In-Village	Out-of-Village
Springwater Wells	Town of Springwater				
	Minimum Quarterly Charge (0-10,000 gal)	$85.00			
	Additional per 1,000 gal	$4.00			
Chidsey Reservoir	Village of Nunda				
	Minimum Quarterly Charge (0-5,000 gal)			$49.50	
	Additional per 1,000 gal (>5,000 gal)			$3.50	
	Misc. Service Charge for Indebtedness			$28.87	
	Town of Nunda (In-District)				
	Minimum Quarterly Charge (0-5,000 gal)	$61.10			
	Additional per 1,000 gal (>5,000 gal)	$4.75			
	Misc. Service Charge for Indebtedness	$28.87			
	Town of Nunda (Out-of-District)				
	Minimum Quarterly Charge (0-5,000 gal)		$64.00		
	Additional per 1,000 gal (>5,000 gal)		$5.00		
	Misc. Service Charge for Indebtedness		$28.87		
Silver Lake	Village of Mount Morris				
	Minimum Quarterly Charge (0-3,000 gal)			$42.50	
	Additional per 1,000 gal (4,000-10,000 gal)			$2.75	
	Additional per 1,000 gal (>11,000 gal)			$3.00	
	Town of Mount Morris				
	Minimum Yearly Charge	$41.35			
	Additional per 1,000 gal	$5.25			
	Town of Mount Morris (ARS)				
	Minimum Yearly Charge	$184.00			
	Additional per 1,000 gal	$5.85			

Table 3-7
Livingston County Water Systems
Existing Water Rates

Source	Municipality	Town Billing		Village Billing	
		In-District	Out-of-District	In-Village	Out-of-Village
Silver Lake	Village of Leicester (In-Village)				
	Minimum Quarterly Charge (0-4,000 gal)			$65.00	
	Additional per 1,000 gal			$3.95	
	Village of Leicester (Out-of-Village)				
	Minimum Quarterly Charge (0-4,000 gal)				$82.00
	Additional per 1,000 gal				$4.45
	Town of Leicester				
	Minimum Quarterly Charge (0-4,000 gal)	$25.00			
	Additional per 1,000 gal	$6.50			
	Town of Groveland (ARS)				
	Minimum Yearly Charge	$184.00			
	Additional per 1,000 gal	$5.85			
Mill Creek/ Perkinsville Wells	Village of Dansville				
	Minimum Quarterly Charge (0-5,000 gal)			$83.00	
	Additional per 1,000 gal (>5,000 gal)			$3.50	
	Town of North Dansville – Village of Dansville Billing				
	Minimum Quarterly Charge (0-5,000 gal)				$98.00
	Additional per 1,000 gal (>5,000 gal)				$4.00
	Town of West Sparta – Village of Dansville Billing				
	Minimum Quarterly Charge (0-5,000 gal)				$98.00
	Additional per 1,000 gal (>5,000 gal)				$4.00
Conesus Lake	Village of Avon (In-Village)				
	Flat Filtration Charge			$33.00	
	Minimum per 6,000 gal			$33.00	
	Additional per 1,000 gal			$5.49	

Table 3-7
Livingston County Water Systems
Existing Water Rates

Source	Municipality	Town Billing		Village Billing	
		In-District	Out-of-District	In-Village	Out-of-Village
Conesus Lake	Village of Avon (Out-of-Village)				
	Flat Filtration Charge				$33.00
	Minimum per 6,000 gal				$57.70
	Additional per 1,000 gal				$9.49
	Town of Avon				
	Minimum Quarterly Charge (0-8,000 gal)	$50.00			
	Additional per 1,000 gal	$6.08			
	Town of Avon - LCWSA Billing (South Avon)				
	Minimum Yearly Charge	$216.00			
	Additional per 1,000 gal	$6.08			
	Town of Caledonia - LCWSA Billing (District #3)				
	Minimum Yearly Charge	$144.00			
	Additional per 1,000 gal	$5.35			
	Village of Geneseo				
	Minimum Quarterly Charge (1,000 cu ft)			$25.50	
	Additional per 100 cu ft Town of Geneseo (District #1, 2, 4 & 5)			$2.55	
	Minimum Quarterly Charge	$30.00			
	Additional per 1,000 gal	$4.50			
	Town of Leicester (York-Leicester District)				
	Minimum Quarterly Charge (0-4,000 gal)	$25.00			
	Additional per 1,000 gal	$6.50			
	Town of York				
	Minimum Quarterly Charge (0-6,000 gal)	$29.35			
	Additional per 1,000 gal (6,001-20,000 gal)	$5.01			
	Additional per 1,000 gal (20,001-50,000 gal)	$5.00			

Table 3-7
Livingston County Water Systems
Existing Water Rates

Source	Municipality	Town Billing		Village Billing	
		In-District	Out-of-District	In-Village	Out-of-Village
Hemlock/ Canadice Lakes	Town of Conesus - LCWSA Billing				
	Minimum Yearly Charge	$148.00			
	Additional per 1,000 gal	$3.50			
	Village of Livonia				
	Per 1,000 gal	$2.00			
	Town of Geneseo - LCWSA Billing (District #3)				
	Minimum Yearly Charge	$148.00			
	Additional per 1,000 gal	$3.50			
	Debt Charge	$226.00			
	Town of Groveland - LCWSA Billing				
	Minimum Yearly Charge	$148.00			
	Additional per 1,000 gal	$3.50			
	Town of Groveland - LCWSA Billing (Groveland Station)				
	Minimum Yearly Charge	$148.00			
	Additional per 1,000 gal	$3.50			
	Debt Charge	$256.00			
	Village of Livonia				
	Minimum Yearly Charge	$200.00			
	Additional per 1,000 gal	$6.00			
	Town of Livonia - LCWSA Billing				
	Minimum Yearly Charge	$148.00			
	Additional per 1,000 gal	$3.25			
	Town of Livonia - LCWSA Billing (South Livonia)				
	Minimum Yearly Charge	$148.00			
	Additional per 1,000 gal	$3.50			
	Debt Charge	$347.00			
	Town of Sparta - LCWSA Billing				
	Minimum Yearly Charge	$148.00			
	Additional per 1,000 gal	$3.50			

Table 3-7
Livingston County Water Systems
Existing Water Rates

Source	Municipality	Town Billing		Village Billing	
		In-District	Out-of-District	In-Village	Out-of-Village
Hemlock/ Canadice Lakes	Village of Lima				
	Minimum Quarterly Charge (0-5,000 gal)			$53.00	$65.80
	Additional per 1,000 gal (5,000-10,000 gal)			$19.00	$89.22
	Additional per 1,000 gal			$6.10	$7.30
	Town of Lima - (Districts #1 & 3)				
	Minimum Quarterly Charge	$45.00			
	Additional per 1,000 gal	$6.05			
	Town of Lima - (Districts #2 & 4)				
	Minimum Quarterly Charge	$45.00			
	Additional per 1,000 gal	$6.70			
Lake Ontario	Village of Caledonia (MCWA Wholesale)				
	Minimum Quarterly Charge			$30.00	
	Additional per 1,000 gal			$6.60	
	Village of Caledonia (MCWA Wholesale)				
	Minimum Quarterly Charge				$25.00
	Additional per 1,000 gal				$6.00
	Town of Caledonia - LCWSA Billing (District #1)				
	Minimum Yearly Charge	$116.00			
	Additional per 1,000 gal	$4.50			

Source: All data was gathered from each Village and Township in Livingston County, New York State Department of Environmental Conservation, and the Livingston County Department of Health

One method for providing a comparison of these water rates is utilizing the average single-family home water usage per day (180 GPD) as shown in **Table 3-8**. Based on this water usage figure, yearly water expenses to users typically range from $200 to $800. By comparison, water expenses for single-family homes serviced by a private well range between $200 and $2,000 depending on ground water quality and the extent of the system needed to provide potable water.

Table 3-8
Livingston County Municipal Water Systems Yearly Cost Scenario
2019 Budget Year Rates

Source	Municipality	LCWSA Billing	Town Billing	Village Billing
Springwater Wells	Springwater (T)		$420.00	
Chidsey Reservoir/Newville Creek	Nunda (V)			$473.00
	Nunda (T)			
	Water District #1			$549.88
	Out-of-District			$571.48
Silver Lake	Mount Morris (V)			$307.00
	Mount Morris (T)			
	Town District		$417.40	
	ARS Service Area	$535.00		
	Leicester (V)			
	In-Village			$433.80
	Out-of-Village			$523.80
	Leicester (T)		$386.00	
	Groveland (T)			
	ARS Service Area	$535.00		
Mill Creek/Perkinsville Wells	Dansville (V)			$472.00
	North Dansville (T)			$552.00
	West Sparta (T)			$552.00
Conesus Lake	Avon (V)			
	In-Village			$433.80
	Out-of-Village			$523.80
	Avon (T)			
	Consolidated District		$370.24	
	South Avon	$580.80		
	Caledonia (T)			
	Water District #3	$465.00		
	Geneseo (V)			$204.52
	Geneseo (T) *Water Districts #1, 2, 4, 5*		$390.00	
	Leicester (T)			
	York-Leicester District		$386.00	
	York (T)		$297.76	

Table 3-8
Livingston County Municipal Water Systems Yearly Cost Scenario
2019 Budget Year Rates

Source	Municipality	LCWSA Billing	Town Billing	Village Billing
Hemlock/Canadice Lakes	Conesus (T)	$358.00		
	Geneseo (V)	Varies		
	Geneseo (T)			
	Water Districts #2, 3	$584.00		
	Groveland (T)			
	Groveland Station	$614.00		
	DOCCS	$358.00		
	Livonia (V)			$594.00
	Livonia (T)			
	Town	$343.00		
	South Livonia	$705.00		
	Sparta (T)	$751.00		
	Lima (V)			
	In-Village			$410.00
	Out-of-Village			$502.88
	Lima (T)			
	Water Districts #1, 3		$543.00	
	Water Districts #2, 4		$582.00	
Lake Ontario	Caledonia (V)			
	In-Village			$516.00
	Out-of-Village			$496.00
	Caledonia (T)			
	Water District #1	$386.00		

The final component of the financial aspects of water systems in the County is existing capital improvement indebtedness that are currently (2019) being paid. Those communities that have bonds (debt) associated with water system improvements are noted in **Table 3-9** along with the associated project, start/end date, and original/remaining balance as of 2019.

Table 3-9
Status of Municipal Water-Related Bonds (2019)

Town/Village	Project/Allocation Funds	Original Balance	Start Date	End Date	Remaining Balance
Avon (T)					
Avon (V)	Route 5&20 Water Bond	$1,100,000.00	2009	2029	$675,000.00
Caledonia (T)					
Caledonia (V)	Water System Improvements Serial Bond	$305,000.00	2016	2025	$210,000.00
Conesus (T)					
Geneseo (T)					
Geneseo (V)	Infrastructure Project- Water	$ 638,600.00	2012	2026	$395,000.00
Groveland (T)					
Leicester (T)					
Leicester (V)					
Lima (T)	District #3 owes District #1	$30,309.00	2018	2023	$20,309.00
Lima (V)					
Livonia (T)					
Livonia (V)					
Mount Morris (T)					
Mount Morris (V)	Treatment Plant Serial Bond	$2,030,000.00	2004	2027	$680,000.00
	Transmission Line Serial Bond	$311,700.00	1995	2030	$120,000.00
	Transmission Line Serial Bond	$297,000.00	1999	2030	$120,000.00
North Dansville (T)					
Dansville (V)	USDA Water Storage Tank Phase 1		1999	2032	$908,000.00
	USDA Water Storage Tank		1999	2032	$188,000.00
	EFC/M&T Water Plant		2011	2021	$360,000.00
	DTC Water Meters		2014	2022	$60,000.00
Nunda (T)					

Table 3-9
Status of Municipal Water-Related Bonds (2019)

Town/Village	Project/Allocation Funds	Original Balance	Start Date	End Date	Remaining Balance
Nunda (V)	USDA Public Improvements A	$505,000.00	1998	2034	$237,000.00
Nunda (V)	USDA Public Improvements B	$330,000.00	1998	2034	$153,000.00
	Roosevelt & Cross, Inc. Water Reservoir Dredging	$620,000.00	2010	2037	$474,000.00
	Roosevelt & Cross, Inc. Water System Improvements	$60,000.00	2010	2024	$27,000.00
Ossian (T)					
Portage (T)					
Sparta (T)					
Springwater (T)					
West Sparta (T)					
York (T)	Water Consolidation Water	1,845,000.00	2015	2037	$1,405,000.00
	Water Storage Improvements, Linwood	$3,528,300.00	2019	2049	$1,357,900.00
	BAN Water Storage	$796,680.00	2018	2019	$0.00
	BAN Water Storage	$2,836,620.00	2018	2019	$0.00
LCWSA	Water System Improvements Serial Bond**	$951,750.00	2011	2040	$729,675.00

*** The LCWSA does have water related debt totaling $726,675 at the end of 2018 related to the Groveland Station water project. The debt related to the other various systems is held by the County or the individual municipalities, depending on how the districts were formed.*

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Monroe County

Genesee County

Ontario County

Wyoming County

Allegany County

Steuben County

Town of Caledonia

Village of Caledonia

Town of Avon

Village of Avon

Village of Lima

Town of Lima

Town of York

Town of Geneseo

Village of Geneseo

Village of Livonia

Town of Livonia

Town of Leicester

Village of Leicester

Village of Mount Morris

Town of Mount Morris

Town of Groveland

Town of Conesus

Town of Sparta

Town of Springwater

Town of West Sparta

Village of Nunda

Town of Nunda

Town of Portage

Village of Dansville

Town of North Dansville

Town of Ossian

Conesus Lake

Hemlock Lake

Canadice Lake

Honeoye Lake

Silver Lake

SPRING CREEK

MAXWELL CREEK

DUGAN CREEK

STREAM

FINIGAN CREEK

CHRISTIE CREEK

WHITE CREEK

CONESUS CREEK

GENESEE RIVER TRIBUTARY

SPRING BROOK

HONEOYE CREEK

BROWNS CREEK

BAIRDS CREEK

BIDWELLS CREEK

SALT CREEK

JAYCOX CREEK

SPEZZANO GULLY

TAUNTON GULLY

LITTLE BEARDS CREEK

BEARDS CREEK

FALL BROOK

WILKINS CREEK

HEMLOCK OUTLET

CANADICE OUTLET

DAMONSVILLE CREEK

ALLENS CREEK

BUCK RUN CREEK

GENESEE RIVER

CANASERAGA CANAL

CONESUS INLET

TUSCARORA CREEK

TWO MILE CREEK

BRADNER CREEK

CANASERAGA CREEK

LIMEKILN CREEK

HONEOYE INLET

COHOCTON RIVER

MUD CREEK

CROOKED BROOK

KESHEQUA CREEK

NEWVILLE CREEK

STONY BROOK

BENNETT CREEK

BLACK CREEK

SUGAR CREEK

Livingston County

MAP SHEET:

MAP 3-8

MAP TITLE:

Public Water Systems Billing Service Areas

DATE PREPARED:

AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- LCWSA
- MCWA
- Town
- Village

N W E S

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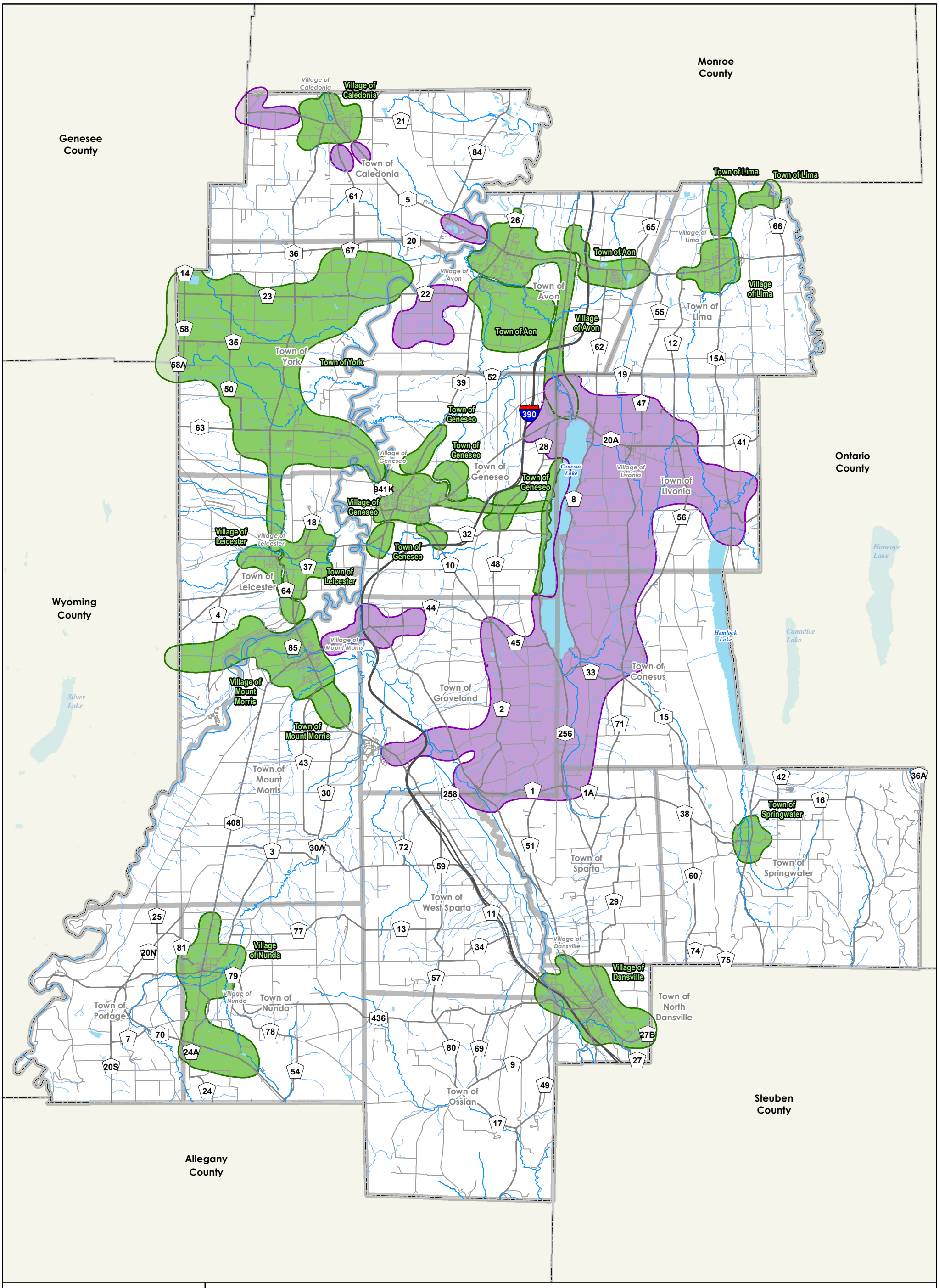
Monroe County
Genesee County
Ontario County
Wyoming County
Steuben County
Allegany County
Village of Caledonia
Town of Caledonia
Town of Lima
Village of Lima
Town of Aon
Village of Avon
Town of Avon
Town of York
Town of Geneseo
Village of Geneseo
Town of Leicester
Village of Leicester
Village of Mount Morris
Town of Mount Morris
Town of Conesus
Town of Groveland
Town of Springwater
Town of Sparta
Town of West Sparta
Village of Nunda
Town of Nunda
Town of Portage
Village of Dansville
Town of North Dansville
Town of Ossian
Town of Livonia
Village of Livonia
Conesus Lake
Honeoye Lake
Hemlock Lake
Canadice Lake
Silver Lake
390
941K
436
MAP SHEET:
MAP 3-9
MAP TITLE:
Livingston County
Local Water Operation Areas
DATE PREPARED:
AUGUST 20, 2020
Livingston County
Legend
County Boundaries
Town Boundaries
Villages
Local Roads
County Roads
Interstate
State Routes
Major Streams
Minor Streams
Waterbodies
LCWSA
Town/Village Operations
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ENGINEERING
PLANNING
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4 Summation of Water Needs

Water systems in Livingston County have many issues of common concern to system operators and customers County-wide. These issues can be summarized into four (4) general categories: water quantity, water quality, interconnections, and operation and maintenance.

4.1 Water Quantity

Water quantity or capacity can be affected by several factors which include such items as the safe yield of surface supplies, the yield of ground water supplies (wells), water treatment capacity, pumping capacity, size and condition of transmission and storage facilities. These factors impact the ability of each system to provide an adequate supply of potable water to its current customers, as well as accommodate increases in demand resulting from new customers and expansion of service areas.

Table 4-1 below is a summary of the current permitted water withdrawal allocation, treatment capacity and available water capacity for each water source, as discussed in Section 3.2. Generally, available capacity is determined by the difference between the water withdraw allocation or treatment capacity as of the publication of this study and the maximum day water usage.

Table 4-1
Water Capacity Summary

Source & Permitted Allocation	*Water Supply Allocation (mgd)*	*Max Day Usage (mgd)*	*Treatment / Purchase Capacity (mgd)*	*Available Water Capacity (mgd)*
Springwater Wells, 0.20 mgd				
Town of Springwater	0.20	0.070	0.288	0.13
Chidsey Reservoir, 0.38 mgd				
Village of Nunda	0.38	0.226	0.20	No Capacity
Silver Lake, 6.15 mgd				
Village of Mount Morris	1.50	0.800	0.9	0.10
Mill Creek/Perkinsville Wells, Entire Flow/2.0 mgd				
Village of Dansville	Entire Flow/2.00	0.865	1.5	0.635
Conesus Lake, 12.96 mgd				
Village of Avon	3.50	1.103	1.0	No Capacity
Village of Geneseo	3.00	2.192	2.0	No Capacity
Hemlock/Canadice Lakes, 48.0 mgd				
LCWSA Consolidated District	3.00 Purchased	0.254	3.00	0.656
Town of Livonia (LCWSA)	1.0	0.840		
Village of Lima	0.275 Purchased	0.637	0.275	*No Capacity
Town of Lima (WD #1 & #3)	0.050			
Lake Ontario, 200.0 mgd				
Village of Caledonia	Purchase Agreement	0.445	0.450	No Capacity
Total (Producers only)	**8.58**	**5.256**	**7.488**	**0.865**
Total (Producers & Purchasers)	**13.28**	**7.432**	**11.213**	**1.521**

*Pumping capacity at 0.667 mgd.

Currently, water suppliers in Livingston County produce and/or purchase an average of approximately 3.80 mgd with max day usage reaching up to 7.50 mgd. Any capacity concerns described above do not necessarily imply that there is an insufficient quantity of water from the existing sources to meet demands on an overall County-wide basis. Instead, it indicates that either intermunicipal agreements could potentially be negotiated to supply water where it is needed or that new water sources and/or expanded treatment plants could be developed to meet the demands.

As discussed above, water quantity can be affected by the safe yield analysis of a particular source. This analysis is used to determine the maximum amount of water that can be withdrawn from a water source without adversely affecting the source directly, water quality or the surrounding environment. According to the 1991 Livingston County Comprehensive Water Study, the NYSDEC has already indicated that Silver, Conesus, and Hemlock Lakes are allocated beyond the optimal withdrawal volume. To protect the integrity of the Lakes and the watershed balance, the NYSDEC would like to see lower overall allocation limits. The volume of the lower allocation is unknown currently.

Based in Table 4-2 below, the need to supply water to existing residents, potential increases in population (*growth based on most current documented projections*), and opportunities to increase economic development (*primarily based on lands zoned or preliminarily developed for commercial and industrial use*), the County will require on average an additional 3.50 mgd for a total of approximately 7.25 mgd, with max day demands reaching up to 14.25 mgd.

Projected demands over the next 30 years are based on population growth and subsequent residential and economic development. It is reasonable to say that 2/3rd of existing and projected population have a desire for public water. Economic development can vary but based on the projected uses of each of the five (5) industrial development areas in the County and the potential uses of future economic development areas (in conjunction with adopted comprehensive plans), water demand was determined assuming full build-out in these areas. Given the limited availability for future development in most Villages in the County, projected max day demands were determined using the current ratio of average usage to max day usage. Upgrades and improvements in the County-wide system will likely take place over a 30 year timeframe; alternatives and implementation are discussed in Section 5.

Table 4-2
Projected Water Supply Demands

Water Source	Municipality	Average Daily Usage (MGD) (*2019*)	Max Daily Usage (MGD) *(2019)*	Projected Avg. Daily Usage (MGD) *(2050)*	Projected Max Daily Usage (MGD) *(2050)*
Springwater Wells	*Springwater (T)*	*0.034*	*0.070*	*0.055*	*0.110*
	Total Usage	**0.034**	**0.070**	**0.055**	**0.110**
Chidsey Road Reservoir	*Nunda (V)*	*0.121*	*0.200*	*0.134*	*0.225*
	Nunda (T)	*0.010*	*0.020*	*0.140*	*0.280*
	Nunda (T) (Out-of-District)	*0.003*	*0.006*	*0.005*	*0.010*
	Total Usage	**0.134**	**0.226**	**0.279**	**0.515**
Silver Lake	*Mount Morris (V)*	*0.317*	*0.460*	*0.360*	*0.525*
	Mount Morris (T)	*0.030*	*0.049*	*0.103*	*0.206*
	Leicester (V)	*0.103*	*0.200*	*0.150*	*0.295*
	Leicester (T)	*0.022*	*0.035*	*0.124*	*0.248*
	Groveland (T) (ARS)	*0.039*	*0.050*	*0.000**	*0.000**
	Total Usage	**0.514**	**0.800**	**0.742**	**1.284**
Mill Creek/ Perkinsville Wells	*Dansville (V)*	*0.430*	*0.715*	*0.550*	*0.915*
	North Dansville (T)	*0.048*	*0.090*	*0.060*	*0.120*
	West Sparta (T)	*0.005*	*0.060*	*0.010*	*0.020*
	Total Usage	**0.483**	**0.865**	**0.620**	**1.055**
Conesus Lake	*Avon (V) (In-Village)*	*0.498*	*0.574*	*0.520*	*0.600*
	Avon (V) (Out-of-Village)	*0.003*	*0.006*	*0.005*	*0.010*
	Avon (T)	*0.235*	*0.513*	*0.475*	*0.950*
	Caledonia (T) (WD #3)	*0.011*	*0.010*	*0.015*	*0.030*
	Total Usage	**0.746**	**1.103**	**1.015**	**1.590**

Table 4-2
Projected Water Supply Demands

Water Source	Municipality	Average Daily Usage (MGD) (*2019*)	Max Daily Usage (MGD) *(2019)*	Projected Avg. Daily Usage (MGD) *(2050)*	Projected Max Daily Usage (MGD) *(2050)*
Conesus Lake	*Geneseo (V)*	*0.358*	*0.910*	*0.500*	*1.250*
	Geneseo (T)	*0.156*	*0.322*	*0.300*	*0.600*
	York (T)	*0.432*	*0.954*	*0.450*	*0.900*
	Leicester (T) (York-Leicester WD)	*0.004*	*0.006*	*0.005*	*0.009*
	Total Usage	**0.949**	**2.192**	**1.254**	**2.759**
Hemlock/Canadice Lakes	*LCWSA*				
	Conesus (T)	*0.034*	*0.075*	*0.200*	*0.400*
	Geneseo (T) (WD #3)	*0.002*	*0.006*	*0.030*	*0.060*
	Geneseo (T) (WD #2)	*0.001*	*0.002*	*0.000**	*0.000**
	Geneseo (V)	*0.036*	*0.075*	*0.050*	*0.100*
	Groveland (T)	*0.019*	*0.045*	*0.700*	*1.400*
	Groveland (T) (Groveland Station)	*0.015*	*0.030*	*0.020*	*0.040*
	Sparta (T)	*0.008*	*0.016*	*0.030*	*0.060*
	Groveland (T) (ARS)	*0.000*	*0.000*	*0.040*	*0.080*
	Avon (T)	*0.003*	*0.005*	*0.030*	*0.060*
	Total Usage (LCWSA w/o Livonia)	**0.119**	**0.254**	**1.115**	**2.230**
	Livonia (T)	*0.317*	*0.650*	*1.150*	*2.300*
	Livonia (V)	*0.081*	*0.190*	*0.410*	*0.820*
	Total Usage (LCWSA & Livonia)	**0.522**	**1.094**	**2.682**	**5.365**

Table 4-2
Projected Water Supply Demands

Water Source	Municipality	Average Daily Usage (MGD) (*2019*)	Max Daily Usage (MGD) *(2019)*	Projected Avg. Daily Usage (MGD) *(2050)*	Projected Max Daily Usage (MGD) *(2050)*
Hemlock/Canadice Lakes	*City of Rochester*				
	Lima (V)	*0.161*	*0.553*	*0.170*	*0.585*
	Lima (V) (Out-of-Village)	*0.003*	*0.006*	*0.005*	*0.010*
	Lima (T)	*0.023*	*0.078*	*0.118*	*0.236*
	Total Usage	**0.187**	**0.637**	**0.293**	**0.831**
Ontario Lake	*Caledonia (V)*	*0.205*	*0.431*	*0.210*	*0.440*
	Caledonia (V) (Out-of-Village)	*0.003*	*0.006*	*0.005*	*0.010*
	Caledonia (T)	*0.004*	*0.009*	*0.0098*	*0.196*
	Total Usage	**0.212**	**0.445**	**0.313**	**0.646**
	County Total Usage	**3.782**	**7.432**	**7.214**	**14.075**

*Will no longer be served in 2050 by the current source.

4.2 Water Quality

Water quality is dependent upon the characteristics of the source water and more importantly the ability of the treatment processes to meet regulatory requirements. Every system in the County provides treatment so that the treated water quality generally meets regulatory standards. Occasionally, in most systems, those standards are violated from time to time and appropriate corrective actions are taken. Water quality is closely monitored by the system operators and Livingston County Department of Health.

Section 3 includes details on raw water quality including the impact and concern of harmful algal blooms (HABs) to the three (3) major Lake sources. It also identifies disinfection by-products as a major concern moving forward, especially with increased regulation from the Federal Environmental Protection Agency and the trend of increased water age due to far reaching system extension into rural areas. Specific quality issues or needs related to source waters and distribution systems will be discussed in Sections 4.5.1 through 4.5.6.

As discussed in Section 3.2, each treatment plant has a cost associated with the physical treatment of source water. This cost includes several items such as operator salaries,

insurances, chemicals, treatment plant utility cost, employee benefits, treatment plant related debt, etc. Due to the difference between source waters and size of each treatment plant, the cost of treatment was calculated using the actual water budgets at each facility and represented per 1,000 gallons of water treated. A summary of these treatment costs is below in **Table 4-3**.

Table 4-3
Cost of Water Treatment

Water Treatment Plant	Cost of Treatment (per 1,000 gallons)
Town of Springwater	$2.79
Village of Nunda	$3.13
Village of Mount Morris	$1.73
Village of Dansville	$2.53
Village of Avon	$1.86
Village of Geneseo	$1.80
City of Rochester	$0.44
Monroe County Water Authority	$0.59

4.3 Interconnections

Interconnections between systems provide redundancy of supply which can be crucial during emergency situations to keep customers supplied with potable water. It is desirable to have sources of supply from secondary sources that are not related to the primary source. This will allow each system to overcome deficiencies in the supply that can result from problems with source water, treatment facilities, and distribution system.

The Livingston County Department of Health has identified water system interconnections with neighboring communities, preferably supplies from a separate source, other than the primary source. Interconnections can be crucial during emergency situations to keep customers supplied with safe, potable water. A lack of secondary sources puts the public at risk of temporary water shut down or contamination. Where these interconnections have been identified by the Department of Health, they have been included in the alternatives in Section 5.

4.4 Operation & Maintenance

Operation and maintenance issues encompass the daily work of systems to provide an adequate supply of potable water to their customers. Included in this is the availability of sufficient trained staff and equipment to ensure that each system operates efficiently and

effectively. Tasks that are included in this effort are the operation and maintenance of treatment, transmission, distribution, and storage facilities. Also included are administrative tasks such as documentation of compliance with regulatory requirements, metering and billing, backflow prevention programs, and customer service.

The NYS Department of Health (DOH) provides regulations (NYS Sanitary Code 5-1, Subpart 5-4) on the number of operators required for treatment facilities. Facilities serving 1,000 people or less that only provide basic treatment and distribution systems are required to have an available operator; treatment plants that filter must have a backup operator. Although not required, the County DOH highly recommends that all systems have a minimum of one backup operator. Most systems in the County currently meet these guidelines, but in time may struggle to meet them with growing systems and a limited number of younger staff in training. As operators begin to retire over the next 10-20 years, it will prove difficult to fill these positions.

Table 4-4 is a summary of maintenance and billing software.

Table 4-4
Operation and Maintenance Equipment

Municipality	Equipment	Brand/Model Number	Date of Purchase	Notes
Avon (T)	Billing Software	WB Max - Softline Data		Uses Village of Avon as needed – no agreement in place
Avon (V)	Billing Software	Springbook		
Caledonia (V)	Billing Software	Flexbill from Harris computers w/ Badger Read Center		Switching to Flexbill with Badger Beacon
	Mini Excavator	Bobcat E45	2017	
	Backhoe	Case 580	2010	Various attachments
	Water Utility Van		1994	
	12 Ton Dump Truck	Sterling	2004	
	7 Ton Dump Truck	Ford L8000	1995	
	Front End Loader	John Deere	1990	
	Pick-up Dump Truck	Ford F-450	2017	

Table 4-4
Operation and Maintenance Equipment

Municipality	Equipment	Brand/Model Number	Date of Purchase	Notes
Caledonia (V)	Skid steer	Bobcat T595	2018	Several buckets, hydraulic breaker, broom, forks, planer and snow removal equipment
	Air Compressor	Sulair		Several hammers and drill
	Portable Generator	15 KVA		
	(2) 3" Trash Pumps			Gasoline
	2" Trash Pump			Electric
	Hypochlorinator (110 Volt)			
	Acoustic Leak Detector	Heath		
	Pipe and Cable Detector	Schonstedt		
	Sweeper with Catch Basin Cleaning Wand	Johnston		
	(2) Pipe Cutting Saws			
Geneseo (T)				
Geneseo (V)	Billing Software	Williamson Law Book Company - Water & Billing Software		
	GPS/GIS Equipment (Desktop Only)			
	Asset Management Software			Provided by Insurance Carrier
	Water main Leak Detection			Currently done by N.Y. Rural Water
	Hydrant Flow Testing	Pitot Instruments		
	Electric Valve Exerciser			
	Sewer Televising, 250' Snake	Ridgid		
	Sewer Flusher, 500' hose	747FR2000	2017	

Table 4-4
Operation and Maintenance Equipment

Municipality	Equipment	Brand/Model Number	Date of Purchase	Notes
Geneseo (V)	Vacuum Trailer	TRAV-L-VACH	2006	
	(4) Portable Flow Meters	Sigma 950		
	Trench Box			
	Excavator	Bobcat E50	2015	
	(2) Backhoes	CAT 420F	2016	
	Telehandler	Bobcat V519	2019	
	Skid steer	Bobcat S570	2018	
Leicester (T)	Billing Software	WaterWorks (NOS-Network Oriented Solutions)		
Leicester (V)				
Lima (T)	Billing Software	LCWSA Billing		
	(4) Shut-off Wrenches			
	copper shutoff tool			
	2" Trash Pump			
	3" Trash Pump			
	(2) 12" Saddles			
	6" Repair Band			
	(3) 8" Repair Bands			
	(3) 12" Repair Bands			
	Colorimeter			
Lima (V)	Billing Software	Currently Williamson Law, switching to BAS		
	Power Jetter	SECA 747FR-2000	2002	
Mount Morris (T)	Billing Software	BAS Utility Billing Program		

Table 4-4
Operation and Maintenance Equipment

Municipality	Equipment	Brand/Model Number	Date of Purchase	Notes
Mount Morris (V)	Billing Software	USM win - Mastermeter		
	GPS/GIS Equipment			Not set-up
	Water Main Leak Detection		Very Old	Still functional
	Electric Valve Exerciser			
Mount Morris (V)	Sewer Jetter		Very Old	
	Backhoe			
Dansville (V)	GIS/GPS Software and Hardware	Trimble		
	Sewer Jetter	Camel	1995	
	(3) Excavators			
	Dozer			
	Loader			
	Water Main Tapping Machine			Up to 2"
Nunda (T)				
Nunda (V)	Billing Software	Williamson Law Book Company - Water & Billing Software		
	Acoustic Leak Listening Device			
	Backhoe			
	Water Main Leak Detection			Currently done by N.Y. Rural Water
Springwater (T)	Billing Software	BAS Utility Billing		
	UTV			
	Excavator			

Table 4-4
Operation and Maintenance Equipment

Municipality	Equipment	Brand/Model Number	Date of Purchase	Notes
York (T)	Billing Software	WaterWorks (NOS-Network Oriented Solutions)		
LCWSA	Billing Software	WaterWorks (NOS-Network Oriented Solutions)		
	Dump Truck	Peterbilt	2021	
	Generator on Trailer	DGDA 80kw 60thz		
	Uni-Hoist Base		1998	
	Uni-Hoist		1998	
	Winch & Base	Miller, 51/7 ft		
	Recovery System (Confined Space)	MR50gb/50ft		
	Portable Generator on trailer	DKAC-5569677		
	Portable Generator on trailer	DGBB-5739097		
	Air Compressor	Grimmer Schmidt E1805/125D		
	Trash Pump	Teel 3P712B		
	Shredder Pump	AMT MB-61182		
	Smoke Blower	Superior		
	Chop Saw	Stihl TS400 14' Gas		
	Footage tools - 3' Missle Kit	Big Shot U300		
	Tapping Machine 1/2'-2'	Mueller D-5		
	Tapping Machine	Ford 77		
	Welder	Hobart 135		
	Sure Lock Cable & Pipe Locator	Heath Consultants 1180		
	Trash Pump 3'	Koshin		
	Pump 3' 328 gpm	Homelite		
	Tractor & Attachments	John Deere	2008	

Table 4-4
Operation and Maintenance Equipment

Municipality	Equipment	Brand/Model Number	Date of Purchase	Notes
LCWSA	Portable Spectrophotometer	DR2800		
	Portable Gas Generator 6.2kw	Briggs & Stratton 30242		
	Magnetic Locator (Metal detector)	GA-52CX		
	Trash Pump	Multiquip		
	Magnetic Locator w/case	GA52CX		
	Autogun	Sensus		
	Meter Reading Gun	Sensus		
	Magnetic Locator w/case	GA-52Cx		
	Submersible Shredder Pump	AMT 2' - 115VAC		
	2-Ton Mobile Crane	3ZC71		
	Forks for Backhoe			
	Magnetic Locator w/ Case			
		DO Field Kit & Probes HO40D/LDO10105		
	VSR Sampler			
	Meter Reading Gun			
	Process centrifuge			
	Magnetic Locator			
	7040SC O'Brien Sewer Jetter	7040sc		
	Citizen Analytical Balance			
	Zoeller 2' Shredder Pump			
		Pressure Washer PR-3000GH		
		Hack Controller-Sampler Influent		
		Honda Generator EAET-10000913		

Table 4-4
Operation and Maintenance Equipment

Municipality	Equipment	Brand/Model Number	Date of Purchase	Notes
LCWSA		AMT Shredder Pump		
		BW Gas Alert Max Monitor GAMAX 3-4		
		Sensus Metering Gun VSF 24243		
	Zero Turn Mower	Ferris IS2600Z		
	Compact Excavator	Bob Cat BC-E55 T4	2017	
	TV camera system	Envirosight Rovver X TV	2018	
	Pocket Prorader RF system	Neptune		
	Belt Clip Transceiver	Neptune R900		
	Charging Cradle	Neptune Ranger 3		
	Trimble Ranger 3 XE w/HR2650i	Neptune		
	Push Camera	Envirosight Verisight Pro Plus		
	Tamper	MBW GP3550/AP3550	2018	
	Mobile Data Collector v4 with RF Data Logging Feature (Meter Reading Equip)	Neptune MRX920		
	Air Compressor	Sullair 185DDPQKU4F		
	(6) Flow Meter - 2191 Battery Module	Teledyne ISCO 60-2004-006	2019	
	Metering Gun Base	Sensus (Goes w/ item#33) 5390753750601		
	Route Management Software	Neptune NSIGHT 5.6		
	Server	Dell Power Edge T620		
	8 Work Stations @595	Dell T3500		
	2 Laptop Computers	Dell Latitude E6430		

Table 4-4
Operation and Maintenance Equipment

Municipality	Equipment	Brand/Model Number	Date of Purchase	Notes
LCWSA	2 Dell Laptops			
	Dell Laptop			
	Core i7-8565U 15.6'	Lenovo ThinkPad E590		
	i7-8665U 14'	Lenovo ThinkPad E590		

Many municipalities in charge of operation and maintenance have very limited equipment and, in some cases, may rely on each other to borrow equipment necessary to complete operational procedures. This lack of equipment can greatly increase the time required to make repairs in emergency situations. It may also inhibit the operators' ability to efficiently operate and maintain the system on a daily basis. As part of this analysis, any requested equipment that was not available within the communities was noted, including a sewer/vacuum truck (Village of Dansville), sewer camera (Village of Mount Morris), and a coordinated approach to GIS.

The use of various software programs for billing or meter reading also contributes to less efficient operations as troubleshooting, technical support, and upgrades/maintenance, among other aspects, are the responsibility of each municipality to address rather than the "economies of scale" that coincide with the use of a single program. In terms of asset management and system tracking, the use of Geographic Information Systems (GIS) is highly beneficial to public utilities and governments for infrastructure. Currently, only Livingston County has a robust GIS available that is used by the Planning and Real Property/Assessor's departments. No other communities have in-house GIS available. The Villages of Avon and Lima have GIS capabilities available to them through consultants, but no ability to maintain, update, or analyze data on their own. After discussions with many of the Towns and Villages in the County, it was concluded that it would be significantly beneficial to have a user friendly, fully operational GIS software available for all water systems in the County to utilize.

4.5 Source Water Needs

4.5.1 Springwater Wells

The Town of Springwater is supplied by two (2) ground water wells, treated at the 0.07 mgd Springwater water treatment plant located on Kellogg Road, serving approximately 360 customers.

- Water Quantity: The wells currently have a NYSDEC water allocation of 0.20 mgd and the water treatment plant capacity is 0.288 mgd. The current system has an average water usage of 0.034 mgd. The 2050 projected average demand is 0.055 mgd. Both the water allocation and treatment capacity are well below the 2050 projected average and max day demands.
- Water Quality: The two (2) wells are approximately 30 feet deep and have been assessed as having medium susceptibility to microbial, nitrates, pesticides, solvents, and other contaminates. The water treatment plant, transmission and distribution system are currently meeting regulatory water quality requirements. Disinfection by-products are low but should continue to be closely monitored. The Town of Springwater relies upon a dedicated, but relatively small source of supply. While provisions are in place to protect the raw water supply, there is risk for natural or man-made contamination that could result in these supplies being unavailable for an extended period. There is a lack of source protection, such as property ownership, surrounding the supply wells. If these wells were contaminated, due to the Town's remote location from other water sources in the County, there would be no water available.
- Interconnections: At the present time, the Springwater system is remote from other sources of supply. There are no other available sources to provide redundancy. The closest system which could provide redundancy is LCWSA's Consolidated District, which is approximately seven (7) miles away in the Town of Conesus.
- Operation and Maintenance: The Town of Springwater Water District currently has two (2) Class C certified operators. The distribution system includes a 60,000 gallon water storage tank. Water meters have recently been replaced. The LCDOH has suggested the installation of a second water storage tank to help provide adequate fire protection. All billing and administration are completed by the Town.

4.5.2 Chidsey Reservoir (Newville Creek)

The Village and Town of Nunda water districts are supplied from the 13,000,000 gallon surface reservoir on Neville Creek and a secondary emergency well source consisting of two (2) wells. Water is treated at the Village water treatment plant and distributed to approximately 1,660 customers in the Town and Village. Currently, the Hamlet of Dalton in the Town of Nunda is not served by the Town water district. There have been reports of contaminated wells in the Hamlet due to failing septic systems.

- Water Quantity: The reservoir has a NYSDEC water allocation of 0.38 mgd while the wells have an allocation of 0.11 mgd. The Village of Nunda water treatment plant capacity is 0.20 mgd. The current system has an average water usage of 0.134 mgd with a peak usage of 0.226 mgd. The 2050 projected average usage is 0.279 mgd. This is less than the water allocation but exceeds the present treatment capacity. The Village will need to increase their treatment capacity or seek additional supply from an additional source to meet projected average and max day demands. The Village and Town of Nunda rely upon dedicated, but relatively small sources of supply.

- Water Quality: The Chidsey Reservoir has been assessed as having an elevated susceptibility to contamination by the New York State Department of Health Source Water Assessment Program. Water from the reservoir is pre-chlorinated prior to the treatment plant due to algal growth in the reservoir during August and September. TTHM levels in the system are in the mid-level range but have room for improvement. The secondary emergency wells have a medium susceptibility to contaminants. The water treatment plant, transmission and distribution system are currently meeting regulatory water quality requirements. There is a lack of source protection, such as property ownership, surrounding the supply wells. Due to the Town's remote location from other sources in the County, if their wells were contaminated, there would be no water available. While provisions are in place to protect the raw water supplies, there is risk for natural or man-made contamination that could result in these supplies being unavailable for an extended period.

  Currently, the Hamlet of Dalton in the Town of Nunda is not served by the Town water district. There have been reports of contaminated wells due to failing septic systems. There is a major need for public water in this area.

- Interconnections: At the present time, the Nunda system is remote from other sources of supply and has no other available sources to provide redundancy. The emergency wells do provide some redundancy of supply but are still dependent on the existing water treatment plant. The closest system which could provide redundancy is the Village of Mount Morris which is approximately 8.7 miles away. LCWSA's Consolidated District is another potential system for interconnection, approximately nine (9) miles away in the Town of Groveland near the correctional facilities.

- Operation and Maintenance: The Village of Nunda system currently has one (1) IIA and two (2) IIA/D certified operators. The Town of Nunda water district is operated and maintained by the Village of Nunda. The distribution system contains one (1) 500,000 gallon storage tank and one (1) 300,000 gallon water storage tank. Billing and administration are completed by the Village of Nunda.

4.5.3 Silver Lake

Silver Lake is the source of supply for the Village of Mount Morris water treatment plant along with other users in Wyoming County. The Village of Mount Morris also supplies treated water to portions of the Town of Mount Morris, the Town and Village of Leicester,

and the Town of Groveland/ARS Service Area of the Livingston County Water and Sewer Authority. The Silver Lake supply provides potable water to approximately 4,500 customers in Livingston County.

The Village of Mount Morris relies upon a raw water transmission main that runs over six (6) miles to Silver Lake including a single crossing of the Genesee River. Failure of this transmission main would result in water shortages in the Village of Mount Morris, the Village of Leicester and portions of the Towns of Mount Morris, Leicester, and Groveland. The Village and Town of Leicester rely on this same supply connection running under the Genesee River.

The Village of Mount Morris is supplied from a 1,000,000 gallon clear well/storage tank at the water treatment plant.

- Water Quantity: The Village of Mt Morris has a NYSDEC allocation of 1.50 mgd. In addition, other users in Wyoming County are allocated an additional 4.7 mgd for a total Silver Lake allocation of 6.2 mgd. The projected 2050 average day demand of 0.360 mgd can be met by the Village of Mount Morris/Silver Lake Supply with the current upgrades at the WTP (0.5 mgd additional capacity). No additional water will be required for projected max day demands.

  The Village of Mount Morris relies upon a raw water transmission main that runs over 6 miles to Silver Lake including a single crossing of the Genesee River. A significant failure of this main would result in a water shortage in the Village of Mount Morris, along with the Village of Leicester and portions of the Towns of Mount Morris, Leicester, and Groveland. The Village and Town of Leicester rely on this same supply connection running under the Genesee River. The raw water transmission main has approximately 5 years or less before any major upgrades are required.

- Water Quality: Silver Lake has been assessed as having an elevated susceptibility to contamination. In addition, it is susceptible to harmful algal blooms. At the present time, but there is no NYSDEC Harmful Algal Bloom Action Plan for the lake. The NYSDEC has developed a Total Maximum Daily Load (TMDL) for phosphorus that is in place to monitor phosphorus levels in the lake and determine an acceptable maximum level to ensure the quality water. The Village of Mount Morris Water Treatment Plant is currently meeting regulatory water quality requirements. The water treatment plant has approximately 5 years or less before any major upgrades are required.

- Interconnections: There is currently no redundant interconnection or source of supply for the Village of Mount Morris. Given the size of the Villages service area, including the Town and Village of Mount Morris and Town and Village of Leicester, at a minimum the Village should have a supplementary interconnection in-place for emergency situations. LCWSA's Consolidated District (Hemlock Lake) and the Village of Geneseo (Conesus Lake) are potential interconnections distancing, with the closest connection being approximately 1.4 miles away.

- Operation & Maintenance: The Village of Mount Morris currently has three Class IIA/C/D certified operators supplemented by additional water department staff as necessary. The Village of Mount Morris pump station near Silver Lake pumps water approximately 6 miles from Silver Lake across the Genesee River and Letchworth Gorge to a 5,000,000 gallon reservoir at the water treatment plant. The transmission main dates to 1914 and requires repair on a regular basis. Due to the age of the raw water transmission main, there is a significant amount of time and effort needed to maintain operation in the system. All billing and administration are completed by the Village.

The Town of Mount Morris Water District #1 and several out of district users in the ARS Service Area are supplied from the Village of Mount Morris water treatment plant. Like the Village of Mount Morris, all water and fire protection come from the Village's 1,000,000 gallon clear well/storage tank located at the treatment plant.

- Water Quantity: The projected 2050 average day demand of 0.103 can be met by the Village of Mount Morris Silver Lake Supply with the current upgrades at the WTP. No additional water is required for projected max day demands; as it was noted in Section 2, the proposed solar and battery storage for the Town may impact water demand in emergency cases only. This may require a re-evaluation of demands as the project comes to fruition. Since the Town is directly served by the Village, the Town also relies solely on the raw water transmission main.
- Water Quality: Water supplied from the Village of Mount Morris currently meets all regulatory requirements. There are occasional elevated disinfection by-products which violate regulatory requirements. Additional TTHM removal should be considered to lower levels in the system.
- Interconnections: There is currently no redundant interconnection or source of supply for the Town of Mount Morris Water District #1 or ARS Service Area. As stated above, the Town could benefit from a potential interconnection to LCWSA's Consolidated District or the Village of Geneseo.
- Operation & Maintenance: The Town of Mount Morris only has one Class D certified operator on staff and utilizes assistance from the Village of Mount Morris as necessary for operation and maintenance purposes. LCWSA operates and maintains the ARS service area facilities in the Town of Groveland and Town of Mount Morris up to the Village of Mount Morris line. LCWSA owns one 250,000 gallon water storage tank and one pump station for the ARS service area completely maintained by their staff. Billing and administration are provided by the Town of Mount Morris for Water District #1 and billing is administrated by LCWSA in the ARS service area.

The Village of Leicester is supplied by the Village of Mount Morris through a pumped connection that supplies a 200,000 gallon water storage tank which in turn provides water to the Village by gravity flow.

- Water Quantity: The projected 2050 average day demand of 0.150 mgd can be met by the Village of Mount Morris Silver Lake source with current upgrades at the water treatment plant. No additional water will be required for projected max day demands.
- Water Quality: Water supplied from the Village of Mount Morris currently meets all regulatory requirements. There are occasional elevated disinfection by-products which violate regulatory requirements. Additional TTHM removal needs to be considered to lower levels in the system.
- Interconnections: There is currently no redundant interconnection source of supply for the Village of Leicester. The Town of Leicester currently has the potential for one closed connection to the Town of York (Conesus Lake) and an additional closed connection in design. The Village should consider negotiating with the Town of Leicester to have agreements in place to utilize these two connections for supplementary or redundant supply.
- Operation & Maintenance: The Village of Leicester currently has one Class C certified operator supplemented by additional village staff as necessary. There is one 200,000 gallon water storage tank in the system. All water meters have been replaced in the last five (5) years. All billing and administration are completed by the Village of Leicester.

The Town of Leicester (Leicester-Cuylerville District) is supplied from the Village of Mount Morris. The second Town of Leicester Water District (York-Leicester District) is supplied from the Town of York (Conesus Lake Supply). The Town of Leicester has connections with the Village of Leicester and the Town of York for most of their service area. Currently the northern portion is supplied by the Town of York and the southern portion by the Village of Leicester; however, valving is available between the two (2) sections. This will be further enhanced in 2020 with the installation of a main along NYS Route 36 from the Town of York, creating a secondary connection to the Town of York.

- Water Quantity: The projected 2050 average day demand of 0.124 mgd can be met by the Village of Mount Morris Silver Lake source with the Village of Mount Morris's current upgrades at the WTP. No additional water will be required for projected max day demands.
- Water Quality: Water supplied from the Village of Mount Morris currently meets all regulatory requirements. There are occasional elevated levels of disinfection by-products in the Town of Leicester which violate regulatory requirements. Additional TTHM removal needs to be considered to lower levels in the system.
- Interconnections: There is currently one potential closed connection and an additional closed connection under design. The Town needs to complete these connections to achieve a supplementary or potential redundant supply from the Town of York (Conesus Lake).
- Operation & Maintenance: The Town of Leicester water districts currently have one (1) Class C/D certified operator supplemented by additional Town staff as necessary.

There is a 250,000 gallon water storage tank in the system. All billing and administration are completed by the Town.

4.5.4 Mill Creek

The Village of Dansville, Town of North Dansville, and Town of West Sparta are supplied from two (2) sources; a surface supply from a 15 acre impounding reservoir on Little Mill Creek in Steuben County and a supplemental supply from two (2) groundwater wells also located in Steuben County. Water from these sources is conveyed to the Village of Dansville water treatment plant located on Highland Avenue in the Town of North Dansville. Water from this source is distributed to approximately 5,260 users.

- Water Quantity: The Little Mill Creek source does not have a NYSDEC water allocation, so the supply is only limited by the water available in Little Mill Creek. The maximum daily withdrawal allocation for the Perkinsville wells is a combined total of 2.0 mgd or 200 million gallons per year. The Village of Dansville water treatment plant capacity is 3.0 mgd which appears to exceed the available supply. However, the current average daily water use from the Village treatment plant is 0.483 mgd and the 2050 projected average daily usage is 0.620 mgd—both significantly less than the supply and treatment capacity. No additional water will be needed for projected max day demands.
- Water Quality: The Little Mill Creek source has not been identified as having any discrete potential of contaminant sources. Due to the large amount of agricultural land in the watershed, there is a risk from storm water runoff. The supplemental wells are susceptible to surface contamination. The Village of Dansville lacks source protection which puts them at high risk given their remote location and lack of interconnections. The Village of Dansville water treatment plant, transmission, and distribution system are currently meeting regulatory requirements.
- Interconnections: At the present time, the Village of Dansville's Mill Creek system is remote from other sources of supply and has no other potential sources of supply to provide redundancy or supplemental supply. The closest system which could provide redundancy is the LCWSA's Consolidated District which is approximately six (6) miles away in the Town of Groveland and Sparta. The Village of Dansville lacks an interconnection with a separate system but has a secondary source available for backup and emergency purposes. As previously mentioned in Section 3, the Village's Perkinsville wells are a secondary source that is adequate to supply the customers during an emergency.
- Operation and Maintenance: The Village of Dansville system currently has two certified operators and one trainee. The Town of North Dansville users and the Town of West Sparta Woodsville District are both operated and maintained by the Village of Dansville. The Village of Dansville distribution system has a 1,500,000 million gallon water storage tank and a 250,000 gallon clear well that supplies the systems. The Village of Dansville currently has a Class IIA/C/D and a Class IIA/D certified operator supplemented by additional water department staff as necessary. The

Village currently has one staff member in training to become certified to assist with the system. All billing and administration are completed by the Village.

4.5.5 Conesus Lake

Conesus Lake is the source of supply for the Village of Avon water treatment plant and the Village of Geneseo water treatment plant. The Village of Avon supplies treated water to the Village and Town of Avon, and a small portion of the southeast corner of the Town of Caledonia. The Village of Geneseo supplies water to the Village and Town of Geneseo, the Town of York, and portions of the Town of Leicester. The Conesus Lake supply provides potable water to approximately 19,000 customers.

- Water Quantity: The most recent (1994) safe yield assessment for Conesus Lake is 10.7 mgd. The current maximum water withdrawal allocations by the NYSDEC are 3.5 mgd for the Village of Avon, 3.0 mgd for the Village of Geneseo, and 6.46 mgd downstream release for the LCWSA Lakeville wastewater treatment plant. These allocations total 12.96 mgd which is in excess of the safe yield assessment for the Lake. As part of the CLWMP development, the issue of water allocation and safe yield was discussed with the NYSDEC regional water engineer. The current withdrawals for public water supply are well below their permit allocation. Furthermore, the water suppliers could not consistently draw water to the level of their current allocation without increasing the capacity of the infrastructure used to draw, filter, disinfect, and distribute potable water to their customers. For example, the Avon plant is rated at a capacity of 1 million gallons per day (mgd), which is one-third of their allocation. The Geneseo facility is rated at 2 mgd, or two-thirds of their allocation. Average withdrawal for both plants is below this rated plant capacity, although peak daily withdrawals may be above the annual average. The current total combined treatment capacity of both water treatment plants is 3.0 mgd, less than one half of their combined current allocated amount of 7.5 mgd.
- Water Quality: Conesus Lake has been assessed as having increased susceptibility to contamination primarily due to non-point source water runoff. Harmful algal blooms (HAB) have been identified as one of the primary water quality concerns. The 2016 NYSDEC watershed assessment notes that Conesus Lake is on the List of Impaired /TMDL Waters. Although Conesus Lake has a history of harmful algal blooms there has not been any impact on the drinking water supply. The County has undertaken significant water quality improvement and monitoring efforts and will continue this into the future. The Village of Avon and Geneseo water treatment plants are currently meeting regulatory water quality standards.
- Interconnections: Both the Village of Avon and the Village of Geneseo systems have or are in the process of constructing interconnections with other sources of supply. These connections are discussed in further detail below.
- Operation and Maintenance: Both the Village of Avon and the Village of Geneseo operate and maintain their respective treatment systems and distribution networks

except as noted below. There are several different billing parties and software for each municipality served.

Village of Avon WTP

The Village of Avon serves approximately 6,360 customers from their water treatment plant including the Town of Avon and Town of Caledonia Water District #3. As discussed in Section 3, in addition to the residential customers, there are two (2) major food processing facilities and the Livingston County Complex.

- Water Quantity: The projected 2050 average day demands for the current service area of the Villages WTP will exceed their current capacity. Approximately 0.025 mgd will be needed to fulfill project max day demands in the Village. Additional water will be needed by Conesus Lake or a new source to fulfill these future demands.
- Water Quality: There are occasional elevated disinfection by-products which violate regulatory requirements. Additional TTHM removal should be considered to reduce overall TTHM in the system. Overall, water supplied from the Village of Avon water treatment plant currently meets all regulatory requirements.
- Interconnections: There is currently no redundant interconnection or source of supply for the Village of Avon supply. The Village of Avon and Town of Avon recently constructed a supplemental interconnection with the Village of Lima (Hemlock/ Canadice Lakes Supply) consisting of an 8-inch water main.
- Operation & Maintenance: The Village of Avon currently has one Class IIA/D and one Class C certified operators who are supported by additional Village staff. There have been aging concerns at the Pebble Beach pump station which is the only supply for the Village's WTP service area. This is a critical item that needs attention in the very near future. The Village currently has plans to address this issue in 2020. Most of the distribution mains have been upgraded and a meter replacement project has been completed. All billing and administration are completed by the Village.

The Town of Avon is served by one (1) combined water district, the Route 39 Water District Extension and the South Avon Water District.

- Water Quantity: The projected 2050 average day water demand of 0.475 mgd cannot be met by the Village of Avon WTP without an increase in capacity. The Town will need to provide approximately an additional 0.45 mgd to fulfill the projected max day demands.
- Water Quality: Water supplied from the Village of Avon to the Town of Avon currently meets all regulatory requirements. There are occasional elevated disinfection by-products which violate regulatory requirements. Like the Village of Avon, TTHM removal needs to be considered to lower levels in the system.

- Interconnections: There is currently no redundant interconnection/source of supply for the Town of Avon. The Village of Avon and Town of Avon are currently constructing an interconnection with the Village of Lima (Hemlock Lake Supply).
- Operation & Maintenance: The Town of Avon currently has one Class C/D and one Class D certified operators who are supplemented by additional Town staff. The Town operates a 500,000 gallon water tank near the easterly Town line and a 100,000 gallon tank in east Avon. The Town line tank needs a new roof vent, repair to the balcony railings, ladder replacement, and the joints of the bottom exterior need resealing. The east Avon tank also needs a new roof vent, repair to the balcony railings, and ladder replacement. The exterior of this tank also needs to be recoated. All billing and administration are completed by the Town.

The Town of Caledonia Water District #3 is served from the Village of Avon at a connection on NYS Routes 5 & 20. Water for the district is purchased by the Livingston County Water & Sewer Authority (LCWSA).

- Water Quantity: The projected 2050 average day water needs of 0.01 mgd cannot be met by the Village of Avon WTP. An additional 0.02 mgd will be required to fulfill projected max day usage in Water District #3.
- Water Quality: Water supplied from the Village of Avon to the Caledonia Water District does not currently meet all regulatory requirements. There are general elevated disinfection by-products which violate regulatory requirements. Two (2) potential causes for these elevated levels are due to the district being a "dead end" and water age. The system lacks additional TTHM removal or interconnection to the Town of Caledonia Water District #1.
- Interconnections: There is currently no redundant interconnection or source of supply for the Town of Caledonia Water District #3. The Village of Avon is currently constructing an interconnection with the Village of Lima along NYS Route 5 & 20 (Hemlock/Canadice Lakes Supply). This connection would only be a supplementary supply and would have a minor impact on Water District #3 during an emergency.
- Operation & Maintenance: The LCWSA operates and maintains Caledonia Water District #3. All billing and administration are completed by LCWSA.

Village of Geneseo WTP

The Village of Geneseo 2.0 mgd water treatment plant is adjacent to Conesus Lake. Treated water is pumped from the treatment plant to a 3,000,000 million gallon storage tank on Reservoir Road and the remainder of the Village distribution system is fed by gravity for this tank. Approximately 12,600 customers are served by the Village of Geneseo WTP including the Town of Geneseo and York, with approximately 8,000 customers in the Village alone.

- Water Quantity: The projected 2050 average day demand of 0.50 mgd can be met by the Village of Geneseo WTP. The projected max day demands of 1.50 mgd cannot be met without increasing capacity.
- Water Quality: Water supplied from the Village of Geneseo water treatment plant currently meets all regulatory requirements. There are occasional elevated disinfection by-products which violate regulatory requirements. TTHMs in the system are mid-level range.
- Interconnections: There is a supplemental connection to the LCWSA Consolidated District (Hemlock Lake) at West Lake Road and Reservoir Road in the Town of Geneseo. The Village of Geneseo has an agreement with the LCWSA to provide up to 0.50 mgd to the Village in the event of an emergency. However, this interconnection would not be enough to meet the current or projected average day demands of the Village of Geneseo and the municipalities it supplies. If LCWSA was in an emergency situation, this interconnection would not be sufficient to supply LCWSA's Consolidated District.
- Operation & Maintenance: The Village of Geneseo water system is operated and maintained by the Village of Geneseo Water Department with five (5) Class IIA/C/D certified operators, two (2) of which have been with the Village for 30 years or more. The Village currently maintains the WTP and 3,000,000 gallon water storage tank. All billing and administration are completed by the Village.

The Town of Geneseo has five (5) water districts. Four (4) of the districts are supplied from the Village of Geneseo source and one district is supplied from the LCWSA source. Approximately 2,494 customers are served from the Village source. The Town system has one 250,000 gallon water storage tank on Burbank Drive.

- Water Quantity: The projected 2050 average demand of 0.30 mgd can be met by the Village of Geneseo WTP, but the projected max day demands of 0.60 mgd cannot without upgrades to the Village WTP or a decrease in the service area.
- Water Quality: Water supplied from the Village of Geneseo water treatment plant currently meets all regulatory requirements. There are occasional elevated disinfection by-products which violate regulatory requirements.
- Interconnections: As stated previously, the Village of Geneseo has a supplementary interconnection with LCWSA for up to 0.5 mgd, but it is not nearly enough to supply the entire Town of Geneseo.
- Operation & Maintenance: The Town of Geneseo water districts are operated and maintained by the Town of Geneseo Water Department which has one Class D certified operator. The Town is also in charge of operation and maintenance of their 250,000 gallon water storage tank. All billing and administration are completed by the Town.

The Town of York's distribution system serves approximately 2,130 residential customers and two (2) high demand agricultural customers. Additionally, the Leicester-York water district is served though the Town of York. Water is provided from the Village of Geneseo. A booster station pumps water to a 500,000 gallon storage tank. Two (2) additional storage tanks are gravity fed.

- Water Quantity: The projected 2050 average demand of 0.45 mgd can be met by the Village of Geneseo WTP, but their projected max day demands of up to 1.0 mgd cannot be fulfilled without significant upgrade at the Village of Geneseo water treatment plant. The Town of York has a single connection below the Genesee River with the Village of Geneseo. While the Town of York does have 2,000,000 million gallons of water storage, this would only last 2-3 days at their current demands if the connection with the Village had a significant issue.
- Water Quality: Water supplied from the Village of Geneseo water treatment plant currently meets all regulatory requirements. There are occasional elevated disinfection by-products in the Town of York system which violates regulatory requirements. These elevated levels are generally due to water age. Additional TTHM removal should be considered to lower system levels with current operations.
- Interconnections: There is currently no active redundant interconnection/source of supply for the Town of York. Operating without an interconnection present, potentially puts the Town at risk during an emergency.
- Operation & Maintenance: The Town of York water districts are operated and maintained by the Town of York. The Town has two Class C/D and one Class D certified operators who are supplemented by additional Town staff. All billing and administration are completed by the Town.

4.5.6 Hemlock/Canadice Lakes

The City of Rochester water treatment plant on Hemlock Lake is the source of supply for customers in the City of Rochester, Monroe County, Livingston County Water and Sewer Authority (LCWSA), Town of Lima, and Village of Lima.

Village of Lima Pump Station

The Village of Lima is supplied by the City of Rochester along NYS Route 15A at the northern Town of Lima line. A pump station at this location fills a 500,000 gallon storage tank and serves approximately 2,290 customers in the Village.

- Water Quantity: The projected 2050 average day demand of 0.170 mgd and projected max day demand of 0.620 mgd can be met by the Village of Lima pump station. The agreement between the Village of Lima and the City of Rochester needs to be updated to reflect projected demands and the proposed interconnection with Avon.

- Water Quality: Water supplied from the City of Rochester currently meets all regulatory requirements. There are occasional elevated disinfection by-products which violate regulatory requirements. The Village of Lima needs to consider additional TTHM removal to lower levels in the system.
- Interconnections: A connection to the Town and Village of Avon (Conesus Lake) supply was recently completed along NYS Route 5 & 20 for emergency and supplemental supply purposes only. Without significant upgrades to both the Village of Avon WTP and Village of Lima pump station, this interconnection would not have the ability to provide a redundant supply. With proper upgrades, there is significant potential to provide secondary supply to several water systems through the Village pump station.
- Operation and Maintenance: The Village of Lima water system is operated and maintained by the Village of Lima Water Department with two Class IIB/C/D and one Class D certified operators. The Village received a 2.4 million dollar grant for system wide improvements in 2019 to include water main replacement, storage tank improvements, and the interconnection with the Town of Avon. All billing and administration are completed by the Village.

The Town of Lima has four (4) water districts. Water Districts #1 and #3 are supplied from a connection to the City of Rochester transmission conduit at the northeast corner of the Town and a secondary connection to the MCWA system for emergency purposes. Water District #2 is located north of the Village of Lima along NYS Route 15A and is supplied from the Village of Lima. The transmission main connecting the Village of Lima pump station to the Village is jointly owned by the Village and Town of Lima Water District #2. The Village also supplies Water District #4 along the west side of the Village. There are approximately 220 customers in the Town.

- Water Quantity: The current and projected 2050 average day demand of 0.118 mgd and projected max day demand of 0.236 mgd can be met by the Village and Town of Lima supply with no upgrades, but a new agreement with the City of Rochester would be required. This is necessary if the Town's identified potential areas of commercial and industrial growth (see Section 2.6) are to be realized.
- Water Quality: Water supplied from the City of Rochester currently meets all regulatory requirements. Water District #2 has the same TTHM concerns mentioned above for the Village of Lima since it is directly served through the Village system. Town Water Districts #1 and #3 generally have mid-level TTHM samples but should continue to be closely monitored.
- Interconnections: A connection between the Village of Lima and the Town of Avon/Conesus Lake supply is currently under construction along NYS Route 5 & 20 for emergency and supplemental supply purposes. This interconnection would provide some supplemental supply to Water District #2.

- Operation & Maintenance: The Town of Lima has two Class D certified operators with limited additional labor. The Town has expressed interest in the LCWSA assuming operation of their system. The Town recently signed an agreement with LCWSA for billing administration. The Town has expressed concern over potential maintenance issues with the distribution piping in Water Districts #1 and #3 due to the aging water mains.

LCWSA Hemlock Pump Station

The LCWSA supplies potable water through the Hemlock pump station from Hemlock and Canadice Lakes (Town of Caledonia and the ARS service area not included) to a total of 3,500 residential and commercial customers in the Towns of Conesus, Geneseo, Groveland, Livonia, Sparta, West Sparta, and the Village of Livonia.

- Water Quantity: The Hemlock/Canadice Lake supply has an estimated safe yield between 37.0 and 47.0 mgd. The total withdrawal allocation is 48.0 mgd. The City of Rochester water treatment plant has a capacity of 48.0 mgd. Water withdrawal allocations are 44.0 mgd for the City of Rochester including 3.0 mgd for the LCWSA and 1.0 mgd for the Town and Village of Livonia. The Village of Livonia distribution system is a major restriction in providing the necessary water supply to Gateway Park, as previously mentioned in Section 2.4. The projected 2050 average day demands of 2.643 mgd can be fulfilled with the current capacity. The projected max day demands of 5.285 mgd will require a minimum of 2.5 mgd of additional water in the system. Major upgrades to the Hemlock pump station or a new source of water will be required in the near future.
- Water Quality: Several potential sources of contamination have been identified but none have had a significant impact on water quality. Development of the watershed has been very limited as a result of the long-term ownership of a large portion of the watershed by the City of Rochester and its subsequent transfer to New York State Department of Environmental Conservation (NYSDEC). There is no residential development on the shore of either Lake. There have been a few reports of harmful algal blooms (HAB) in the last three (3) years but no specific causes have been identified. The City of Rochester water treatment plant is currently meeting all regulatory water quality standards. Treated water from the City of Rochester water treatment plant meets all current regulatory requirements.

  LCWSA experienced three (3) contaminant issues in 2018 including total coliform, e. coli bacteria, and TTHM. During this time period, the section of West Lake Road that tested positive for total coliform and e. coli temporarily received water from the Town of Geneseo until lab tests determined the water was safe for human consumption.

  The TTHM levels at the Groveland Station upper tank exceeded the maximum contaminant level in November of 2018. As a result, LCWSA increased flushing in

the surrounding areas and made chlorine adjustments until an acceptable level of TTHM's was achieved. On June 24, 2019, LCWSA received a consent order for violating the maximum contaminant level for TTHM's. LCWSA has not yet addressed this issue but is currently developing a Corrective Action Plan. Disinfection byproducts are a common issue throughout LCWSA's system mainly because of aging water due to the distance it must travel to serve the southern service areas in the County.

- Interconnections: There are no interconnections in LCWSA's system capable of providing redundant or supplemental supply for users in the Consolidated District. The City of Rochester system in Monroe County is interconnected to the Monroe County Water Authority Lake Ontario supply. At the present time, it is not hydraulically possible to supplement Livingston County users from the Lake Ontario supply through the Hemlock transmission mains. The LCWSA Consolidated District system is only supplied from Hemlock Lake at the City of Rochester transmission main connection. The LCWSA Consolidated District does have many redundant components including connections to both City of Rochester conduits, parallel transmission mains to the Village of Livonia, and a looped network to the communities at the southern end of the system. There are several supplemental interconnections that could be considered including connections to the Village of Avon WTP, Village of Geneseo WTP, and Village of Lima pump station. To do so, several upgrades would need to be completed.
- Operation and Maintenance- The City of Rochester Department of Environmental Services Bureau of Water operates and maintains the water treatment plant and the transmission conduits in Livingston County. The Consolidated District is fully operated and maintained by LCWSA with two Class IIB/C/D operators. All billing and administration are completed by LCWSA.

4.6 Lake Ontario

The Village and Town of Caledonia purchase treated water from the Lake Ontario/MCWA supply. Approximately 2,300 customers are supplied from this source combined in the Village and Town of Caledonia. The MCWA total treatment capacity is 200 mgd. MCWA's service area includes over 50 Towns, Cities, Villages, other water authorities and includes approximately 200,000 accounts. Lake Ontario water treated by MCWA meets all regulatory requirements. There is generally low risk with Lake Ontario due to the depth and length of the intake pipe.

The Village of Caledonia is supplied from the Monroe County Water Authority System along NYS Route 5. The Village purchases all water from MCWA for a specific Out-of-County rate. The Village serves approximately 2,201 customers.

- Water Quantity: The projected 2050 average day demands of 0.21 mgd and projected max day demand of 0.42 mgd can be met by the MCWA supply through upgrades

currently under construction with the Genesee County Phase 2A Water Supply project.

- Water Quality: Water supplied from the MCWA currently meets all regulatory requirements. TTHM levels are low and should continue to be closely monitored.
- Interconnections: MCWA, Genesee County, and the Village of Caledonia are currently working to increase the supply of water to Genesee County through the Village of Caledonia. This will result in a new connection to the Village of Caledonia from the Hamlet of Mumford along NYS Route 36. The current connection will be maintained for emergency purposes.
- Operation & Maintenance: The MCWA operates and maintains its main along NYS Route 5 and Spring Street through the Town and Village of Caledonia. The Village of Caledonia has one Class IIB/D and four Class D certified operators that operate and maintain the Village distribution system. All billing and administration are completed by the Village.

The Town of Caledonia Water District #1 purchases water from the Village of Caledonia system and supplies approximately 93 customers.

- Water Quantity: The projected 2050 average day demands of 0.098 mgd and projected max day demand of 0.196 mgd can be met by the MCWA supply with the upgrades currently under construction as mentioned above.
- Water Quality: Water supplied from the MCWA currently meets all regulatory requirements. TTHM levels are low and should continue to be closely monitored.
- Interconnections: There is currently no active redundant or supplemental interconnection source of supply for the Town of Caledonia Water District #1.
- Operation and Maintenance: Water District #1 is operated and maintained by the Livingston County Water and Sewer Authority. All billing and administration is also completed by LCWSA.

4.7 Private Water Systems

There are no public water systems in the Towns of Ossian and Portage in southern Livingston County. All residents in these Towns are served by private water supplies, the majority being ground water wells. These Towns also utilize private wastewater treatment systems which could potentially contaminate ground water over time. Regular well monitoring needs to be completed by all residents to ensure safety of their private well supplies. It is crucial to protect ground water sources in these areas to ensure there is safe potable water available to residents.

5 Water Alternatives

The Summation of Water Needs identified in Section 4 identified a wide range of topics and concern across Livingston County. This report has split the needs into quantity, quality, interconnections, and operation and maintenance. Examples include but are not limited to:

- Long term shortage of water supply related to source safe yield, source allocations, and treatment capacity.
- Source quality concerns related to harmful algal blooms and system concerns caused by disinfection by-products.
- Size and condition of transmission, distribution, and storage infrastructure.
- Source and system interconnections to provide either redundant or supplemental supply—supplemental being a portion of the required demand and redundant being full replacement of the required demand.
- Desire for public water system expansions in areas not currently served.

The operation and maintenance issues to be discussed include:

- Lack of new operators, operating education, and proper certifications.
- Reduction of annual expenses related to operation and maintenance.
- Reduction of annual non-revenue water.
- Aging systems and high-risk infrastructure.

To address these needs, they will be broken down by capital improvements, addressing source capacity, quality concerns, need for interconnections, and operational improvements. This report does not identify the municipality responsible for making these improvements but will identify the potential municipalities to be involved with each alternative. Some of these improvements can be completed at the local level, while others can be completed at the County level. Coordination and combined efforts between the County and municipalities are yet another option to complete the proposed/necessary improvements. **Maps 5-1** through **5-8** represent the alternatives considered for all seven (7) sources in the County and identify the municipalities that would benefit. In addition, an overall flowchart that outlines the options across the communities and how they interact and interrelate with one another is provided on the following page. Individual flowcharts for each community follow the map for each section. These potential improvements are discussed in detail in the following sections.

The cost for each alternative is broken down into capital cost and cost of water per 1,000 gallons. As shown in the maps, several municipalities will benefit from each alternative and therefore have been included in the breakdown of each cost. As mentioned previously in Section 3, water rates across the County differ in each municipality and in many cases water rates may not necessarily reflect the actual cost of water. To accurately compare the existing

and proposed cost of water between all municipalities, each of their water budgets are separated into production cost, distribution cost, and debt. In doing so, each of these costs can be divided by the overall water usage to calculate an existing cost per 1,000 gallons for production, distribution, and debt. It should be noted that any additional tax rate for debt service not included in the appropriate water budget, is not included in the proposed rates and will still need to be paid in addition to proposed rate. The proposed alternatives are broken down into a cost per 1,000 gallons based on the combined water usages of each municipality being impacted. Tables and figures summarizing capital costs and cost of water per 1,000 gallons is provided **Appendices D** through **F**.

5.1 Springwater Wells (*Map 5-1*)

1. Water quality - Wellhead protection

Alternative #1 includes 3 options available to address potential water quality concerns in the future. Any of the options can be selected independently or together. These options include:

A. The Springwater well source can implement a well head protection program that would include flow and pressure tests, cleaning and televising the wells. The estimated capital cost of this work is $5,000 per well.

B. Purchasing property around the current supply wells is an additional protection measure that can be taken to preserve the ground water source, costing approximately $5,000 per acre.

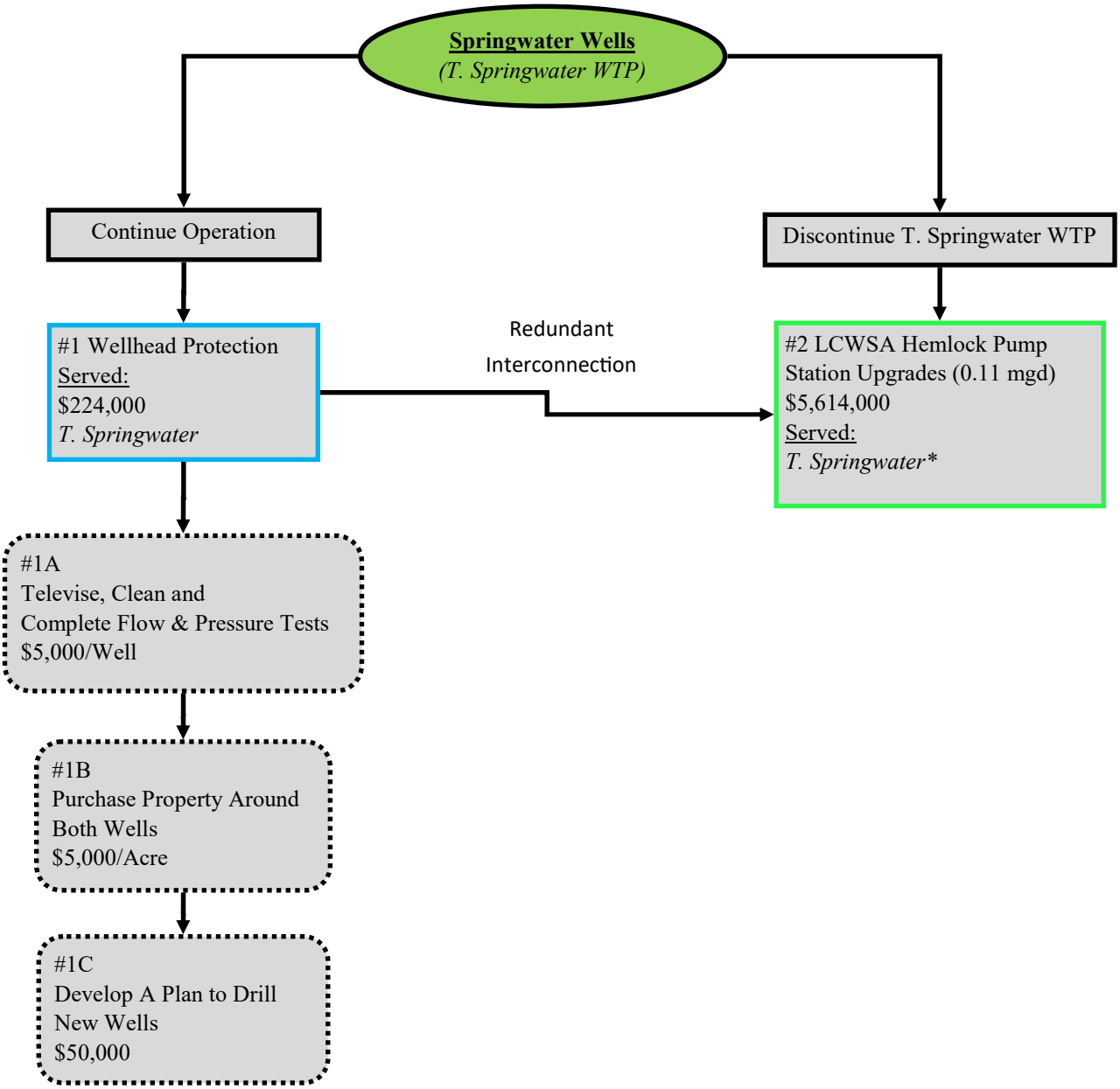
C. The Town could explore potential areas for new wells and produce a plan to drill new wells in the future. Land exploration and a report has an estimated capital cost of $50,000. In doing so, the Town would be taking an early initiative to ensure safe potable water for all users, as well as ensuring adequate supply or quality. The estimated capital cost to drill new wells is $1,500 per foot.

The estimated capital cost of all three wellhead protection options combined is approximately $224,000.

2. New source/interconnection – LCWSA Hemlock Pump Station Upgrades (0.11 mgd)

Rather than drill new wells as described above, a new water main could be installed along Conesus Springwater Road to create an interconnection with the LCWSA Consolidated District for the Town of Springwater. This construction would consist of 8-inch water main and a pressure reducing valve to meet the lower hydraulic grade in the Town of Springwater. This could be a supplemental or redundant interconnection, as well as a complete replacement source.

The estimated capital cost of the interconnection is approximately $5,614,000.


Springwater Wells
(T. Springwater WTP)
Continue Operation
Discontinue T. Springwater WTP
#1 Wellhead Protection
Served:
$224,000
T. Springwater
Redundant
Interconnection
#2 LCWSA Hemlock Pump
Station Upgrades (0.11 mgd)
$5,614,000
Served:
T. Springwater*
#1A
Televise, Clean and
Complete Flow & Pressure Tests
$5,000/Well
#1B
Purchase Property Around
Both Wells
$5,000/Acre
#1C
Develop A Plan to Drill
New Wells
$50,000

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Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Monroe County

Genesee County

Uplands Supply Conduits

Ontario County

Alt. 2

Alt. 1

Wyoming County Water Resources Agency System

Wyoming County

Steuben County

Allegany County

Village of Caledonia

Town of Caledonia

Village of Avon

Town of Avon

Village of Lima

Town of Lima

Town of York

Town of Geneseo

Village of Geneseo

Village of Leicester

Town of Leicester

Village of Mount Morris

Town of Mount Morris

Town of Groveland

Town of Conesus

Village of Livonia

Town of Livonia

Town of Springwater

Town of Sparta

Town of West Sparta

Village of Nunda

Town of Nunda

Town of Portage

Village of Dansville

Town of North Dansville

Town of Ossian

Conesus Lake

Hemlock Lake

Canadice Lake

Honeoye Lake

Silver Lake

942D

390

Livingston County

MAP SHEET:

MAP 5-1

MAP TITLE:

Springwater Wells
Town of Springwater WTP
Alternative Service Areas

DATE PREPARED:

NOVEMBER 22, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Existing Waterlines
- Under design/Construction
- New/Upgrade
- Pump Station Upgrade
- Water Trmt. Plant Upgrade
- Water Tank/Upgrade

N W E S

Miles
0 0.5 1 2

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PLANNING
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5.2 Chidsey Reservoir (Newville Creek) (*Map 5-2)*

1. Water quality – Reservoir protection

A. The Village of Nunda can protect both reservoir (surface water) sources by purchasing the surrounding property. Purchasing this property will help to greatly reduce development around the reservoir that could increase contaminated runoff to the reservoir watershed area. The Village is currently seeking funding to purchase approximately 270 acres of property surrounding the reservoir. The estimated capital cost of purchasing the property is $5,000 per acre, based on average property costs in the area.

The estimated capital cost of this property acquisition is approximately $1,890,000.

2. Water quality - Wellhead protection

The Village of Nunda also should consider adding protection to their secondary wells. Similar to the Town of Springwater, the Village should consider the following options independently or together:

A. The Village could implement a well head protection program that would include flow and pressure tests, and cleaning and televising the wells. The estimated capital cost of this work is $10,000 per well.

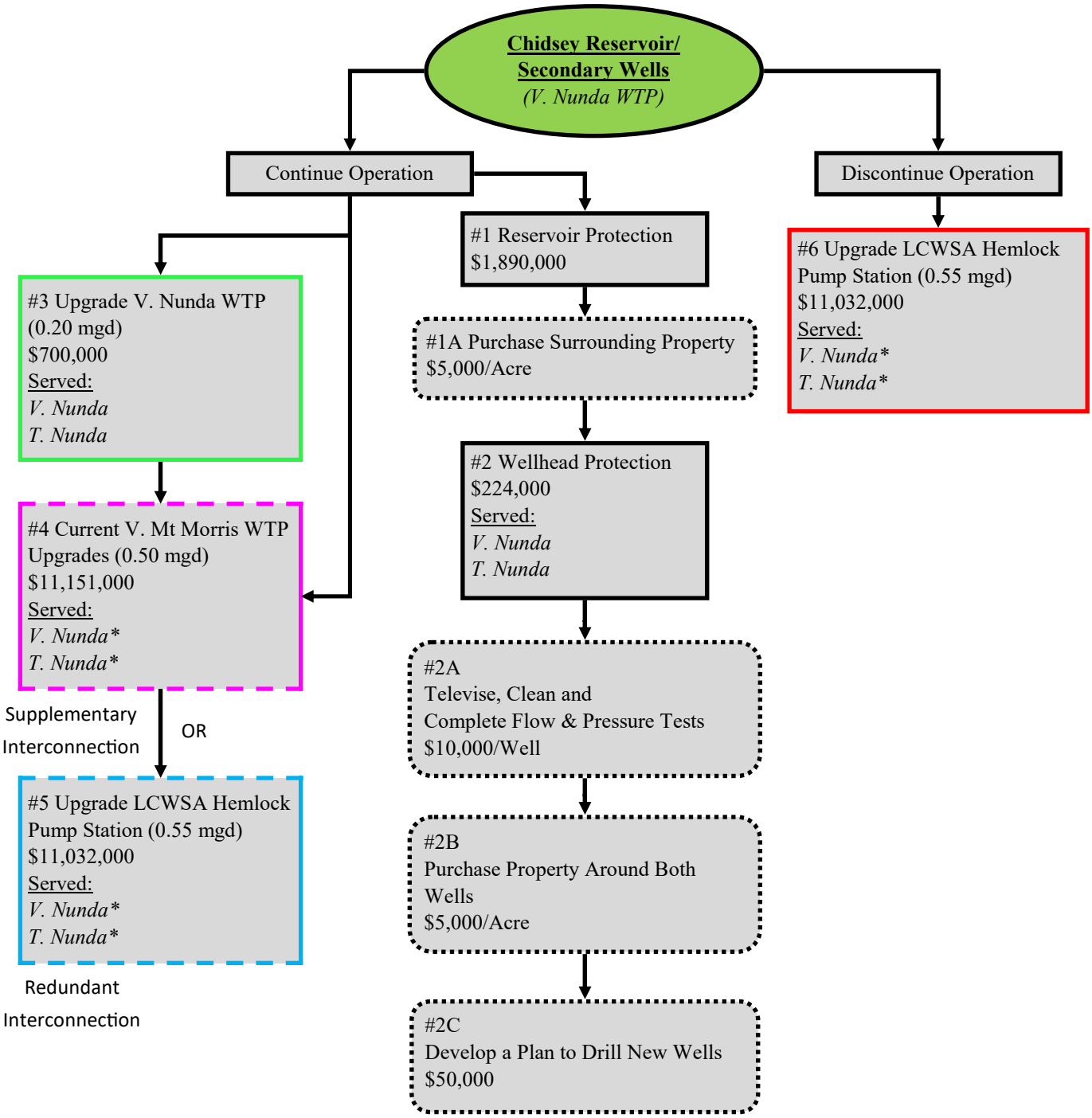
B. Purchasing property around the current supply wells is an additional protection measure that can be taken to preserve the ground water source, costing approximately $5,000 per acre.

C. Explore potential areas for new wells and produce a plan to drill new wells in the future. Land exploration and a report has an estimated capital cost of $50,000. In doing so, the Village is taking an early initiative at ensure safe potable water for all users, as well as ensuring adequate supply or quality. The estimated capital cost to drill new wells is $1,500 per foot.

The estimated capital cost of all three wellhead protection options combined is approximately $224,000.

3. Water quantity – Upgrade Village of Nunda WTP Upgrades (0.20 mgd)

One way that the Village of Nunda can address future water demands, is to upgrade their water treatment plant for an additional 0.20 mgd of flow. In doing so, the Village of Nunda could meet projected demands for 2050 and continue to use their current source (Chidsey Reservoir).


Chidsey Reservoir/
Secondary Wells
(V. Nunda WTP)
Continue Operation
Discontinue Operation
#1 Reservoir Protection
$1,890,000
#1A Purchase Surrounding Property
$5,000/Acre
#2 Wellhead Protection
$224,000
Served:
V. Nunda
T. Nunda
#2A
Televise, Clean and
Complete Flow & Pressure Tests
$10,000/Well
#2B
Purchase Property Around Both
Wells
$5,000/Acre
#2C
Develop a Plan to Drill New Wells
$50,000
#3 Upgrade V. Nunda WTP
(0.20 mgd)
$700,000
Served:
V. Nunda
T. Nunda
#4 Current V. Mt Morris WTP
Upgrades (0.50 mgd)
$11,151,000
Served:
V. Nunda*
T. Nunda*
Supplementary
Interconnection
OR
#5 Upgrade LCWSA Hemlock
Pump Station (0.55 mgd)
$11,032,000
Served:
V. Nunda*
T. Nunda*
Redundant
Interconnection
#6 Upgrade LCWSA Hemlock
Pump Station (0.55 mgd)
$11,032,000
Served:
V. Nunda*
T. Nunda*

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Monroe County

Genesee County

Uplands Supply Conduits

Village of Caledonia

Town of Caledonia

Village of Avon

Town of Avon

Village of Lima

Town of Lima

Town of York

Town of Geneseo

Village of Geneseo

Village of Leicester

Town of Leicester

Wyoming County Water Resources Agency System

Wyoming County

Village of Mount Morris

Town of Groveland

Town of Mount Morris

Town of Conesus

Village of Livonia

Town of Livonia

Conesus Lake

Ontario County

Honeoye Lake

Hemlock Lake

Canadice Lake

Silver Lake

Alt. 4

Alt. 6

Alt. 5

Alt. 3

Alt. 1/2

Town of Portage

Village of Nunda

Town of Nunda

Town of Sparta

Town of West Sparta

Village of Dansville

Town of North Dansville

Town of Springwater

Town of Ossian

Steuben County

Allegany County

MAP SHEET:

MAP 5-2

MAP TITLE:

Chidsey Reservoir
Village of Nunda WTP
Alternative Service Areas

DATE PREPARED:

NOVEMBER 22, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Existing Waterlines
- Under design/Construction
- New/Upgrade
- Pump Station
- Water Treatment Plant
- Water Tank

N W E S

Miles 0 0.5 1 2

ARCHITECTURE ENGINEERING PLANNING CPLteam.com

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The estimated capital cost for Alternative #3 is $700,000.

4. *New source/interconnection – Connection to the Village of Mount Morris in conjunction with the current Village of Mount Morris WTP Upgrades (0.20 mgd)*

The Village of Nunda could install new water main along Route 408, creating an interconnection between the Town/Village of Nunda and the Village of Mount Morris. This construction would consist of 8-inch water main, a 250,000 gallon water storage tank, and a pump station to address the increase in elevation rising above the hydraulic grade in the Village of Mount Morris systems, as well as a pressure reducing valve to meet the lower hydraulic grade in the Town and Village of Nunda. This interconnection would be used for a supplemental supply.

The estimated capital cost of the interconnection is approximately $11,151,000.

5. *New source/interconnection – Connection to the LCWSA Consolidated District in conjunction with upgrades at the LCWSA Hemlock Pump Station (0.55 mgd)*

Another alternative for the Village of Nunda is to install new water main along Route 408, creating an interconnection between the LCWSA Consolidated District. This construction would consist of 8-inch water main, a 250,000 gallon water storage tank, and a pump station to address the increase in elevation rising above the hydraulic grade in the LCWSA system, as well as a pressure reducing valve to meet the lower hydraulic grade in the Town and Village of Nunda. This interconnection would be used as a redundant supply.

The estimated capital cost of the interconnection is approximately $11,032,000.

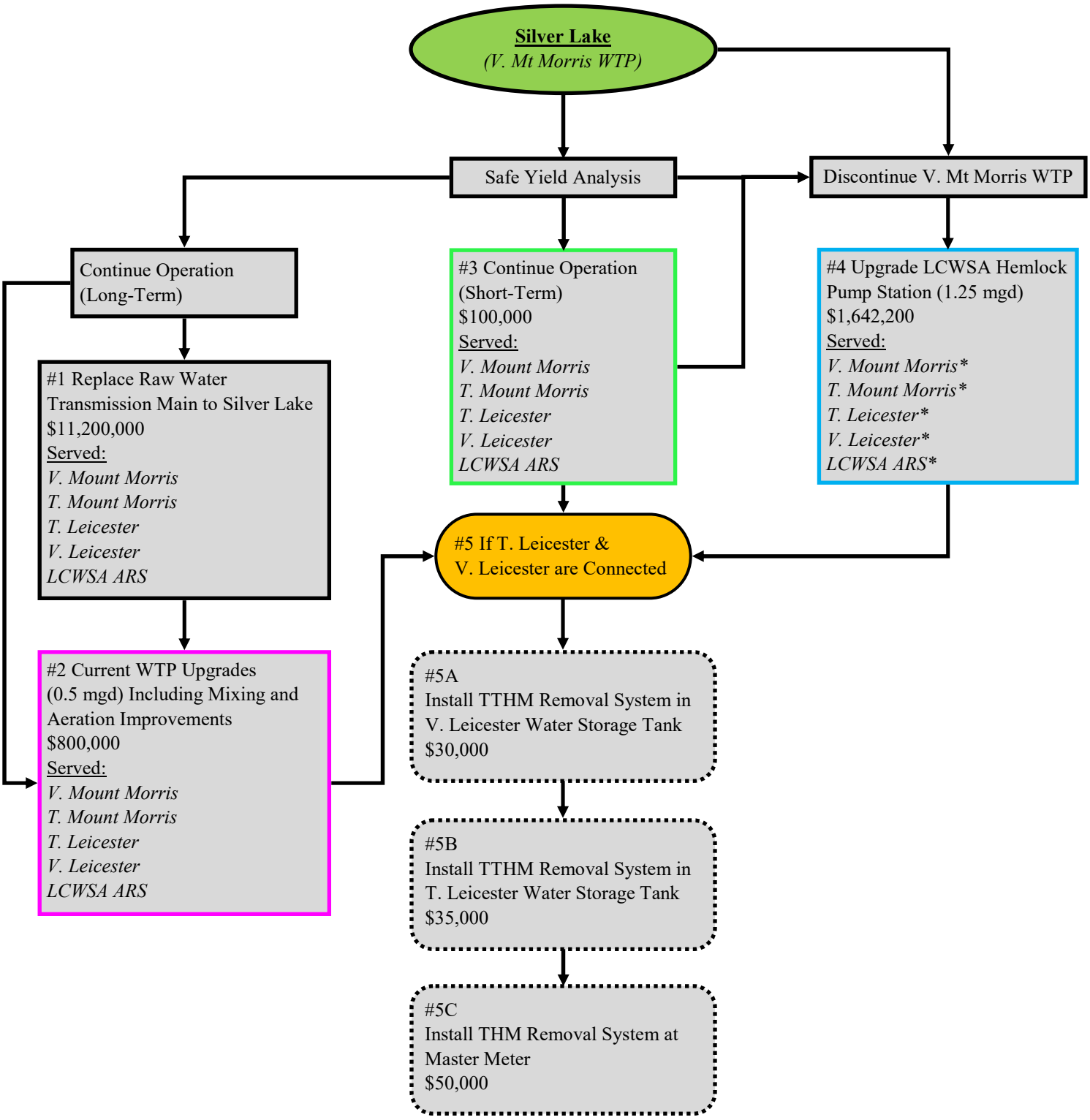
6. *New source – Connection to the LCWSA Consolidated District in conjunction with upgrades at the LCWSA Hemlock Pump Station (0.55 mgd)*

Alternative #6 is the same as Alternative #5. The installation of new water main along Route 408 would create an interconnection between the LCWSA Consolidated District and the Village of Nunda, but rather than the Village utilizing this connection as emergency back-up, it would be a complete water supply replacement should the Village decide to decommission its water treatment plant.

The estimated capital cost of the interconnection is approximately $11,032,000.

5.3 Silver Lake (*Map 5-3)*

A safe yield analysis should be completed prior to selecting any future alternatives to determine whether any additional water should be withdrawn from Silver Lake.


Silver Lake
(V. Mt Morris WTP)
Safe Yield Analysis
Discontinue V. Mt Morris WTP
Continue Operation
(Long-Term)
#3 Continue Operation
(Short-Term)
$100,000
Served:
V. Mount Morris
T. Mount Morris
T. Leicester
V. Leicester
LCWSA ARS
#4 Upgrade LCWSA Hemlock
Pump Station (1.25 mgd)
$1,642,200
Served:
V. Mount Morris*
T. Mount Morris*
T. Leicester*
V. Leicester*
LCWSA ARS*
#1 Replace Raw Water
Transmission Main to Silver Lake
$11,200,000
Served:
V. Mount Morris
T. Mount Morris
T. Leicester
V. Leicester
LCWSA ARS
#5 If T. Leicester &
V. Leicester are Connected
#2 Current WTP Upgrades
(0.5 mgd) Including Mixing and
Aeration Improvements
$800,000
Served:
V. Mount Morris
T. Mount Morris
T. Leicester
V. Leicester
LCWSA ARS
#5A
Install TTHM Removal System in
V. Leicester Water Storage Tank
$30,000
#5B
Install TTHM Removal System in
T. Leicester Water Storage Tank
$35,000
#5C
Install THM Removal System at
Master Meter
$50,000

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Monroe County

Genesee County

Uplands Supply Conduits

Ontario County

Wyoming County Water Resources Agency System

Wyoming County

Steuben County

Allegany County

Alt. 1

Alt. 2

Alt. 3

Alt. 4

Village of Caledonia

Town of Caledonia

Village of Avon

Town of Avon

Village of Lima

Town of Lima

Town of York

Town of Geneseo

Village of Geneseo

Village of Leicester

Town of Leicester

Village of Mount Morris

Town of Groveland

Town of Mount Morris

Town of Conesus

Village of Livonia

Town of Livonia

Town of Sparta

Town of Springwater

Town of West Sparta

Village of Dansville

Town of North Dansville

Village of Nunda

Town of Nunda

Town of Portage

Town of Ossian

Conesus Lake

Honeoye Lake

Hemlock Lake

Canadice Lake

Silver Lake

MAP SHEET:

MAP 5-3

MAP TITLE:

Silver Lake
Village of Mount Morris WTP
Alternative Service Areas

DATE PREPARED:

NOVEMBER 22, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Existing Waterlines
- Under design/Construction
- Under Design/Construction
- New/Upgrade

N W E S

0 0.5 1 2 Miles

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Following a safe yield analysis, if the result showed room for additional water withdraw without adverse impacts and there was full support from the New York State Department of Environmental Conservation, the Village of Mount Morris could potentially increase their allocation to supply more water users.

There are four (4) alternatives to consider for the Mount Morris WTP. These alternatives include: the replacement of the raw water transmission main, the WTP stays operational long term with the Village's current upgrades, the WTP stays operational short term with no major upgrades or it discontinues operation. Each of these alternatives are described in more detail below:

1. *Water quality/quantity – Replace Raw Water Transmission Main to Silver Lake*

Village of Mount Morris has experienced several complications and water main breaks along their raw water transmission main throughout its stretch from Silver Lake to the Village water treatment plant located in the Village of Mount Morris.

Alternative #1 is to replace the existing 10-inch transmission main in its entirety, eliminating short-term and long-term supply concerns, but the NYSDEC allocation of 1.50 mgd would limit supply into the Village. If the result of a safe yield analysis indicates that additional water could be withdrawn without adverse impacts and there was full support from the New York State Department of Environmental Conservation, the Village could potentially increase their allocation to supply more customers. The Village of Mount Morris currently treats and supplies an average of 0.514 mgd to the Village and Town of Mount Morris, Village and Town of Leicester, and the ARS service area.

The proposed upgrades would need to include replacement of the raw water transmission main which would involve a single crossing of the Genesee River and Mount Morris Dam. It is anticipated that the new transmission main would be installed along the path of the existing transmission main, an estimated 50,000 linear feet, with the exception of any unforeseen obstructions that would require relocating the new transmission main. The main would be sized at 12-inch minimum to accommodate the treatment plant at the maximum capacity of 1.50 MGD. This replacement should only be considered if it is in conjunction with the WTP 2019/20 upgrades (Alternative #2), improving water quality and increasing treatment capacity by 0.5 mgd, for a total of 1.5 mgd.

The estimated capital cost of these upgrades is $11,200,000.

2. *Water quality/quantity – Current WTP upgrades (0.50 mgd) including mixing and aeration improvements*

Alternative #2 is to continue the operation of the water treatment plant with the current upgrades proposed at the facility. The Village is in the process of completing improvements in 2019/20 at a cost of $800,000 to continue operating at a daily average of 0.514 mgd but

increasing treatment capacity to approximately 1.5 mgd. Additionally, these improvements will include a mixing and aeration system in the Village of Mount Morris reservoir, lowering TTHM levels in the system.

3. Continue WTP operations (short-term)

The Village of Mount Morris can decide to continue water treatment plant operations as is without and major upgrades. This alternative should only be considered if the Village commits to decommissioning their treatment plant once there are significant cost upgrades to be completed. Given the current condition of the raw water transmission main from Silver Lake to the water treatment plant, if this alternative is selected, a new water source will be needed within 5-10 years.

The estimated capital cost to this alterative is $100,000 to temporarily address any minor concerns, increasing the longevity of the current operations.

4. New source – Discontinue the Village of Mount Morris WTP, connect to the LCWSA Consolidated District, and upgrade the LCWSA Hemlock Pump Station (1.25 mgd)

If Alternative #3 is selected or the Village of Mount Morris decides to decommission their water treatment plant at any time in the future, the water system can be connected to the LCWSA Consolidated District at the Livingston County Correctional Facilities along NYS Route 36 to the new DOCCS water main. This construction would consist of 12-inch minimum water main and a pump station to meet the higher hydraulic grade in the Village and Town of Mount Morris.

The estimated capital cost of Alternative #4 is $1,642,200.

5. Water Quality – Town and Village of Leicester

If either of the Alternatives #1-4 are selected and the Town and Village of Leicester continues to be served through the Village of Mount Morris distribution system, there are three options available to address TTHM issues in their systems. Any of the options can be selected independently or together. These options include:

A. Install a TTHM removal system in the Village of Leicester water storage tank.

   The estimated capital cost of this upgrade is $31,500.

B. Install a TTHM removal system in the Town of Leicester water storage tank.

   The estimated capital cost for this upgrade is $35,000.

C. Install a TTHM removal system at the master meter going into the Town of Leicester.

The estimated capital cost for this option is $50,400.

The Town and Village of Leicester may potentially still need to install some of this equipment to improve water quality if the systems were served by a new source, but at least a year or more of standard quarterly sampling would need to be completed to determine whether it is necessary.

5.4 Mill Creek (*Map 5-4)*

1. Water quality – Reservoir protection

A. The Village of Dansville could protect the reservoir (surface water) sources by purchasing the surrounding property. Purchasing this property will help to greatly reduce development around the reservoir that could increase contaminated runoff to the reservoir watershed area. The estimated capital cost of purchasing the property is $5,000 per acre, based on average property costs in the area.

The estimated capital cost of this alternative, based on 100 acres purchased, is approximately $700,000.

2. Water quality - Wellhead protection

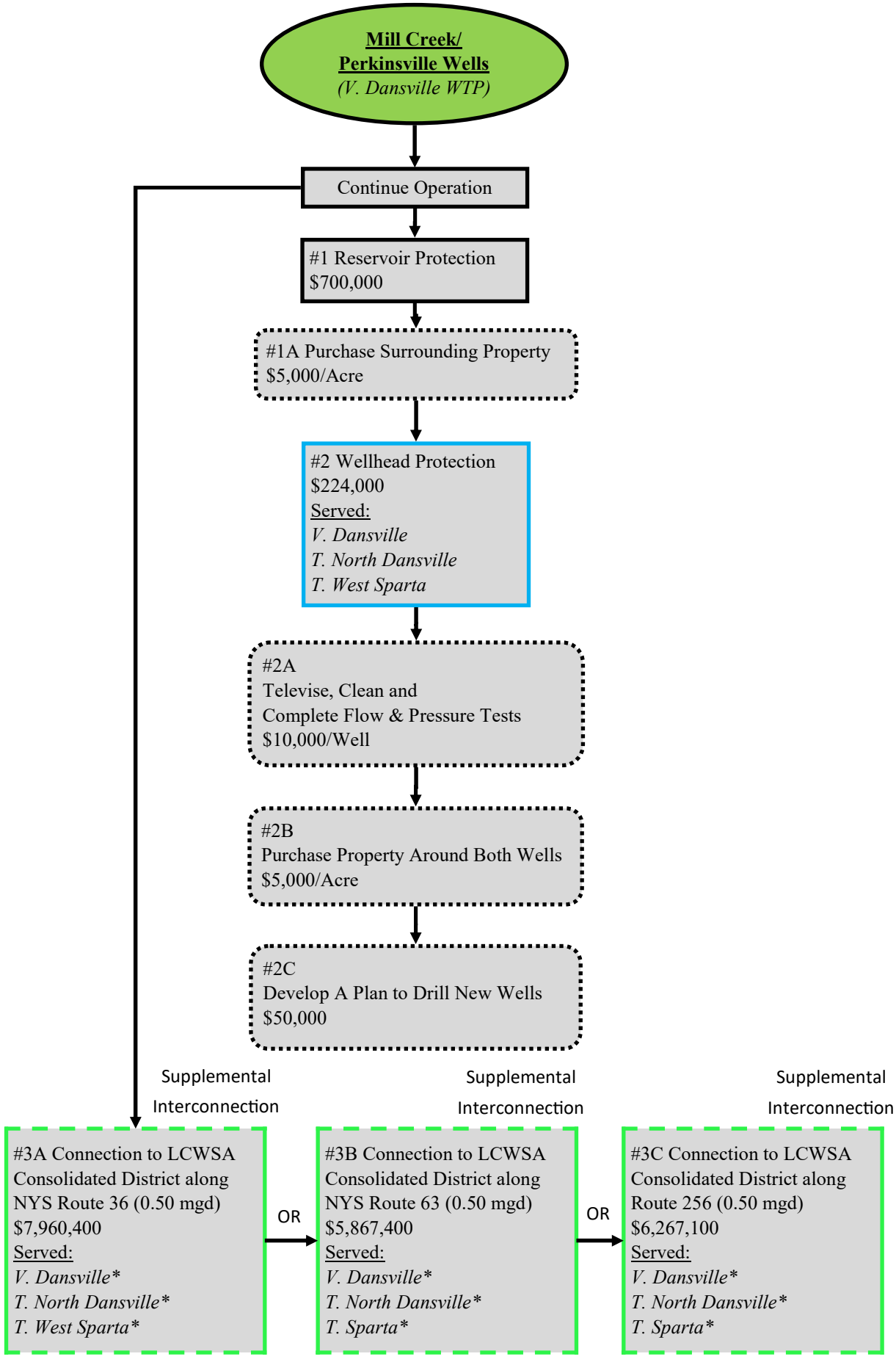
The Village of Dansville also should consider adding protection to their secondary wells (Perkinsville Wells). The following three option can be selected independently or together to address future water quality concerns:

A. The Village can implement a well head protection program that would include flow and pressure tests, clean and televise the wells. The estimated capital cost of this work is $10,000 per well.

B. Purchasing property around the current supply wells is an additional protection measure that can be taken to preserve the ground water source, costing approximately $5,000 per acre.

C. Explore potential areas for new wells and produce a plan to drill new wells in the future. Land exploration and a report has an estimated capital cost of $50,000. In doing so, the Village is taking an early initiative at ensure safe potable water for all users. If new wells are ever required to ensure adequate supply or quality, the estimated capital cost to drill new wells is $1,500 per foot.

The estimated capital cost of all three wellhead protection options combined is approximately $224,000.


Mill Creek/
Perkinsville Wells
(V. Dansville WTP)
Continue Operation
#1 Reservoir Protection
$700,000
#1A Purchase Surrounding Property
$5,000/Acre
#2 Wellhead Protection
$224,000
Served:
V. Dansville
T. North Dansville
T. West Sparta
#2A
Televise, Clean and
Complete Flow & Pressure Tests
$10,000/Well
#2B
Purchase Property Around Both Wells
$5,000/Acre
#2C
Develop A Plan to Drill New Wells
$50,000
Supplemental
Interconnection
Supplemental
Interconnection
Supplemental
Interconnection
#3A Connection to LCWSA
Consolidated District along
NYS Route 36 (0.50 mgd)
$7,960,400
Served:
V. Dansville*
T. North Dansville*
T. West Sparta*
OR
#3B Connection to LCWSA
Consolidated District along
NYS Route 63 (0.50 mgd)
$5,867,400
Served:
V. Dansville*
T. North Dansville*
T. Sparta*
OR
#3C Connection to LCWSA
Consolidated District along
Route 256 (0.50 mgd)
$6,267,100
Served:
V. Dansville*
T. North Dansville*
T. Sparta*

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Monroe County

Genesee County

Uplands Supply Conduits

Village of Caledonia

Town of Caledonia

Village of Avon

Town of Avon

Village of Lima

Town of Lima

Town of York

Town of Geneseo

Village of Geneseo

Village of Leicester

Town of Leicester

Wyoming County Water Resources Agency System

Wyoming County

Village of Mount Morris

Town of Groveland

Town of Mount Morris

Town of Conesus

Village of Livonia

Town of Livonia

Ontario County

Conesus Lake

Honeoye Lake

Hemlock Lake

Canadice Lake

Silver Lake

Alt. 3

Town of Sparta

Town of Springwater

Town of West Sparta

Village of Dansville

Town of North Dansville

Alt. 2

Alt. 1

Town of Nunda

Village of Nunda

Town of Portage

Town of Ossian

Steuben County

Allegany County

MAP SHEET:

MAP 5-4

MAP TITLE:

Mill Creek
Village of Dansville WTP
Alternative Service Areas

DATE PREPARED:

NOVEMBER 22, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Existing Waterlines
- Under design/Construction
- New/Upgrade

N W E S

0 0.5 1 2 Miles

ARCHITECTURE
ENGINEERING
PLANNING
CPLteam.com

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3. *Interconnection – Connection to LCWSA Consolidated District in conjunction with LCWSA Hemlock Pump Station improvements (0.50 mgd)*

There are three potential routes for interconnection between the LCWSA system and the Village of Dansville. All of the potential interconnections would be for supplemental emergency supply. Capital cost, along with the number of users along the alternative water main route, will impact which of the following alternatives is selected:

A. Water main could be installed along NYS Route 36, creating an interconnection between the Village of Dansville and the LCWSA (DOCCS system). This construction would consist of a 12-inch water main minimum and a pump station to meet the higher hydraulic grade in the Village of Dansville.

   The estimated capital cost of the interconnection is approximately $7,960,400.

B. Another route could be along NYS Route 63, creating an interconnection between the Village of Dansville and the LCWSA Consolidated District. This construction would consist of 12-inch water main minimum and a pressure reducing valve to meet the lower hydraulic grade in Groveland Station.

   The estimated capital cost of the interconnection is approximately $5,867,400.

C. A final route could be along NYS Route 256, creating an interconnection between the Village of Dansville and the LCWSA Consolidated District. Construction would consist of a 12-inch water main minimum and a pressure reducing valve to lower the pressure from the LCWSA system to the Village of Dansville system.

   The estimated capital cost of the interconnection is approximately $6,267,100.

5.5 Conesus Lake

As noted in earlier sections, the current safe yield for Conesus Lake is significantly outdated. An updated safe yield analysis should be completed prior to selecting any future alternatives to determine whether any additional water should be withdrawn from Conesus Lake without detriment to other uses or users of the Lake. Any increase in capacity would require a revision to the public water supply permit and therefore trigger the SEQR process of environmental review. This review would include a reanalysis of the lake's safe yield.

5.5.1 Village of Avon WTP *(Map 5-5)*

There are several alternatives for the Village of Avon water treatment plant that fall under either upgrading the plant, continuing to operate at current capacity or decommissioning the plant and connecting to a new source. Any upgrades to the Village WTP will be directly associated with the results of the safe yield analysis.

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Conesus Lake

Safe Yield Analysis

V. Avon WTP
Continue Operation

#1 Upgrade V. Avon WTP (2.0 mgd)
$9,919,560
Served:
V. Avon
T. Avon
T. Caledonia WD#3
*T. York**

Supplemental Interconnection

Served:
V. Lima
T. Lima

#2 Upgrade V. Avon WTP (1.0 mgd)
$5,954,060
Served:
V. Avon
T. Avon
T. Caledonia WD#3

Supplemental Interconnection

Served:
V. Lima
T. Lima

#4 LCWSA Consolidated District Connection (0.5 mgd)
$252,000
Served:
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

Supplemental Interconnection

Served:
*V. Lima**
*T. Lima**

#3 Continue Operation with Current Capacity
$1,988,560
Served:
V. Avon
T. Avon
T. Caledonia WD#3

Supplemental Interconnection

Served:
V. Lima
T. Lima

Discontinue V. Avon WTP

#5 LCWSA New Pump Station & Transmission Main (1.5 mgd)
$24,248,000
Served:
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

Supplemental Interconnection

Served:
*V. Lima**
*T. Lima**

#6 Upgrade V. Lima Pump Station & Transmission Main (1.5 mgd)
$7,047,600
Served:
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**
V. Lima
T. Lima

V. Geneseo WTP
Continue Operation

#1 Upgrade V. Geneseo WTP (1.0 mgd)
$42,000,000
Served:
V. Geneseo
T. Geneseo
T. York
*T. Leicester**
*V. Leicester**

Supplemental Interconnection

Connection to T. Groveland
Served:
*LCWCA Consolidated District**
*V. Mt. Morris**
*T. Mt Morris**

#2 New 500,000 gallon Water Storage Tank in V. Geneseo for Peak Flows
$1,050,000
Served:
V. Geneseo
T. Geneseo
T. York

#3 Continue Operation with Current Capacity
$100,000
Served:
V. Geneseo
T. Geneseo
T. York

Discontinue V. Geneseo WTP

#4 MCWA Connection in T. York (1.0 mgd)
$834,400
V. Geneseo WTP Served:
V. Geneseo
T. Geneseo
T. York
MCWA (Lake Ontario) Served:
T. York
T. Leicester
V. Leicester

#5 MCWA Connection in T. York (0.5 mgd)
$834,400
V. Geneseo WTP Served:
V. Geneseo
T. Geneseo
T. York

MCWA (Lake Ontario) Served:
*T. York**
*T. Leicester**
*V. Leicester**

#6 Upgrade V. Lima Pump Station & Transmission Main (3.5 mgd)
$30,131,850
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**
*T. Leicester**
*V. Leicester**

OR

#7 LCWSA New Pump Station & Transmission Main (3.5 mgd)
$31,512,250
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**
*T. Leicester**
*V. Leicester**

OR

#8 MCWA Connection in T. York (1.0 mgd)
$834,400
Served:
*T. York**
*T. Leicester**
*V. Leicester**

LCWSA New Pump Station & Transmission Main (2.25 mgd)
$31,400,250
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**

OR

#9 MCWA Connection in T. York (0.5 mgd)
$834,400
Served:
*T. York**
*T. Leicester**
*V. Leicester**

LCWSA New Pump Station & Transmission Main (2.75 mgd)
$31,442,250
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**

OR

#10 MCWA Connection in T. York (0.5 mgd)
$834,400
Served:
*T. York**
*T. Leicester**
*V. Leicester**

Upgrade V. Lima Pump Station & Transmission Main (2.75 mgd)
$30,061,850
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**

OR

#11 MCWA Connection in T. York (1.0 mgd)
$834,400
Served:
*T. York**
*T. Leicester**
*V. Leicester**

Upgrade V. Lima Pump Station & Transmission Main (2.25 mgd)
$30,019,850
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Monroe County

Uplands Supply Conduits

Alt. 6

Alt. 2

Alt. 3

Alt. 5

Alt. 1

Genesee County

Ontario County

Wyoming County Water Resources Agency System

Wyoming County

Steuben County

Allegany County

Village of Caledonia

Town of Caledonia

Village of Avon

Town of Avon

Village of Lima

Town of Lima

Town of York

Town of Geneseo

Village of Geneseo

Village of Leicester

Town of Leicester

Village of Mount Morris

Town of Mount Morris

Town of Groveland

Town of Conesus

Town of Livonia

Village of Livonia

Conesus Lake

Hemlock Lake

Canadice Lake

Honeoye Lake

Silver Lake

Town of Sparta

Town of Springwater

Town of West Sparta

Village of Nunda

Town of Nunda

Town of Portage

Village of Dansville

Town of North Dansville

Town of Ossian

63 21 84 61 5 26 65 66 20 67 14 36 23 5 22 12 58 35 62 58A 50 55 15A 52 19 47 39 83 39 63 20A 41 28 8 56 18 942D 32 37 10 48 64 44 85 45 4 33 256 2 71 15 43 30 258 1 1A 42 36A 16 38 408 3 30A 72 51 15 59 60 36 25 29 20N 81 77 13 11 34 74 75 79 78 436 80 69 9 27B 20S 24A 70 54 24 57 49 27 17 70

MAP SHEET:

MAP 5-5

MAP TITLE:

Conesus Lake
Village of Avon WTP
Alternative Service Areas

DATE PREPARED:

NOVEMBER 22, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Existing Waterlines
- Under design/Construction
- Under Design/Construction
- New/Upgrade
- Pump Station Upgrade
- Water Trmt. Plant Upgrade

N W E S

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1. Water quantity – Upgrade the Village of Avon WTP (2.0 mgd)

Upgrading the WTP by 2.0 mgd will address long-term capacity, Town and Village expansion, and the high-risk infrastructure at the Pebble Beach pump station for the Town and Village of Avon, while also providing potential to supply additional water to the Town of Caledonia and Town of York. Additionally, the upgrades could provide a supplemental or redundant supply to the Village and Town of Lima depending on the amount of undesignated water available.

The Village of Avon WTP has reached its maximum treatment capacity of 1.0 mgd but is permitted to withdraw a maximum of 3.5 mgd from Conesus Lake based on their NYSDEC allocation. The treatment plant was originally designed and built to allow for future expansion. Any additional infrastructure needed to increase capacities at the treatment plant should be able to be constructed without any major complications.

An additional 2.0 mgd of capacity (3.0 mgd total capacity) at the Village of Avon WTP would supply the projected demands in the Town and Village of Avon, including any continuing economic development in either of the two Industrial Development Parks: James M. Steele Commerce Park and Livingston County Industrial Complex. A 2.0 mgd upgrade would provide a remainder of 1.55 mgd of undesignated water. The upgrades would include but are not limited to, additional filter(s), disinfection equipment, pump upgrades, and possibly a new intake pipe to address the major aging concerns at the Pebble Beach pump station.

The Joint Town and Village of Avon Comprehensive Water System Study currently being completed is addressing other areas of concern in the existing distribution system including a new water storage tank. Any additional demand associated with the treatment plant upgrades combined with a new storage tank, would allow for adequate storage and fire flows for any new customers in the future.

The estimated capital cost for a 2.0 mgd WTP upgrade and associated Pebble Beach pump station improvements is $9,919,560.

2. Water quantity – Upgrade the Village of Avon WTP (1.0 mgd)

Upgrading the WTP by 1.0 mgd will meet projected demands, Town and Village expansion, and high-risk infrastructure at the Pebble Beach pump station for the Town and Village of Avon with the potential to supply additional water to the Town of Caledonia. Additionally, the upgrades could provide a supplemental supply to the Village and Town of Lima. As stated above, any additional infrastructure needed to increase capacities at the treatment plant could be constructed without any major complications.

An additional 1.0 mgd of capacity (2.0 mgd total capacity) at the Village of Avon WTP would supply the projected demands in the Town and Village of Avon, including any continuing economic development in either of the two (2) Industrial Development Parks: James M. Steele Commerce Park and Livingston County Industrial Complex. A 1.0 mgd upgrade would provide a remainder of 0.55 mgd of undesignated water. The upgrades would include but are not limited to, additional filter(s), disinfection equipment, pump upgrades, and a potential new intake pipe to address the major aging concerns at the Pebble Beach pump station.

The Joint Town and Village of Avon Comprehensive Water System Study currently being completed is addressing other areas of concern in the existing distribution system including a new water storage tank. Any additional demand associated with the treatment plant upgrades combined with a new storage tank would allow for adequate storage and fire flows for any new customers in the future.

The estimated capital cost for a 1.0 mgd WTP upgrade and associated Pebble Beach pump station improvements is $5,954,060 based MRB Group's 2018 Village of Avon Water Filtration Plant Expansion and Improvements preliminary engineering report.

3. Continue WTP operations at the current capacity of 1.0 mgd

If there are no capacity upgrades completed at the WTP, the Village of Avon could continue operation of the WTP at its current capacity of 1.0 mgd. Although this alternative does not require any capacity upgrades, the Pebble Beach raw water pump station would still need improvements to maintain current operation procedures.

The estimated capital cost for the Pebble Beach pump station improvements is $1,988,560 based on MRB Group's 2018 Village of Avon Water Filtration Plant Expansion and Improvements preliminary engineering report.

4. New source/interconnection – Connection to LCWSA Consolidated District (0.50 mgd)

If the Village of Avon chooses to continue operating at the current capacity of 1.0 mgd, an additional source of water could be achieved through interconnection to address future demands in the Village and Town of Avon and Town of Caledonia Water District #3.

New water main could be installed along NYS Route 256 in the Town of Livonia creating an interconnection or potential replacement source between the Village of Avon and the LCWSA Consolidated District. Construction would include the installation of a 12-inch water main minimum and a pressure reducing valve to meet the lower hydraulic grade in the Town and Village of Avon. This connection would only serve as a supplemental supply to the current 1.0 mgd at the Village of Avon WTP.

The estimated capital cost of the interconnection is approximately $252,000.

5. New source– LCWSA New Pump Station and transmission main (1.5 mgd)

A new transmission main could be installed from a new pump station and a connection made to the City of Rochester Hemlock Lake transmission mains, creating an interconnection and/or a replacement source if the Village of Avon decides to decommission their water treatment plant. Construction would consist of the installation of a new pump station capable of supplying 1.5 mgd, a 20-inch water main minimum, potentially a 3,000,000 gallon water storage tank, and a pressure reducing valve to meet the lower hydraulic grade in the Town and Village of Avon. This connection would be designed and constructed to be a redundant supply for the Village and Town of Avon and Town of Caledonia Water District #3 as well as a supplemental interconnection for the Village and Town of Lima. This new pump station and transmission main is discussed in further detail in Section 5.6.2.

The estimated capital cost of the interconnection is approximately $24,248,000.

6. New source– Upgrades to the Village of Lima Pump Station and new transmission main (1.5 mgd)

A new transmission main could be installed from the Village of Lima's existing pump station bypassing any infrastructure restrictions in the Village of Lima. Additionally, the pump station would need to be expanded and upgraded to supply 1.5 mgd. Construction would consist of upgrading the existing pump station, electrical improvements, and a 20-inch water main minimum to the new supplemental interconnection currently being constructed along NYS Route 5&20. This connection would be designed and constructed to be a redundant interconnection or potential replacement source for the Village of Avon, Town of Avon, and Town of Caledonia Water District #3.

The estimated capital cost of the interconnection is approximately $7,047,600.

There is opportunity to potentially increase the size and hydraulic grade of the proposed water storage tank, discussed in the recent Town and Village of Avon joint study, as part of Alternatives #5 and #6. This option would require a cost sharing agreement with the Town and Village of Avon. If this opportunity is considered, the cost from the above alternatives requiring a water storage tank would be reduced.

5.5.2 Village of Geneseo WTP *(Map 5-6A/B)*

There are several alternatives to consider for the Geneseo WTP that fall under the following categories: upgrading the water treatment plant, continuing to operate at the current capacity or discontinuing operation and decommissioning the plant. Upgrading the Village WTP will be directly associated with results of the safe yield analysis. The following alternative could be considered to address future water supply demands:

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Conesus Lake

Safe Yield Analysis

V. Avon WTP
Continue Operation

#1 Upgrade V. Avon WTP (2.0 mgd)
$9,919,560
Served:
V. Avon
T. Avon
T. Caledonia WD#3
*T. York**

Supplemental Interconnection

Served:
V. Lima
T. Lima

#2 Upgrade V. Avon WTP (1.0 mgd)
$5,954,060
Served:
V. Avon
T. Avon
T. Caledonia WD#3

Supplemental Interconnection

Served:
V. Lima
T. Lima

#4 LCWSA Consolidated District Connection (0.5 mgd)
$252,000
Served:
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

Supplemental Interconnection

Served:
*V. Lima**
*T. Lima**

#3 Continue Operation with Current Capacity
$1,988,560
Served:
V. Avon
T. Avon
T. Caledonia WD#3

Supplemental Interconnection

Served:
V. Lima
T. Lima

Discontinue V. Avon WTP

#5 LCWSA New Pump Station & Transmission Main (1.5 mgd)
$24,248,000
Served:
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

Supplemental Interconnection

Served:
*V. Lima**
*T. Lima**

#6 Upgrade V. Lima Pump Station & Transmission Main (1.5 mgd)
$7,047,600
Served:
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**
V. Lima
T. Lima

V. Geneseo WTP
Continue Operation

#1 Upgrade V. Geneseo WTP (1.0 mgd)
$42,000,000
Served:
V. Geneseo
T. Geneseo
T. York
*T. Leicester**
*V. Leicester**

Supplemental Interconnection

Connection to T. Groveland
Served:
*LCWCA Consolidated District**
*V. Mt. Morris**
*T. Mt Morris**

#2 New 500,000 gallon Water Storage Tank in V. Geneseo for Peak Flows
$1,050,000
Served:
V. Geneseo
T. Geneseo
T. York

#3 Continue Operation with Current Capacity
$100,000
Served:
V. Geneseo
T. Geneseo
T. York

Discontinue V. Geneseo WTP

#4 MCWA Connection in T. York (1.0 mgd)
$834,400
V. Geneseo WTP Served:
V. Geneseo
T. Geneseo
T. York
MCWA (Lake Ontario) Served:
T. York
T. Leicester
V. Leicester

#5 MCWA Connection in T. York (0.5 mgd)
$834,400
V. Geneseo WTP Served:
V. Geneseo
T. Geneseo
T. York

MCWA (Lake Ontario) Served:
*T. York**
*T. Leicester**
*V. Leicester**

#6 Upgrade V. Lima Pump Station & Transmission Main (3.5 mgd)
$30,131,850
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**
*T. Leicester**
*V. Leicester**

OR

#7 LCWSA New Pump Station & Transmission Main (3.5 mgd)
$31,512,250
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**
*T. Leicester**
*V. Leicester**

OR

#8 MCWA Connection in T. York (1.0 mgd)
$834,400
Served:
*T. York**
*T. Leicester**
*V. Leicester**

LCWSA New Pump Station & Transmission Main (2.25 mgd)
$31,400,250
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**

OR

#9 MCWA Connection in T. York (0.5 mgd)
$834,400
Served:
*T. York**
*T. Leicester**
*V. Leicester**

LCWSA New Pump Station & Transmission Main (2.75 mgd)
$31,442,250
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**

OR

#10 MCWA Connection in T. York (0.5 mgd)
$834,400
Served:
*T. York**
*T. Leicester**
*V. Leicester**

Upgrade V. Lima Pump Station & Transmission Main (2.75 mgd)
$30,061,850
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**

OR

#11 MCWA Connection in T. York (1.0 mgd)
$834,400
Served:
*T. York**
*T. Leicester**
*V. Leicester**

Upgrade V. Lima Pump Station & Transmission Main (2.25 mgd)
$30,019,850
Served:
*V. Geneseo**
*T. Geneseo**
*T. York**

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Monroe County

Genesee County

Uplands Supply Conduits

Village of Caledonia

Town of Caledonia

Village of Avon

Town of Avon

Village of Lima

Town of Lima

Town of York

Alt. 1

Alt. 3

Alt. 4/5

Alt. 2

Town of Geneseo

Village of Geneseo

Village of Leicester

Town of Leicester

Wyoming County Water Resources Agency System

Wyoming County

Village of Mount Morris

Town of Groveland

Town of Conesus

Village of Livonia

Town of Livonia

Conesus Lake

Honeoye Lake

Hemlock Lake

Canadice Lake

Ontario County

Silver Lake

Town of Mount Morris

Town of Sparta

Town of Springwater

Town of West Sparta

Village of Nunda

Town of Nunda

Town of Portage

Village of Dansville

Town of North Dansville

Town of Ossian

Steuben County

Allegany County

MAP SHEET:

MAP 5-6A

MAP TITLE:

Conesus Lake
Village of Geneseo WTP
Alternative Service Areas 1-5

DATE PREPARED:

NOVEMBER 22, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Existing Waterlines
- Under design/Construction
- New/Upgrade
- Pump Station Upgrade
- Water Trmt. Plant Upgrade
- Water Tank Upgrade

N W E S

Miles
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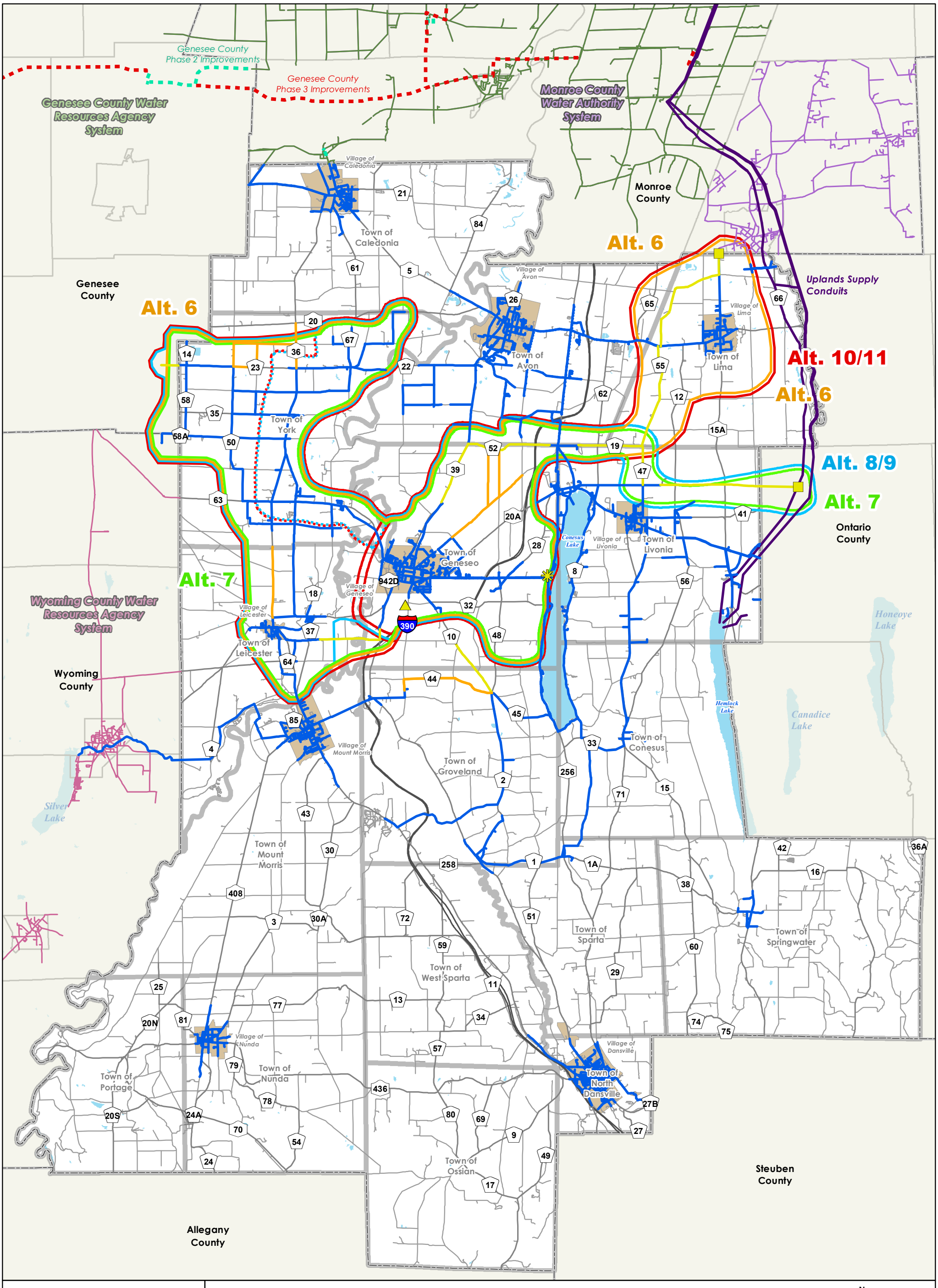

MAP SHEET:

MAP 5-6B

MAP TITLE:

Conesus Lake
Village of Geneseo WTP
Alternative Service Areas 6-11

DATE PREPARED:

NOVEMBER 22, 2020

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1. Water quantity – Upgrade the Village of Geneseo WTP (1.0 mgd)

Any increase in capacity at the Village of Geneseo's current WTP would require a new WTP to be constructed, as sufficient room for an expansion does not existing at the current location. A new WTP would address long-term capacity in the Town and Village of Geneseo, as well as the Town of York and Town and Village of Leicester. Construction of a new WTP would provide the water capacity required to promote additional Town of Geneseo and/or Town of York water expansion and potentially offer additional water for other surrounding communities such as the Town and Village of Mount Morris or LCWSA Consolidated District.

Increasing the treatment capacity by 1.0 mgd would max out the Village at their permitted withdrawal of 3.0 mgd. The upgrades would include but are not limited to, additional filter(s), disinfection equipment, and pump upgrades.

The estimated capital cost for constructing a new WTP for the Village of Geneseo is $42,000,000.

2. Water quantity – New 500,000 gallon water storage tank

The current location of the Village water treatment plant along West Lake Road is compact and will not allow for additional infrastructure to be constructed on site. Peak water production at the Village of Geneseo water treatment plant has reached 2.192 mgd. This has only occurred once since 2017 and the treatment plants normal max day usage is around 1.6 mgd.

The plant could operate at current capacity for the foreseeable future with no significant upgrades. This would limit the flow available for expansion in the area served by the Geneseo WTP, serving mainly existing customers only.

Considering that the average usage or production at the plant is 0.949 mgd, an additional 500,000 gallon water storage tank would provide the necessary capacity required during peak events for additional water users that may be added to the system over the next 30 years. Since the current location of the Village treatment plant will not allow for additional infrastructure to be constructed on site, the addition of a new water storage tank would be a more cost-effective solution to provide additional capacity during peak events without having to construct a new treatment plant. This alternative would allow for additional water users by utilizing storage to address peak demands. In doing so, there is more capacity available at the treatment plant to allow for additional users. A new 500,000 gallon water storage tank would provide adequate water storage and fire flow capacity for the entire system during peak events.

The estimated capital cost for a new storage tank is $1,050,000.

3. *Continue WTP operations at the current capacity of 2.0 mgd*

If there are no capacity upgrades completed at the WTP, the Village of Geneseo could continue operation of the WTP at its current capacity. This alternative would have a very low capital cost, but would limit future development in the municipalities served (Village of Geneseo, Town of Geneseo, Town of York). Additionally, the WTP could continue to experience larger peak events, causing potential water shortages during these events.

The estimated capital cost of this alterative is $100,000.

4. *New source/interconnection - Continue WTP operations at the current capacity of 2.0 mgd and connect to the Monroe County Water Authority system in the Town of Pavilion (1.0 mgd)*

The Town of York, receives its water from the Village of Geneseo and could connect to the Monroe County Water Authority system (Lake Ontario) in the Town of Pavilion, Wyoming County. This connection would provide the Town of York and potentially the Town and Village of Leicester with 1.0 mgd supply. In doing so, up to 1.0 mgd of capacity currently designated for the Town of York from the Village of Geneseo WTP would be directed back to the Village. This would support future growth in the Town and Village of Geneseo, while addressing peak flow concerns. The current connection along NYS Route 63 from the Village of Geneseo to the Town of York would be a closed valve during normal operation but remain functional for a system interconnection and the potential to supply additional water to the Town of York during peak events.

The Town of York connection to the MCWA system would consist of a 12-inch water main and a pressure reducing valve to meet the hydraulic grade in the Town of York.

The estimated capital cost of this connection is $834,400.

5. *New source/interconnection - Continue WTP operations at the current capacity of 2.0 mgd and connect to the Monroe County Water Authority system in the Town of Pavilion (0.5 mgd)*

The Town of York, which receives its water from the Village of Geneseo, could connect to the Monroe County Water Authority system (Lake Ontario) in the Town of Pavilion, Wyoming County. This connection would provide the Town of York and potentially the Town and Village of Leicester with 0.5 mgd supply. In doing so, approximately 0.5 mgd of capacity currently designated for the Town of York from the Village of Geneseo WTP would be directed back to the Village. This would support future growth in the Town and Village of Geneseo, while addressing peak flow concerns. The current connection along NYS Route 63 from the Village of Geneseo to the Town of York would continue to be metered to supply water to the Town of York as necessary.

The Town of York connection to the MCWA system would consist of a 12-inch water main and a pressure reducing valve to meet the hydraulic grade in the Town of York.

The estimated capital cost of this connection is $834,400.

6. *New Source - Upgrades to the Village of Lima Pump Station and new transmission main (3.5 mgd)*

If the Village of Geneseo decides to decommission their WTP, a new transmission main could be installed from the Village of Lima's existing pump station bypassing any infrastructure restrictions in the Village of Lima, completely replacing the Village of Geneseo's Conesus Lake Supply. Additionally, the pump station would need to be expanded and upgraded to supply an additional 3.5 mgd to fulfill projected demands in 2050 for the Villages of Geneseo and Leicester, as well as the Towns of Geneseo, Leicester and York. Construction would consist of upgrading the existing pump station, a 20-inch and 16-inch water main minimum to the new supplemental interconnection currently being constructed along NYS Route 5&20 between the Town of Lima and Town of Avon, and potentially a 3,000,000 gallon water storage tank.

The estimated capital cost of the interconnection is approximately $30,131,850.

7. *New Source – LCWSA New pump station and transmission main (3.5 mgd)*

Similar to Alternative #6, if the Village of Geneseo decides to decommission the WTP, a second option to completely replace this supply is a new transmission main, pump station, and connection to the City of Rochester's Hemlock Lake transmission mains. The pump station would need to be capable of producing 3.5 mgd to fulfil projected demands in 2050 for the Villages of Geneseo and Leicester, as well as the Towns of Geneseo, Leicester and York. Construction would consist of the installation of a new pump station, a 20-inch and 16-inch water main minimum, and potentially a 3,000,000 gallon water storage tank. This new pump station and transmission main is discussed in further detail in Section 5.6.2.

The estimated capital cost of the interconnection is approximately $31,512,250.

8. *New Source - New pump station and transmission main (2.25 mgd) in conjunction with Alternative #4*

Alternative #8 includes a new transmission main, pump station, and connection to the City of Rochester's Hemlock Lake transmission mains. The pump station would need to be capable of producing 2.25 mgd. Construction would consist of the installation of a new pump station, a 20-inch and 16-inch water main minimum, and potentially a 3,000,000 gallon water storage tank. This new pump station and transmission main is discussed in further detail in Section 5.6.2.

Concurrent with these upgrades and improvement, would include the connection from the Town of York to the MCWA system in the Town of Pavilion (Alternative #4). This connection would provide an additional 1.0 mgd. The combination of these two projects would completely replace the Village of Geneseo's WTP.

The estimated capital cost of both these alternatives is approximately $32,234,650.

9. *New Source – New pump station and transmission main (2.75 mgd) in conjunction with Alternative #5*

Alternative #9 includes a new transmission main, pump station, and connection to the City of Rochester Hemlock Lake transmission mains. The pump station would need to be capable of producing 2.75 mgd. Construction would consist of the installation of a new pump station, a 20-inch and 16-inch water main minimum, and potentially a 3,000,000 gallon water storage tank. This new pump station and transmission main is discussed in further detail in Section 5.6.2.

Concurrent with these upgrades and improvements, is the connection from the Town of York to the MCWA system in the Town of Pavilion (Alternative #5). This connection would provide an additional 0.5 mgd. The combination of these two projects would completely replace the Village of Geneseo's WTP.

The estimated capital cost of these alternatives combined is approximately $32,276,650.

10. *New Source - Upgrades to the Village of Lima Pump Station and new transmission main (2.75) in conjunction with Alternative #5*

Alternative #10 includes a new transmission main that could be installed from the Village of Lima's existing pump station bypassing any infrastructure restrictions in the Village of Lima. Additionally, the pump station would need to be expanded and upgraded to supply 2.75 mgd. Construction would consist of upgrading the existing pump station, a 20-inch and 16-inch water main minimum to the new supplemental interconnection currently being constructed along NYS Route 5&20 between the Town of Lima and Town of Avon, and potentially a 3,000,000 gallon water storage tank.

Concurrent with these upgrades and improvements, is the connection from the Town of York to the MCWA system in the Town of Pavilion (Alternative #5). This connection would provide an additional 0.5 mgd. The combination of these two projects would completely replace the Village of Geneseo's WTP.

The estimated capital cost of these alternatives combined is approximately $30,896,250.

11. New Source - Upgrades to the Village of Lima Pump Station and new transmission main (2.25 mgd) in conjunction with Alternative #4

Alternative #11 includes a new transmission main that could be installed from the Village of Lima's existing pump station bypassing any infrastructure restrictions in the Village of Lima. Additionally, the pump station would need to be expanded and upgraded to supply 2.25 mgd. Construction would consist of upgrading the existing pump station, a 20-inch and 16-inch water main minimum to the new supplemental interconnection currently being constructed along NYS Route 5&20 between the Town of Lima and Town of Avon, and potentially a 3,000,000 gallon water storage tank.

Concurrent with these upgrades and improvement, is the connection from the Town of York to the MCWA system in the Town of Pavilion (Alternative #4). This connection would provide an additional 1.0 mgd. The combination of these two projects would completely replace the Village of Geneseo's WTP.

The estimated capital cost of these alternatives combined is approximately $30,854,250.

There is opportunity to potentially increase the size and hydraulic grade of the proposed water storage tank, discussed in the recent Town and Village of Avon joint study, in the southern portion of the Town of Avon to replace the proposed water storage tank in Alternatives #6-11. This option would require a cost sharing agreement with the Town and Village of Avon. If this opportunity is considered, the cost from the above alternatives requiring a water storage tank would be reduced.

5.6 Hemlock/Canadice Lakes (*Map 5-7)*

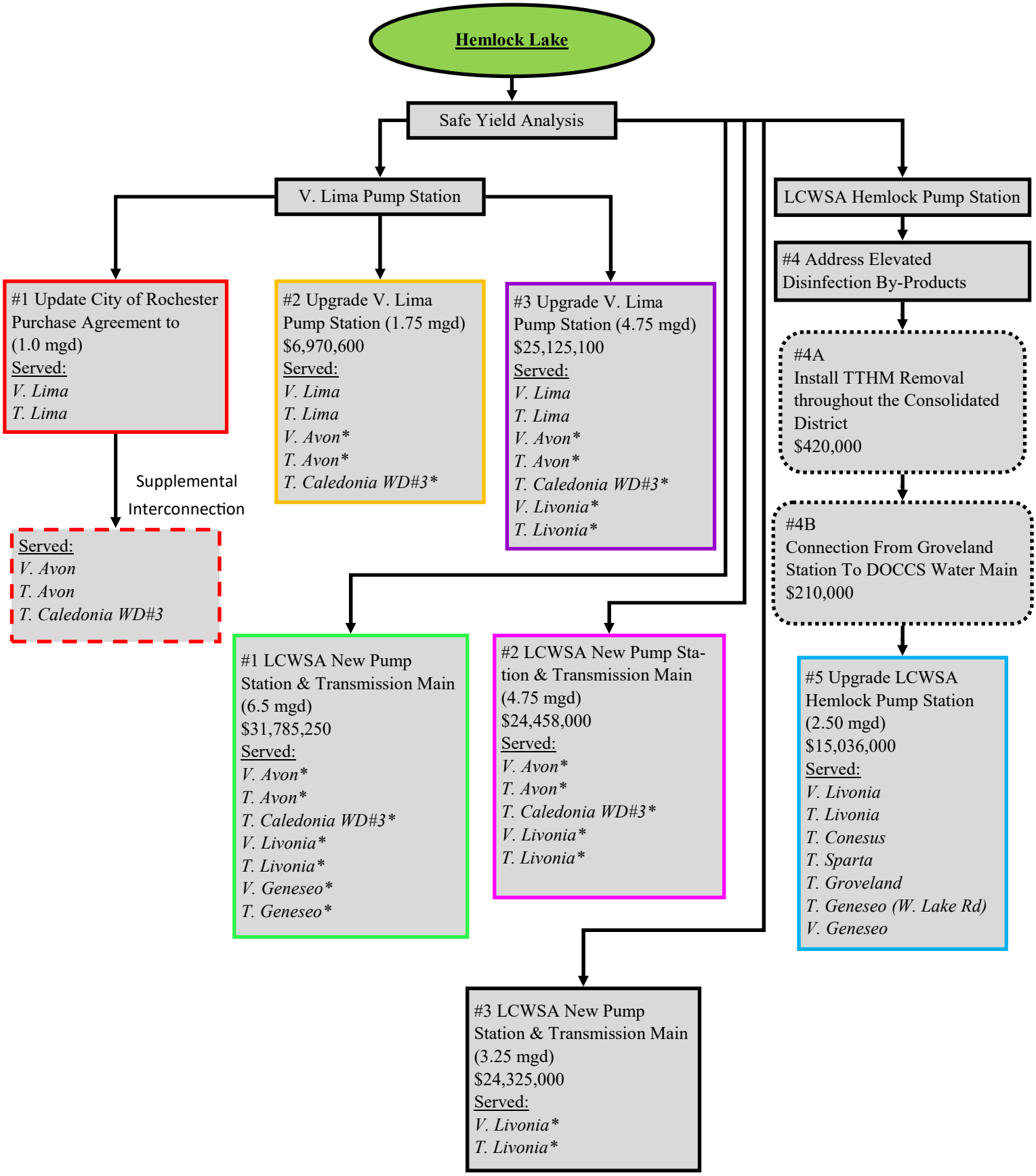
A safe yield analysis should be completed prior to selecting any future alternatives to determine whether any additional water should be withdrawn from Hemlock/Canadice Lakes. The existing study for the Lakes dates back to the 1940's (see Section 3.2).

5.6.1 Village of Lima Pump Station

There are several alternatives to consider for the Village of Lima pump station. Those alternatives include: staying operational at the same capacity, upgrade capacity to 1.75 mgd, or upgrade capacity to 4.75 mgd, plus any additional alternatives that were presented in Sections 5.5.1 and 5.5.2.

1. Update the City of Rochester purchase agreement to 1.0 mgd

Currently, the pump station serves the Village and a portion of the Town of Lima, but frequently exceeds the maximum daily usage in their agreement with the City of Rochester.


Hemlock Lake
Safe Yield Analysis
V. Lima Pump Station
LCWSA Hemlock Pump Station
#1 Update City of Rochester Purchase Agreement to (1.0 mgd)
Served:
V. Lima
T. Lima
#2 Upgrade V. Lima Pump Station (1.75 mgd)
$6,970,600
Served:
V. Lima
T. Lima
V. Avon*
T. Avon*
T. Caledonia WD#3*
#3 Upgrade V. Lima Pump Station (4.75 mgd)
$25,125,100
Served:
V. Lima
T. Lima
V. Avon*
T. Avon*
T. Caledonia WD#3*
V. Livonia*
T. Livonia*
#4 Address Elevated Disinfection By-Products
#4A
Install TTHM Removal throughout the Consolidated District
$420,000
#4B
Connection From Groveland Station To DOCCS Water Main
$210,000
Supplemental Interconnection
Served:
V. Avon
T. Avon
T. Caledonia WD#3
#1 LCWSA New Pump Station & Transmission Main (6.5 mgd)
$31,785,250
Served:
V. Avon*
T. Avon*
T. Caledonia WD#3*
V. Livonia*
T. Livonia*
V. Geneseo*
T. Geneseo*
#2 LCWSA New Pump Station & Transmission Main (4.75 mgd)
$24,458,000
Served:
V. Avon*
T. Avon*
T. Caledonia WD#3*
V. Livonia*
T. Livonia*
#5 Upgrade LCWSA Hemlock Pump Station (2.50 mgd)
$15,036,000
Served:
V. Livonia
T. Livonia
T. Conesus
T. Sparta
T. Groveland
T. Geneseo (W. Lake Rd)
V. Geneseo
#3 LCWSA New Pump Station & Transmission Main (3.25 mgd)
$24,325,000
Served:
V. Livonia*
T. Livonia*

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Monroe County

Genesee County

Uplands Supply Conduits

Alt. 3 (Lima)

Alt. 2 (Lima)

Alt. 1 (Lima)

Alt.1 (LCWSA)

Alt. 2 (LCWSA)

Alt. 3 (LCWSA)

Alt. 5 (LCWSA)

Ontario County

Wyoming County Water Resources Agency System

Wyoming County

Steuben County

Allegany County

Village of Caledonia
Town of Caledonia
Village of Avon
Town of Avon
Village of Lima
Town of Lima
Town of York
Town of Geneseo
Village of Geneseo
Village of Leicester
Town of Leicester
Village of Mount Morris
Town of Mount Morris
Town of Groveland
Village of Livonia
Town of Livonia
Town of Conesus
Town of Sparta
Town of Springwater
Town of West Sparta
Village of Nunda
Town of Nunda
Town of Portage
Village of Dansville
Town of North Dansville
Town of Ossian

Conesus Lake
Hemlock Lake
Canadice Lake
Honeoye Lake
Silver Lake

MAP SHEET:
MAP 5-7

MAP TITLE:
Hemlock Lake
City of Rochester
Alternative Service Areas

DATE PREPARED:
DECEMBER 30, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Existing Waterlines
- New/Upgrade
- Pump Station Upgrade

N W E S

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The current agreement permits a maximum daily usage of 0.275 mgd, but the Village has several max day usages reaching up to 0.637 mgd.

The Village of Lima could renegotiate with the City of Rochester to increase their purchase agreement to 1.0 mgd per day. This would keep the Village compliant with their agreement based on projected usage over the next 30 years. The Village also needs to amend their agreement with the City of Rochester to include the Village and Town of Avon as potential users in an emergency situation to reflect the current interconnection being installed along NYS Route 5&20.

There is no cost directly associated with the Village of Lima amending the current purchasing agreement to reflect a maximum daily usage of 1.0 mgd.

2. Water Quantity - Upgrades to the Village of Lima Pump Station (1.75 mgd)

The pump station could be expanded and upgraded to 1.75 mgd to fulfill projected demands in the Towns of Avon, Caledonia (Water District #3), and Lima, as well as the Villages of Lima and Avon. This alternative does not imply the Village of Avon is discontinuing their WTP, but presents the opportunity to discontinue and provides a redundant supply for emergency purposes.

Construction would consist of upgrading the existing pump station, electrical improvements, and a 20-inch water main minimum to the new supplemental interconnection currently being constructed along NYS Route 5&20.

The estimated capital cost of the interconnection is approximately $6,970,600.

3. Water Quantity - Upgrades to the Village of Lima Pump Station (4.75 mgd)

The pump station could be expanded and upgraded 4.75 mgd to fulfill projected demands in the Towns of Avon, Caledonia (Water District #3), Livonia and Lima, as well as the Villages of Livonia, Lima and Avon. This alternative does not imply the Village of Avon is discontinuing their WTP, but presents the opportunity to discontinue and provides a redundant supply for emergency purposes. These upgrades would provide adequate water supply for projected demands at the proposed Gateway Park in Livonia while freeing up capacity in LCWSA's Consolidated District to send elsewhere in the system, preferably the southern portion.

The proposed upgrades for a 4.75 mgd increase at the pump station would include, but are not limited to: building expansion, pump replacement, electrical improvements, a 20-inch transmission main, and potentially a 3,000,000 gallon water storage tank.

The estimated capital cost for these upgrades is $25,125,100.

There is opportunity to potentially increase the size and hydraulic grade of the proposed water storage tank, discussed in the recent Town and Village of Avon joint study, as part of Alternatives #2 and #3. This option would require a cost sharing agreement with the Town and Village of Avon. If this opportunity is considered, the cost from the above alternatives requiring a water storage tank would be reduced.

5.6.2 LCWSA New Pump Station and Transmission Main

A new pump station connecting to the City of Rochester Hemlock Lake transmission mains, in or near the Town of Richmond, and a new transmission main provides the potential to supply future demands to several different municipalities. This alternative would be designed to serve northern Livonia and Lakeville and would provide a redundant source connection that could easily serve these areas without making major alterations to the Consolidated District. There are several different opportunities for regional coordination of municipalities to connect to this transmission main and benefit from a redundant interconnection or supply replacement. The following alternatives could be considered in addition to the alternatives discussed in Sections 5.5.1 and 5.5.2:

1. Water Quantity – LCWSA New pump station and transmission main (6.50 mgd)

Alternative #1 consists of a new pump station and transmission main to supply 6.50 mgd to the Town and Village of Livonia, Town and Village of Avon, Town and Village of Geneseo and the Town of Caledonia Water District #3. Construction would consist of a new connection to the Hemlock Lake transmission mains, new pump station capable of meeting demands up to 6.50 mgd, a 3,000,000 gallon water storage tank, and 20-inch and 16-inch minimum transmission mains sized to potentially supply up to 8.0 mgd. This alternative would be utilized if the Village of Geneseo and Avon decommission their water treatment plants. This alternative would also provide the necessary flow to meet projected demands at the proposed Gateway Park.

The estimated capital cost of this alternative is $31,785,250.

2. Water Quantity – LCWSA New pump station and transmission main (4.75 mgd)

Alternative #2 consists of the new pump station and transmission main to supply 4.75 mgd to the Town and Village of Livonia, Town and Village of Avon, and the Town of Caledonia Water District #3. Construction would consist of a new connection to the Hemlock Lake transmission main, a new pump station capable of meeting demands up to 4.75 mgd, a 3,000,000 gallon water storage tank, and 20-inch and 16-inch minimum transmission mains sized to potentially supply up to 8.0 mgd. This alternative would be utilized if the Village of Avon discontinues operations at their WTP. This alternative would also provide the necessary flow to meet projected demands at the proposed Gateway Park.

The estimated capital cost of this alternative is $24,458,000.

3. Water Quantity – LCWSA New pump station and transmission main (3.25 mgd)

Alternative #3 consists of a new pump station and transmission main to supply 3.25 mgd to the Town and Village of Livonia. Construction would consist of a new connection to the Hemlock Lake transmission mains, a new pump station capable of meeting demands up to 3.25 mgd, a 3,000,000 gallon water storage tank, and 20-inch and 16-inch minimum transmission mains sized to potentially supply up to 8.0 mgd. This alternative would provide the necessary flow to meet projected demands at the proposed Gateway Park.

The estimated capital cost of this alternative is $24,325,000.

There is opportunity to potentially increase the size and hydraulic grade of the proposed water storage tank, discussed in the recent Town and Village of Avon joint study, as part of each of the alternative presented above. This option would require a cost sharing agreement with the Town and Village of Avon. If this opportunity is considered, the cost from the above alternatives requiring a water storage tank would be reduced.

In each of the alternatives described above and in Sections 5.5.1 and 5.5.2, the proposed transmission main to the new pump station would be sized to accommodate up to 8.0 mgd. This demand would allow for redundant supply to the Towns of Avon, Geneseo, Mount Morris, York, and Caledonia Water District#3, as well as the Villages of Avon, Geneseo and Mount Morris. This would also allow for the Town and Village of Livonia to be completely served, although only a portion of each is intended to be supplied based on their current distribution system operations. It is not anticipated that the Villages of Avon, Geneseo or Mount Morris will discontinue operations, but sizing the transmission main to serve as a redundant supply to these water treatment plants would help address the Department of Health's desire and recommendation for system interconnections, while provide the opportunity for any of the communities above to be supplied. Designing and constructing a transmission main capable of providing 8.0 mgd would provide significant long-term cost savings even though current demand does not require the 8.0 mgd.

5.6.3 LCWSA Hemlock Pump Station

LCWSA's Hemlock pump station has limited room for expansion due to distribution infrastructure restrictions. Lack of sufficiently sized water main and available water pressure limits the potential service area that the Hemlock Pump Station can supply. The Town and Village of Livonia, currently served by the pump station, will require a significant amount of water in the near future to fulfill projected demands in the proposed Gateway Park.

4. Water Quality – Address elevated disinfection by-products

LCWSA's Consolidated District, supplied by the Hemlock pump station, has TTHM concerns that need to be addressed. As mentioned in Section 4.7, LCWSA recently received a consent order from the EPA, as elevated TTHM levels above the maximum contaminant level in the Consolidated District have occurred. Below are two option available to lower elevated TTHM levels in the distribution system:

A. Install TTHM removal systems in all tanks throughout the system.

   The estimated capital cost for this installation is $420,000.

B. Connect Groveland Station to the recently installed DOCCS water main. The southern portion of the Consolidated District, mainly the Town of Groveland, has elevated TTHM levels exceeding the maximum contaminate level due to water age. This connection would eliminate a dead end and contribute to looping the system. In doing so, it would not eliminate the water age in this southern area but would move the aged water to a different location where it can more easily be addressed. Construction would consist of a 12-inch water main and a pressure reducing valve.

   The capital cost for this alternative is $210,000.

5. Water Quantity - Upgrades to the LCWSA Hemlock Pump Station (2.50 mgd)

A potential alternative to address projected demands is to upgrade the Hemlock pump station to 2.5 mgd and install a new transmission main from the pump station around the Village to northern Livonia and the Lakeville area. This would allow additional water to be supplied to the southern and far most western portion of the Consolidated District, fulfilling demands of the potential interconnections and supply options discussed previously in this section. To implement this alternative, LCWSA may need to negotiate new purchase agreements with the City of Rochester for the additional water demand over the currently allocated 3.0 mgd for LCWSA and 1.0 mgd for the Village of Livonia. Construction would consist of building expansion, electrical improvements, a 16-inch transmission main, a 3,000,000 gallon water storage tank, and several operational adjustments.

The estimated capital cost for these upgrades is $15,036,000.

As mentioned previously, this alternative could involve a cost sharing agreement with the Town and Village of Avon for the proposed water storage tank.

5.7 Lake Ontario (*Map 5-8)*

5.7.1 Village of Caledonia – MCWA Pump Station

Due to distribution infrastructure restrictions throughout the Village of Caledonia, upgrading the Village pump station beyond minor increased demands in the Town and Village is very unlikely without installing additional infrastructure to bypass the Village.

1. *Water Quantity – Upgrade the Village of Caledonia Pump Station (0.25mgd)*

The Village of Caledonia could upgrade the pump station to 0.25 mgd to address future demands in the Town and Village over the next 30 years. This option would require pump replacement and potentially minor electrical upgrades.

The estimated capital cost of these upgrades is $245,000.

2. *Water quantity/quality – Connection the Town of Caledonia Water District #1 to Water District #3*

Assuming Alternative #1 is implemented, water main would be installed along NYS Route 5, connecting Water District #1 and #3 while creating an interconnection between the Village of Avon. Construction would consist of a 12-inch water main minimum and a booster pump station to meet the higher hydraulic grade in the Town and Village of Avon. Due to the location of Water District #3 and the operations of the Village and Town of Avon water systems, TTHM levels are generally elevated and at times over the maximum contaminant level. In addition to increasing capacity to serve more residents, switching the supply/source should reduce TTHMs to a more acceptable level.

The estimated capital cost of the interconnection is approximately $3,797,500.

3. *Water quantity/quality – Connection the Town of Caledonia Water District #1 to the Town of York*

Water main would be installed along NYS Route 36, creating an interconnection with the Town of York. Construction would consist of a 12-inch water main minimum and a booster pump station to meet the higher hydraulic grade in the Town of York.

The estimated capital cost of the interconnection is approximately $3,806,250.

5.7.2 New MCWA Supply

Monroe County Water Authority could be a potential option for additional supply in the County, but there are very significant costs associated with this. Although MCWA has plenty of allocation from Lake Ontario, there are major distribution infrastructure restrictions to

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Lake Ontario

V. Caledonia Pump Station Continue Operation

#1 Upgrade V. Caledonia Pump Station (0.25 mgd)
$245,000
Served:
V. Caledonia
T. Caledonia WD#1

Supplementary Interconnection

#2 Connect T. Caledonia WD#1 to T. Caledonia WD#3
$3,797,500
Served:
*T. Caledonia WD#3**
*V. Avon**
*T. Avon**

Supplementary Interconnection

#3 Connect T. Caledonia WD#1 to T. York
$3,806,250
Served:
*T. York**

Discontinue V. Avon, V. Geneseo, V. Mt Morris WTP

#1 MCWA Connection
(5.5 mgd)
$73,425,000
Served:
*T. York**
*V. Geneseo**
*T. Geneseo**
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**
*T. Leicester**
*V. Leicester**
*V. Mt Morris**
*T. Mt Morris**

#2 MCWA Connection
(6.5 mgd)
$86,775,000
Served:
*T. York**
*V. Geneseo**
*T. Geneseo**
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**
*T. Leicester**
*V. Leicester**
*V. Mt Morris**
*T. Mt Morris**

Redundant Interconnection

Served:
*V. Lima**
*T. Lima**

Discontinue V. Avon, V. Geneseo WTP

#3 MCWA Connection
(4.25 mgd)
$56,737,500
Served:
*T. York**
*V. Geneseo**
*T. Geneseo**
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

#4 MCWA Connection
(5.25 mgd)
$70,087,500
Served:
*T. York**
*V. Geneseo**
*T. Geneseo**
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

Redundant Interconnection

Served:
*V. Lima**
*T. Lima**

Discontinue V. Avon, V. Mt Morris WTP

#5 MCWA Connection
(3.75 mgd)
$50,062,500
Served:
*T. York**
*V. Mt Morris**
*T. Mt Morris**
*T. Leicester**
*V. Leicester**
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

#6 MCWA Connection
(4.75 mgd)
$63,412,500
Served:
*T. York**
*V. Mt. Morris**
*T. Mt. Morris**
*T. Leicester**
*V. Leicester**
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

Redundant Interconnection

Served:
*V. Lima**
*T. Lima**

Discontinue V. Geneseo, V. Mt Morris WTP

#7 MCWA Connection
(4.0 mgd)
$53,400,000
Served:
T. York
*V. Geneseo**
*T. Geneseo**
*V. Mt. Morris**
*T. Mt Morris**
*T. Leicester**
*V. Leicester**

Discontinue V. Mt Morris WTP

#8 MCWA Connection
(2.25 mgd)
$30,037,500
Served:
*T. York**
*V. Mt Morris**
*T. Mt Morris**
*T. Leicester**
*V. Leicester**

#9 MCWA Connection
(4.0 mgd)
$53,400,000
Served:
*T. York**
*V. Mt Morris**
*T. Mt Morris**
*T. Leicester**
*V. Leicester**

Redundant Interconnection

Served:
*V. Geneseo**
*T. Geneseo**

Discontinue V. Geneseo WTP

#10 MCWA Connection
(2.75 mgd)
$36,712,500
Served:
*T. York**
*V. Geneseo**
*T. Geneseo**

#11 MCWA Connection
(3.25 mgd)
$43,387,500
Served:
*T. York**
*V. Geneseo**
*T. Geneseo**

Redundant Interconnection

Served:
*T. Leicester**
*V. Leicester**

Discontinue V. Avon WTP

#12 MCWA Connection
(2.5 mgd)
$33,375,000
Served:
*T. York**
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

#13 MCWA Connection
(3.5 mgd)
$46,725,000
Served:
*T. York**
*V. Avon**
*T. Avon**
*T. Caledonia WD#3**

Redundant Interconnection

Served:
*V. Lima**
*T. Lima**

Genesee County Phase 2 Improvements

Genesee County Phase 3 Improvements

Genesee County Water Resources Agency System

Monroe County Water Authority System

Alt. 1 (Caledonia)

Alt. 2 (Caledonia)

Alt. 3 (Caledonia)

Alt. 5/6

Alt. 3/4

Alt. 12/13

Alt. 7

Alt. 8/9

Alt. 1/2

Alt. 10/11

Uplands Supply Conduits

Wyoming County Water Resources Agency System

Village of Caledonia

Town of Caledonia

Village of Avon

Town of Avon

Village of Lima

Town of Lima

Town of York

Town of Geneseo

Village of Geneseo

Village of Leicester

Town of Leicester

Village of Mount Morris

Town of Groveland

Town of Conesus

Village of Livonia

Town of Livonia

Conesus Lake

Hemlock Lake

Canadice Lake

Honeoye Lake

Silver Lake

Village of Nunda

Town of Nunda

Town of Portage

Town of West Sparta

Town of Sparta

Town of Springwater

Village of Dansville

Town of North Dansville

Town of Ossian

Genesee County

Monroe County

Ontario County

Wyoming County

Steuben County

Allegany County

MAP SHEET:

FIGURE 5-8

MAP TITLE:

Lake Ontario/MCWA Alternative Service Areas

DATE PREPARED:

DECEMBER 30, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Existing Waterlines
- New/Upgrade

N W E S

0 0.5 1 2 Miles

ARCHITECTURE ENGINEERING PLANNING CPLteam.com

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overcome to have over 1.0 mgd of water available to Livingston County. Similar to the Genesee County Phase 2 Water Supply project currently under construction, several upgrades to existing facilities and the installation of new infrastructure would be required within Livingston County and between it and MCWAs water treatment plants to move water to the County. The infrastructure that currently provides MCWA water to select locations within Livingston County restricts the extent of distribution. To provide additional MCWA water within Livingston County, improvements would include, but are not limited to, large diameter transmission mains, upgrading existing pump stations, constructing new pump station(s), alterations to the current operation of the MCWA distribution system, and potential WTP upgrades. The extent of infrastructure development/ upgrades is dependent on the amount of water Livingston County needs to provide for existing and future users, whether it is for additional supply, new supply or redundancy.

Water supply from MCWA could be utilized for redundant interconnection, but the following alternatives were catered around any combination of the water treatment plants in the Villages of Avon, Geneseo or Mount Morris discontinuing operation:

1. *Water Quantity - Villages of Avon, Geneseo and Mount Morris discontinue operation (5.5 mgd)*

Alternative #1 would provide 5.5 mgd to the Towns of Avon, Caledonia Water District #3, Geneseo, Leicester, Mount Morris and York, as well as the Villages of Avon, Geneseo, Leicester and Mount Morris.

The estimated capital cost associated with this alternative is $73,425,000.

2. *Water Quantity - Villages of Avon, Geneseo and Mount Morris discontinue operation (6.5 mgd)*

Alternative #2 would provide 6.5 mgd to the Towns of Avon, Caledonia Water District #3, Geneseo, Leicester, Mount Morris, and York, as well as the Villages of Avon, Geneseo, Leicester and Mount Morris. Additionally, this would provide a redundant interconnection to the Town and Village of Lima.

The estimated capital cost associated with this alternative is $86,775,000.

3. *Water Quantity - Villages of Avon and Geneseo discontinue operation (4.25 mgd)*

Alternative #3 would provide 4.25 mgd to the Towns of Avon, Caledonia Water District #3, Geneseo, and York, as well as the Villages of Avon and Geneseo.

The estimated capital cost associated with this alternative is $56,737,500.

4. Water Quantity - Villages of Avon and Geneseo discontinue operation (5.25 mgd)

Alternative #4 would provide 5.25 mgd to the Towns of Avon, Caledonia Water District #3, Geneseo, and York, as well as the Villages of Avon and Geneseo. Additionally, this would provide a redundant interconnection to the Town and Village of Lima.

The estimated capital cost associated with this alternative is $70,087,500.

5. Water Quantity - Villages of Avon and Mount Morris discontinue operation (3.75 mgd)

Alternative #5 would provide 3.75 mgd to the Towns of Avon, Caledonia Water District #3, Leicester, Mount Morris, and York, as well as the Villages of Avon, Leicester and Mount Morris.

The estimated capital cost associated with this alternative is $50,062,500.

6. Water Quantity - Villages of Avon and Mount Morris discontinue operation (4.75 mgd)

Alternative #6 would provide 4.75 mgd to the Towns of Avon, Caledonia Water District #3, Leicester, Mount Morris, and York, as well as the Villages of Avon, Leicester, and Mount Morris. Additionally, this would provide a redundant interconnection to the Town and Village of Lima.

The estimated capital cost associated with this alternative is $63,412,500.

7. Water Quantity - Villages of Geneseo and Mount Morris discontinue operation (4.0 mgd)

Alternative #7 would provide 4.0 mgd to the Towns of Geneseo, Leicester, Mount Morris, Leicester, and York, as well as the Villages of Geneseo, Leicester and Mount Morris.

The estimated capital cost associated with this alternative is $53,400,000.

8. Water Quantity - Village of Mount Morris discontinues operation (2.25 mgd)

Alternative #8 would provide 2.25 mgd to the Towns of Leicester, Mount Morris, and York, as well as the Villages of Mount Morris and Leicester.

The estimated capital cost associated with this alternative is $30,037,500.

9. Water Quantity - Village of Mount Morris discontinues operation (4.0 mgd)

Alternative #9 would provide 4.0 mgd to the Towns of Leicester, Mount Morris, and York, as well as the Villages of Mount Morris and Leicester. Additionally, this would provide a redundant interconnection to the Town and Village of Geneseo and Town of York.

The estimated capital cost associated with this alternative is $53,400,000.

10. Water Quantity - Village of Geneseo discontinues operation (2.75 mgd)

Alternative #10 would provide 2.75 mgd to the Towns of Geneseo and York, as well as the Village of Geneseo.

The estimated capital cost associated with this alternative is $36,712,500.

11. Water Quantity - Village of Geneseo discontinues operation (3.25 mgd)

Alternative #11 would provide 3.25 mgd to the Towns of Geneseo and York, as well as the Village of Geneseo. Additionally, this would provide a redundant interconnection to the Town and Village of Leicester.

The estimated capital cost associated with this alternative is $43,387,500.

12. Water Quantity - Village of Avon discontinues operation (2.50 mgd)

Alternative #12 would provide 2.5 mgd to the Towns of Avon, Caledonia Water District #3 and York, as well as the Village of Avon.

The estimated capital cost associated with this alternative is $33,375,000.

13. Water Quantity - Village of Avon discontinues operation (3.50 mgd)

Alternative #13 would provide 3.5 mgd to the Towns of Avon, Caledonia Water District #3 and York, as well as the Village of Avon. Additionally, this would provide a redundant interconnection to the Town and Village of Lima.

The estimated capital cost associated with this alternative is $46,725,000.

5.8 Water Operations and Maintenance

5.8.1 Shared Services

County-wide shared services could simplify operations and eliminate deficiencies within some water systems in Livingston County. Some of the main items that would be included are billing, water related purchases, and operations. Pooling resources and streamlining operations and decision making can greatly increase efficiency, reduce costs, and increase water quality.

Almost every water system in Livingston County completes their own billing. There are 17 water departments, 17 different billing systems, at least 17 billing clerks, collections, and meter reading equipment. The thought of full consolidation is concerning for the majority

of the municipalities but entering into an agreement with an entity such as the LCWSA to complete billing services for a set fee could result in substantial savings while not giving up full control.

Water related purchases would include any equipment or supplies that are used frequently such as chlorine, lab supplies, water service piping, and water meters. The majority of the municipalities make these purchases on their own, eliminating the potential for discounted costs based on bulk purchases.

Shared operators and operation services would have a significant impact on every water system, but more importantly on smaller municipalities with low and limited budgets. As discussed previously, it has become more difficult to find and hire certified water operators. Many municipalities do not have the resources or funding to train new operators. Livingston County could work through the hiring process and manage water operators amongst water systems, eliminating this task for individual municipalities. An alternative would be entering into an agreement for back-up coverage from a neighboring municipality during emergencies or scheduled vacation time.

5.8.2 Shared Equipment

Shared water system equipment available for all water systems in Livingston County would be a significant cost savings for each municipality and indirectly for all water users. Some equipment used to maintain a water system is rarely used and can have extremely expensive costs associated with it. In most cases, this equipment cannot be justified for purchasing by a single municipality. This equipment can be crucial to ensure the highest quality of water and could include leak detection, software, and GIS.

GIS Equipment

As noted in Section 4.4, the availability of GIS software and equipment is limited to the County level, with only a few municipalities having indirect access through consultants. Several municipalities in the County have experienced the benefits and efficiency that GIS provides for operation and almost all have expressed interest in having it available in the near future.

There are various approaches that could be taken within the County for GIS use, ranging from an enterprise based system in which the County hosts/maintains data and provides access to each community through a dedicated site to a bulk purchase of individual licenses for each community interested (the County could act in the capacity as the central administrator for billing, license maintenance aspects). The levels of GIS equipment vary significantly with costs ranging from $5,000 to $50,000, plus the costs of software, data management, and annual licensing. Municipal discounts are available and should be sought when purchasing software and hardware. The preferred approach for the County and the communities is an enterprise level system that is maintained by the County with individual sites available as needed. Erie County has a similar model in place as an example.

Additionally, GIS software (much like other programs) is being moved from downloaded applications to "software as a service" or SaaS in which programs are accessible through the cloud (off site servers). While the County itself would still benefit from a dedicated system, individual communities may be able to use these cloud based services depending on their level of use of GIS and available manpower to maintain/update data.

Software

Asset management is a process water and wastewater utilities can use to make sure that planned maintenance can be conducted and capital assets (pumps, motors, pipes, etc.) can be repaired, replaced, or upgraded on time and that there is enough money to pay for it.

Asset management is the practice of managing infrastructure capital assets to minimize the total cost of owning and operating these assets while delivering the desired service levels. Many utilities use asset management to pursue and achieve sustainable infrastructure. A high performing asset management program includes detailed asset inventories, operation and maintenance tasks, and long-range financial planning.

Each utility is responsible for making sure that its system stays in good working order regardless of the age of its components or the availability of additional funds. Asset management programs with good data including asset attributes (e.g., age, condition, and criticality), life cycle costing, proactive operations and maintenance, and capital replacement plans based on cost benefit analyses can be the most efficient method of meeting this challenge.

In the past, asset management included index cards with equipment listed on each card along with scheduled maintenance. Over time, this has evolved into computer based software that can speed up the adoption of an asset management strategy as well as make it more successful. These systems are designed to help utilities meet their asset management goals, including:

- Lifecycle planning and management
- Organization of unique asset hierarchies
- Seamless integration with GIS (Geographic Information Systems)
- Strict regulatory compliance
- Infrastructure condition assessment
- Inspection schedule for predictive maintenance
- Timely corrective maintenance and repair
- Effective risk management
- Adherence to stringent industry regulations
- Creation and management of work orders and schedules

- Integration with external websites for utility systems
- Development and monitoring for levels of service
- Mobile CMMS features for user convenience
- Funding forecast and capital prioritization

Many levels of asset management software exist, at a wide range of up-front costs and annual costs, but a single municipality could expect costs between $10,000 and $30,000 per year.

Leak Detection

Water system leaks not only waste a precious resource, but also represent lost revenue. Studies have found that the percentage of water lost to leaks in older systems in the northeastern section of the country regularly exceeds 50 percent. The chart below illustrates the actual savings realized by communities similar to those in Livingston County in the northeastern United States that have conducted leak detection surveys on their systems in the past:

- Leaking Curb Box – Potential water loss of 3,169 gallons per day or 1,156,749 gallons per year. Resulting financial impact of $2,892 per year.
- Leaking Valve - Potential water loss of 3,169 gallons per day or 1,156,749 gallons per year. Resulting financial impact of $2,892 per year.
- Leaking Hydrant – Potential water loss of 4,754 gallons per day or 1,735,343 gallons per year. Resulting financial impact of $4,338 per year.
- Leaking Service Pipe – Potential water loss of 19,019 gallons per day or 6,941,808 gallons per year. Resulting financial impact of $17,355 per year.
- Main Break – Potential water loss of 221,895 gallons per day or 80,991,710 gallons per year. Resulting financial impact of $202,479 per year.

Interviews with each of the water system operators and staff, indicated that very few of them have performed comprehensive leak detection surveys on their systems. In the northeast United States, communities that have performed leak detection surveys have realized a water consumption savings of over 30 percent. With the annual water production of all water systems in the County totaling 1,496,500,000 gallons, a 30 percent water leakage factor in these systems could total approximately 448,950,000 gallons. Utilizing the average cost of $2.50 per 1,000 gallons, this "lost" water would translate to more than $1,122,375 per year in lost revenue, not counting other hidden costs that result from the undetected leaks and water line breaks.

Other potential benefits of leak detection and repair that is difficult to quantify and assign a cost savings include:

- Increased knowledge about the distribution system, which can be used to respond more quickly to emergencies and to set priorities for replacement or rehabilitation programs;
- More efficient use of existing supplies and delayed capacity expansion;
- Improved relations with both the public and utility employees;
- Improved environmental quality;
- Increased firefighting capacity;
- Reduced property damage, reduced legal liability, and reduced insurance costs because of fewer water main breaks; and
- Decreased public health threats because of reduced potential contamination events.

Cost estimates to outfit a vehicle complete with sophisticated peak detection equipment are estimated as follows:

Equipment Description	Quantity	Unit Price	Extended Price
Perma Loggers	50	$ 728.00	$ 36,400.00
Antenna Extension	50	$ 45.00	$ 2,250.00
Patroller	1	$ 8,505.00	$ 8,505.00
TriCorr Touch	1	$38,220.00	$ 38,220.00
S-30 System	2	$ 4,410.00	$ 8,820.00
System Training	4 days	$ 1,485.00	$ 5,940.00
	Total:		$100,135.00

Note: Equipment would allow operators to do up to 3 miles of line at a time.

5.8.3 Program Development

Regulatory agencies such as the EPA and NYSDOH continue to increase requirements for existing public water systems in the County. Specific requirements include the following:

- Cross connection control
- Flushing program
- Water use regulations

While each of the items above will have some specific requirements for each community, the majority of the requirements are generic. The County or the different systems should combine resources and develop a common template for each requirement that could be used by everyone versus the "go alone" approach.

In addition to the potential cost savings, this would also result in standardized policies and procedures across the County.

5.8.4 Groundwater Recharge

As mentioned in Section 4.7, regular well monitoring needs to continue to be completed throughout Livingston County, but more importantly in areas of the County that solely rely on groundwater as potable drinking water. Groundwater recharge is referred to as the process of either naturally or artificially "recharging" a groundwater aquifer by "replacing" the water that is contained within it. As water is collected, it infiltrates beneath the surface and into the aquifer. This could occur by natural means such as allowing surface water to infiltrate through pervious surfaces including lawns, ponds, etc. or by artificial means including the construction of infiltration ponds or injection wells.

Most wells, except for any community systems that rely on wells, are privately owned, limiting the capabilities of the County and individual municipalities on maintenance, capacity, and quality. Extensive, high quality, and highly productive aquifers can be protected through municipal level land development regulations and other development standards to limit excessive impervious surfaces and the use of potentially contaminating substances, e.g. petroleum or pesticides. At the private level, there are many opportunities for individuals to take on the responsibility to protect groundwater such as participation through the Conesus Lake Watershed Association, Cornell Cooperative, and other educational and community outreach organizations.

6 Existing Sewer Systems

This section of the study provides a review of the existing sewer systems throughout Livingston County including receiving waters and treatment facilities, an assessment of known or identified concerns, as well as an overview of operations and finances. In addition, this section also includes a summary of various regulations, standards, or issues on a Federal, State, and/or County level that impact these systems. Similar to the public water systems, various treatment facilities within the County are utilized by serving multiple communities – collection systems are maintained by a variety of entities as well. As such, this overview section is organized by receiving waters and further broken down by the treatment facilities serving each Town and Village (wholly or partially) or, in the case of the Livingston County Water & Sewer Authority (LCWSA), those communities it services through its utilization of several treatment facilities.

In summary:

- The 19 communities that have public water systems utilize 10 different wastewater treatment facilities.
- The NYS Groveland Correctional Facility maintains a separate, independent treatment facility covered under the State Pollutant Discharge Elimination System (SPDES).
- Nine (9) different sewer departments provide operation and maintenance of the collection and treatment systems (**Map 6-1)**.
- The remainder of Livingston County operates on private treatment systems.

6.1 Regulation of Public Sewer Systems

Treated waters from public wastewater treatment facilities are discharged into a variety of public waters, most notably creeks/rivers or larger lakes. Alternative or non-conventional systems may utilize other larger receiving waterbodies, such as man-made wetlands as in the case of the Town of Springwater. Unlike the broader view taken to protect raw water quality for potable water use (i.e. watersheds), wastewater treatment is classified as a point pollution source in which the quality of the discharged water is regulated, managed, and monitored on a much smaller scale. Various regulatory mechanisms are available to monitor treatment systems and discharged water to protect water quality. This section provides an overview of protection regulations currently in place at the State, Federal and/or local level. Section 3 identified water quality issues that included discharged water which are highlighted here as well.

6.1.1 Clean Water Act

The Clean Water Act, originally enacted in 1948 as the Federal Water Pollution Control Act, was reorganized and expanded (amended) in 1972 to its current format by the US Environmental Protection Agency (USEPA). The 1972 amendments provided a basic structure for regulating pollutant discharges, setting wastewater standards, regulating discharges into Federal "navigable waters," funding the construction of sewage treatment plants, and providing guidance on planning to address non-point source pollution. One of the most important elements that came out of this Act was the National Pollutant Discharge Elimination System (NPDES), a precursor to New York's State Pollution Discharge Elimination System (SPDES) permitting program as outlined in the following section. In addition to the SPDES program, the Clean Water Act also includes Section 303(d) which outlines "impaired waters" where current pollution control technologies alone cannot meet established water quality standard(s) for that waterbody and to develop a pollutant reduction plan.

6.1.2 State Pollutant Discharge Elimination System

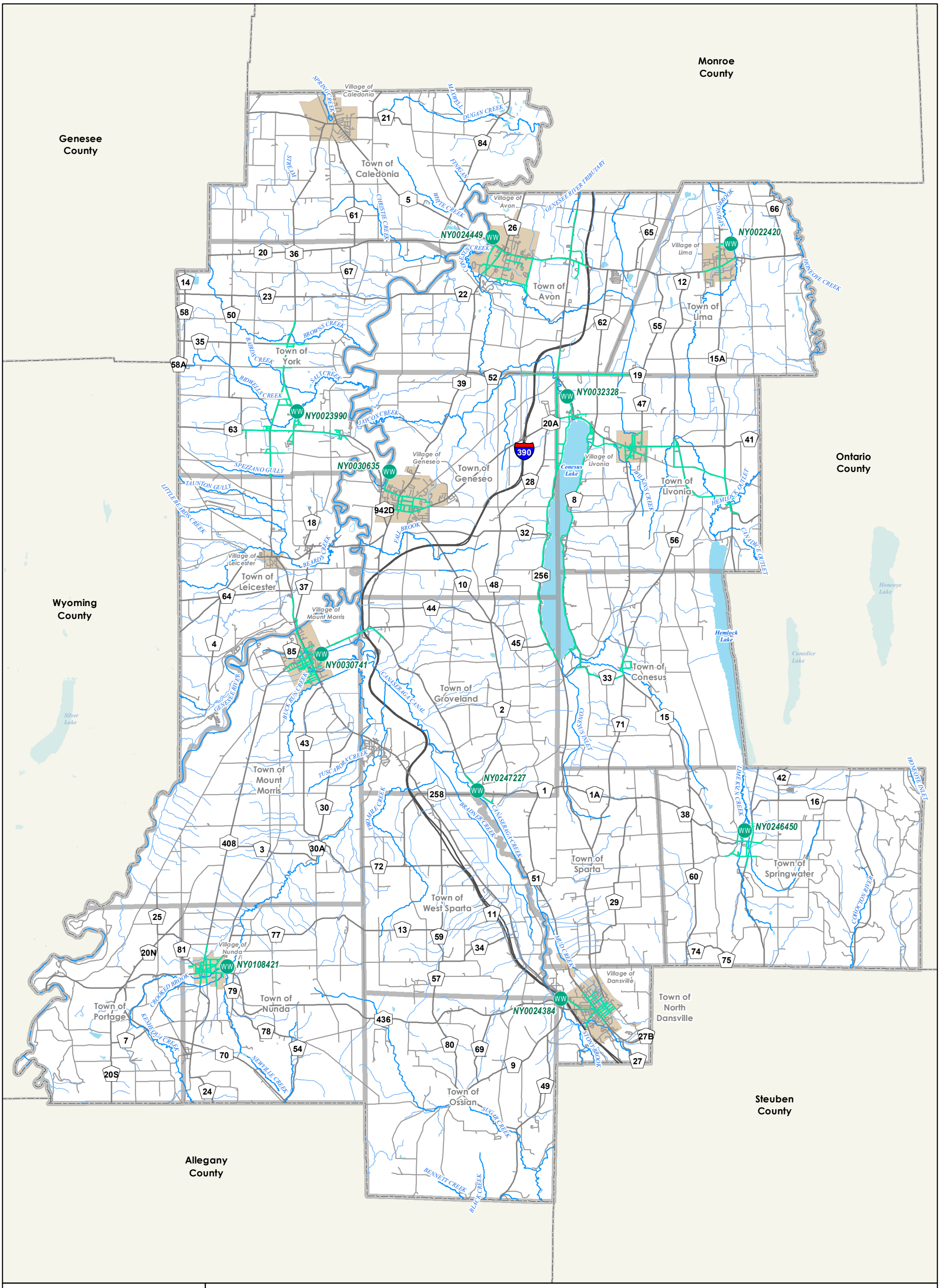
The NYSDEC (New York State Department of Environmental Conservation) Division of Water administers the SPDES through Article 17, Title 8 of the Environmental Conservation Law (6 NYCRR Part 750). This program was approved by the USEPA in 1975 in accordance with the Clean Water Act; however, it is broader in scope as it controls point source discharges to not only surface waters but to groundwaters as well. Within New York, over 633 wastewater treatment facilities or "publicly owned sewage treatment works" (POTW) are permitted and monitored through SPDES (a total of 21,426 permits were authorized as of March 2019).

NYSDEC staff enforce the SPDES program to ensure protection of public health and the intended best use of public waters of the State. Permitting under SPDES establish stringent performance standards, effluent limitations, and operating conditions to protect public waters. Upon discovery of any water quality violation, NYSDEC issues a negotiated Order of Consent to end the violation, restore compliance, and achieve measures to prevent recurrence of conditions that led to the violation.

The SPDES program also includes a resident education component through the Sewage Pollution Right to Know (SPRTK) Act which requires reporting of overflow sewage releases from treatment facilities through the NY Alert system as well as identifying discharge points via signage.

6.1.3 Conesus Lake Watershed Council

As noted in Section 3.1.5, the Conesus Lake Watershed Council was established to monitor and preserve Conesus Lake water quality. Though their primary purpose is to protect water quality for potable water use, wastewater management is another element that the Council



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focuses on, especially for private, on-site wastewater users. The Conesus Lake Watershed Inspection Program responds to water quality complaints, monitors construction sites, and issues water violations. This effort is coordinated with the Livingston County Department of Health.

6.1.4 Livingston County Watershed Assessments

The NYSDEC Watershed Assessments noted in Section 3.1.7 highlighted several waterbodies that are potentially at risk due to several sources of pollution, some of which result from failing residential septic systems.

6.2 Sewer Treatment Quality & Quantity

Within the County, approximately 40 percent of residents are served by public sewer with the remaining 60 percent served by private systems. These private systems are primarily conventional on-site septic systems consisting of a septic (solids) tank and leach field. Though the majority of residents rely on private, on-site wastewater treatment systems, this section of the report will only provide a review of the existing public sanitary sewer systems throughout Livingston County including the collection network, treatment facilities (wastewater treatment facilities/WWTF), and discharge/receiving waters. In many instances, water bodies receiving the treated effluent are outlets for which public water is taken for potable use, though at different points. Therefore, the quality of the water is intrinsically connected.

Similar to public water systems in the County, wastewater systems are issued a permit ID from the NYSDEC as part of the State Pollutant Discharge Elimination System (SPDES) permit program. The NYSDEC monitors and regulates the quality and rate of discharge of treated water. In several instances, a wastewater treatment facility (WWTF) is used for collection and treatment of sewage from several municipalities including outside users ("out of district") – of the 19 municipalities that have public water, 10 facilities are utilized for wastewater treatment (**Map 6-2**).

As noted in Section 4.1.2, the NYSDEC monitors and regulates wastewater treatment as part of this program by requiring that wastewater treatment facilities (WWTF) develop and implement a flow management plan when 95 percent of the rated capacity of the WWTF is surpassed. These requirements are included within 6 NYCRR Part 750. Therefore, the threshold capacity used in this study update will be 95 percent of the permitted flow for these WWTFs.

The summary of the public sewer systems in this section is broken down by receiving waters and the various treatment plants that discharge into it, shown in **Table 6-1**. This summary includes treatment capacity and quality, with any known or identified concerns noted based on the most recent assessments, and water treatment measures undertaken. A summary of

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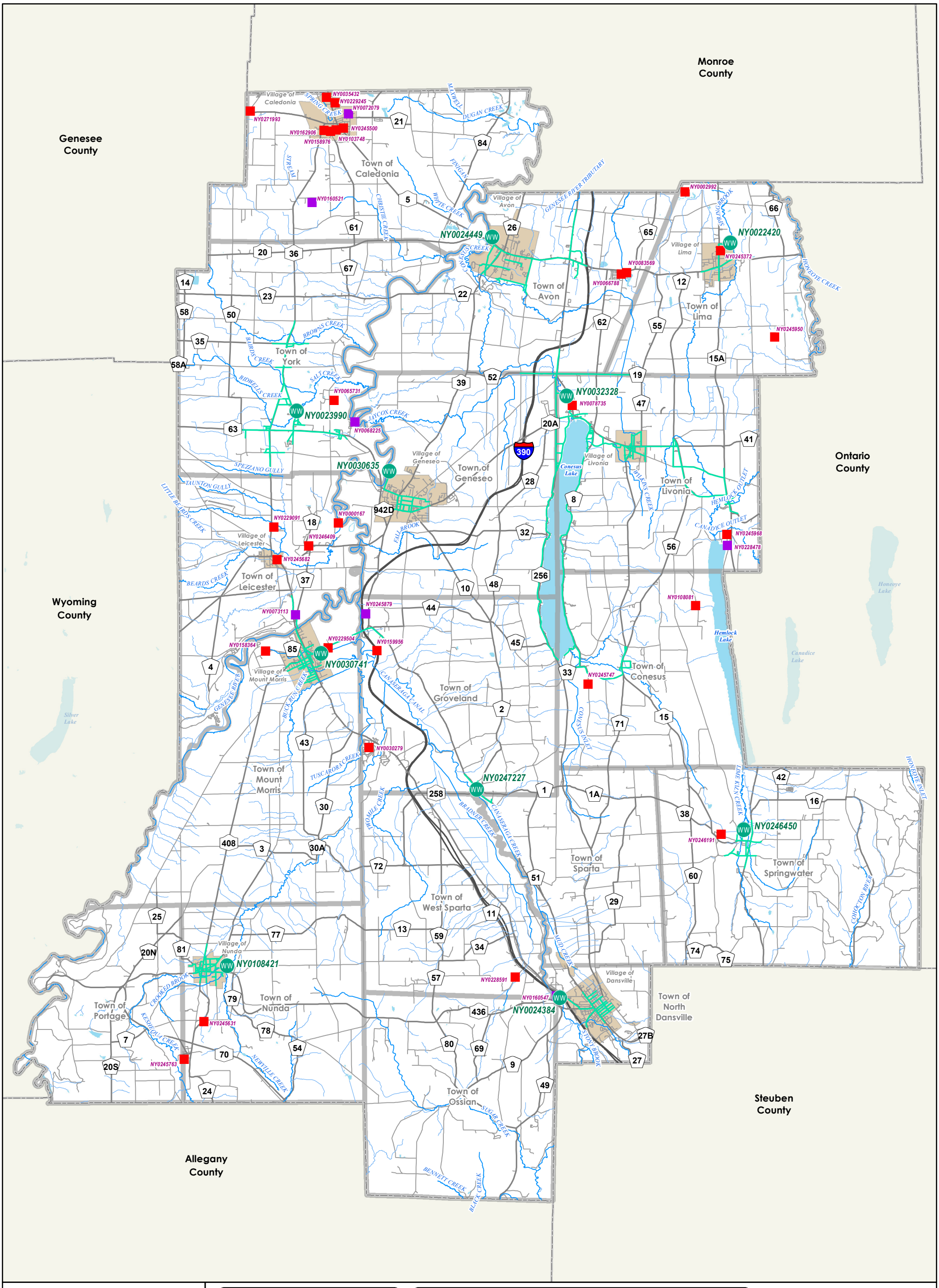

MAP SHEET:

MAP 6-2

MAP TITLE:

Livingston County
NYSDEC SPDES Permits

DATE PREPARED:

AUGUST 20, 2020

this information including the municipalities each treatment facility serves, is found at the end of this section, **Table 6-2**.

The following municipalities are wholly dependent on private, on-site systems (e.g. leach fields, package plants, and other private systems) and are not included in this summary:

- Town of Caledonia
- Village of Caledonia
- Village of Leicester
- Town of Ossian
- Town of Portage
- Town of West Sparta

Table 6-1
Receiving Water Body and Permitted Discharge

Receiving Water	NYSDEC SPDES Discharge Limit (MGD)
Springwater Creek:	
Town of Springwater WWTF	0.04
Keshequa Creek:	
Village of Nunda WWTF	0.20
Groveland Correctional Facility WWTF	0.50
Total Permitted Discharge	***0.70***
Spring Brook Creek:	
Village of Lima WWTF	0.30
Bidswell Creek:	
Town of York WWTF	0.30
Conesus Creek:	
LCWSA SL Lakeville WWTF	0.98
Genesee River:	
Village of Avon WWTF	1.00
Village of Geneseo WWTF	1.50
Total Permitted Discharge	***2.50***
Canaseraga Creek:	
Village of Dansville WWTF	1.75
LCWSA SD Groveland Station WWTF	0.065
Village of Mount Morris WWTF	0.865
Total Permitted Discharge	***2.679***

Source: New York State Department of Environmental Conservation

Springwater Creek

Springwater Creek is a small creek that flows north from the Town of Wayland into the southern end of Conesus Lake. The Town of Springwater is the only community in the County that discharges into the creek.

The Town of Springwater owns and operates a WWTF located on Kellogg Road in the Town of Springwater. Currently, the treatment plant is only for users within the Town limits. This non-conventional facility along with the collection system was completed in 2009. The collection system included septic tanks and grinder pump stations at each connection along with small diameter force mains. The WWTP includes a four (4) cell wetland style treatment system. The NYSDEC permits the Town to discharge up to 0.04 mgd to Springwater Creek. The average wastewater treated is 0.038 mgd.

Due to design and construction issues, the system never operated properly and resulted in the NYSDEC issuing a Consent Order to address SPDES Permit violations related to frequent flow and ammonia exceedances.

Keshequa Creek

Keshequa Creek runs north approximately from the Hamlet of Swain before flowing into the Genesee River in the Village of Mount Morris. Within Livingston County, the Village of Nunda and the Groveland Correctional Facility are the only two entities discharging into the creek.

Village of Nunda

The Village of Nunda owns and operates a WWTF located on Sewer Plant Road in the Village of Nunda which uses an activated sludge process for treatment as well as aeration and biological floc. The entire Village and portions of the Town of Nunda discharge to the Village's WWTF and the combined average wastewater treated at the facility is 0.16 mgd, with a permitted discharge capacity of 0.20 MGD per the NYSDEC.

An engineering report completed in 2018 recommended $2,900,000 in improvements including upgrades to the sludge pumping station, sludge press repairs, influent screen, and repairs to the tertiary sand filters. The report also recommended conversion of the activated sludge process to SBR's (sequencing batch reactors) along with the addition of a UV disinfection system mandated by the NYSDEC. As of this study update, the Village of Nunda received three (3) grants and plans to proceed with design. Final construction scheduling has not yet been determined.

Groveland Correctional Facility

The NYS Groveland Correctional Facility owns and operates their own wastewater treatment plant with a regulated discharge to Keshequa Creek. The treatment plant is located on-site and is currently used for the correctional facilities only. The NYSDEC permits a maximum discharge of 0.50 mgd, but the correction facility only produces a daily average of 0.30 mgd.

Spring Brook Creek

Spring Brook Creek, the receiving water body for the Village of Lima WWTF, flows northerly from the Village of Livonia, travelling through the Village of Lima before connecting to Honeoye Creek to the north. The Village owns and operates the WWTF located on Ziegler Drive. The Village of Lima and the mobile home park, located north of the Village and along the east side of NYS Route 15A, are connected to the collection system that discharges waste to the Village of Lima wastewater treatment facility. The combined average of wastewater treated at the facility is 0.25 mgd, with a permitted discharge capacity of 0.30 mgd per the NYSDEC.

As of the update of this report, the Village of Lima has been awarded two (2) grants for upgrades at the wastewater treatment plant. One grant of $1,860,000 will be used for general improvements and a second for $1,000,000 will be used for a mandatory effluent disinfectant system. In addition to these grants, zero interest financing for project costs not covered by the grants has been secured. Though these do not increase the capacity of the facility, something the Town of Lima has indicated is a factor limiting future development potential, the improvements would help to increase efficiency and provide an opportunity for future capacity increases.

Bidwell Creek

Bidwell Creek flows east from the western boundary of the Town of York before connecting with Salt Creek and flows into the Genesee River on the east side of Town. The Town of York owns and operates a WWTF along Retsof Road in the Town of York which discharges to Bidwell Creek. The WWTF consists of two (2) primary clarifiers, one (1) trickling filter, two (2) final clarifiers and a sludge holding tank. All sludge is hauled off site. The facility treats an average daily flow of 0.23 mgd. The NYSDEC permits the Town to discharge up to 0.30 mgd of treated waste to Bidwell Creek.

There is very limited additional treatment capacity available at the WWTF. The Town of York has discussed potential treatment plant upgrades in the future to keep up with development in the Town. Inflow and infiltration continue to be a major concern in the collection system which increase flows at the WWTF. Addressing these issues within the system could greatly increase capacity at the treatment plant.

Conesus Creek

Conesus Creek is the outlet for Conesus Lake, located on the north side and meandering west and north before connecting to the Genesee River in Avon, This creek is the discharge point for LCWSA's Lakeville WWTF. This facility treats waste from several municipalities surrounding Conesus Lake including portions of the Towns of Avon, Conesus, Geneseo, Groveland and Livonia along with the Village of Livonia. The average daily flow at the WWTF is 0.94 mgd with a permitted discharge of 0.98 mgd to Conesus Creek. NYSDEC issued a consent order to LCWSA on February 4, 2019 for exceeding their permitted discharge of 0.98 mgd, as this has occurred nine (9) times since April 2017. This limits the potential for future development, but the LCWSA is working towards increasing the permitted capacity of the facility to 1.27 mgd.

LCWSA recently received a permit modification to include a reduction in the allowable effluent loading of ammonia during the months of May through October at their Lakeville Wastewater Treatment Plant (WWTP). The Authority completed upgrades to the facility which included filter media replacement, and construction of a new biotower and recirculation pump station in order to meet the stricter ammonia permit limits. Along with the ammonia treatment upgrades, a new secondary clarifier was constructed to assist with capacity challenges based on peak flows in the sanitary sewer system. A second phase of their improvement project will include influent pump replacement, new sludge drying beds, digester methane safety, SCADA, and UV disinfection.

Genesee River

The Genesee River is one of the major rivers in upstate New York that traverses Livingston County. The Village of Avon and Geneseo both own and operate WWTFs that discharge into the river.

Village of Avon

The Village of Avon WWTF is located off Farmers Road and is currently permitted for 1.0 MGD. In 2017, due to industries downsizing operations in the Village, most notably Kraft-Heinz Co., the WWTF was de-rated from a 2.75 mgd by decommissioning some of their treatment infrastructure to its current 1.0 mgd; therefore, the rated capacity for this facility is 0.95 mgd. Since this de-rating, the WWTF has experienced multiple violations for exceeding their allowable monthly average discharge (five (5) times in 2019 alone). The WWTF has also experienced multiple violations regarding biological oxygen demand (BOD) removal. Under their current SPDES permit and infrastructure, there is no room for additional sewer demands. The Village of Avon's average daily flow is 1.0 mgd including all Town of Avon users.

Village of Geneseo

The Village of Geneseo's WWTF is located on Riverside Drive with the entire Village and some of the Town "out of Village" District, being served by this facility. The current SPDES permit allows a maximum treated discharge of 1.5 mgd, but the Village only discharges a daily average of 0.90 mgd, which also includes any additional flow that comes from the Town of Geneseo.

Canaseraga Creek

Canaseraga Creek begins within the Town of Nunda and winds south, east, and north through various municipalities in and out of the County before connecting with the Genesee River east of the Village of Mount Morris. It is the receiving water body for three (3) WWTFs in Livingston County: Village of Dansville, LCWSA Groveland Station, and the Village of Mount Morris.

Village of Dansville

The Village of Dansville owns and operates a WWTF located on McWhorter Road which serves the entire Village of Dansville and a small portion of the Town of North Dansville. The treatment facility went through a major upgrade within the last five (5) years including a new influent structure, compost facility, SBR process, and UV disinfection system. The average daily flow at the WWTF is 0.75 mgd with a permitted maximum discharge of 1.75 mgd.

Groveland Station

The Groveland Station WWTF is located along NYS Route 63 in the Hamlet of Groveland Station. A small portion of the Town of Sparta and the Hamlet of Groveland Station are serviced by the WWTF and collection system. Average daily flows reach 0.013 mgd, while the NYSDEC only permits LCWSA a maximum discharge volume of 0.065 mgd. The WWTF discharge permit has been modified to require effluent disinfection. LCWSA is planning to address this by installing a UV disinfection system.

Village of Mount Morris

The Village of Mount Morris owns and operates a WWTF located along the southern side of NYS Route 408 on the Village boundary line. The facility treats waste throughout the entire Village of Mount Morris, portions of the Town of Mount Morris, American Rock Salt in the Town of Groveland, and a small portion in the Town of Leicester along NYS Route 36. Combined daily flows between all serviced areas average 0.475 mgd. The WWTF SPDES permits a maximum discharge of 0.864 mgd. Several improvements to the wastewater

treatment facility are being considered including UV light disinfection, SCADA monitoring system, fiberoptic internet access, LED lighting, and digester cover repairs.

Table 6-2
Existing Wastewater Discharge Locations and Capacity

Discharge Water Body	Wastewater Treatment Facility *Municipality Served*	NYSDEC SPDES Permit Limit (MGD)	Avg Wastewater Treated (MGD)	Max Wastewater Treated (MGD)	Treatment Capacity Available (MGD)
Springwater Creek	Town of Springwater WWTP	0.04	0.038		0.00
	Springwater (T)		*0.038*		
Keshequa Creek	Village of Nunda WWTP	0.20	0.16		0.04
	Nunda (T)		*0.007*		
	Nunda (V)		*0.15*		
	Groveland Correctional Facility WWTP	0.50	0.30		0.20
	Correctional Facilities		*0.300*		
Spring Brook Creek	Village of Lima WWTP	0.30	0.25		0.05
	Lima (T)		*0.007*		
	Lima (V)		*0.24*		
Bidswell Creek	Town of York WWTP	0.30	0.23		0.07
	York (T)		*0.23*		
Conesus Creek	LCWSA SL-Lakeville WWTP	0.98	0.94		0.04
	Avon (T)		*0.02*		
	Conesus (T)		*0.17*		
	Geneseo (T)		*0.15*		
	Groveland (T)		*0.05*		
	Livonia (T)		*0.40*		
	Livonia (V)		*0.15*		
Genesee River	Village of Avon WWTP	1.00	1.00		0.00
	Avon (T)		*0.16*		
	Avon (V)		*0.84*		

Table 6-2
Existing Wastewater Discharge Locations and Capacity

Discharge Water Body	Wastewater Treatment Facility *Municipality Served*	NYSDEC SPDES Permit Limit (MGD)	Avg Wastewater Treated (MGD)	Max Wastewater Treated (MGD)	Treatment Capacity Available (MGD)
Genesee River	Village of Geneseo WWTP	1.50	0.90		0.60
	Geneseo (T)		*0.03*		
	Geneseo (V)		*0.87*		
Canaseraga Creek	Village of Dansville WWTP	1.75	0.75		1.00
	North Dansville (T)		*0.004*		
	Dansville (V)		*0.75*		
	LCWSA SD-Groveland Station/DOCCS WWTP	0.065	0.013		0.052
	Groveland (T)		*0.01*		
	Sparta (T)		*0.003*		
	Village of Mount Morris WWTP	0.864	0.475		0.389
	Mount Morris (T)		*0.005*		
	Mount Morris (V)		*0.45*		
	Groveland (T)		*0.02*		

As shown in **Table 6-2** above, with the existing SPDES permitted limits for each WWTF, the available capacity for most of the facilities is at or just under capacity. The Village of Dansville has the most capacity available followed by the Village of Mount Morris. Though improvements to existing WWTFs will increase efficiency, upgrades would be needed to provide greater opportunity for expansion of districts and development potential.

6.3 Sewer Operations & Finances

In addition to receiving water bodies and treatment facilities, public sewer systems also include a collection system and operators to manage and maintain the system. This section of the report provides a brief summary of these aspects, referred to as "sewer operations," categorized by the receiving body of water. A general overview of the financial aspects of each sewer system in terms of rate structures and investments (i.e. capital improvements bonds) is also included.

6.3.1 Collection Systems

(*See **Maps 6-1.1** through **6-1.16** and **Map 6-3**)*

Springwater Creek

Town of Springwater

The Town of Springwater owns and maintains the collection system for their service area. As of this study update, the Town has a proposed improvement project which includes removal and replacement of septic tanks connected to the existing system, replacement of pumps as necessary, replacement of a portion of the existing constructed treatment wetlands with a sand filter, and the implementation of UV disinfection. The estimated project cost is $3,700,000 with the Town of Springwater receiving grant funding to cover most of the anticipated project costs. The primary concern within the Town wastewater system is related to the overhaul of the existing system which is scheduled to be completed in 2020. There are no concerns with regards to expanding the current system for future opportunities.

Keshequa Creek

Village of Nunda

The Village of Nunda owns and operates their collection system which is a conventional gravity type with manholes and mainlines. The majority of the collection system piping is PVC. Inflow and infiltration (I&I) are a concern throughout the entire collection system as it is a major contributor to increased peak flows during storm events and snow thaw.

Town of Nunda

The majority of the Town of Nunda is not served by a public sanitary sewer system. However, 25 out-of-Village users are connected to the Village of Nunda. The collection system is a conventional gravity type with manholes and mainlines. All public sewer in the Town of Nunda is operated and maintained by the Village of Nunda. The community need for public sewers in the Town is limited as there is sufficient land area for private septic systems (i.e. low residential density with larger required lot sizes) and low development pressure with the majority of the land utilized for agriculture. The exception to this is the Hamlet of Dalton which has a slightly higher density with approximately 150 homes and the Dalton Elementary School. The Hamlet is currently having issues with failing septic systems which are contaminating well sources in the surrounding areas.

NYS Correctional Facility - Town of Groveland

The NYS Groveland Correctional Facility owns and operates their own wastewater treatment plant including the collection and discharge network with a regulated discharge to Keshequa Creek. This facility is currently used for the correctional facilities only.

Spring Brook Creek

Village of Lima

The entire Village of Lima is served by public sanitary sewer through a combination of a gravity and force main collection system.

With planned upgrades to the treatment facility addressing any process and equipment needs, the primary concern for the Village of Lima is the available capacity for development. This could be addressed by reducing inflow and infiltration or by requesting an increase in the permitted capacity of the facility.

Town of Lima

The majority of the Town of Lima is not served by public sanitary sewer, with the exception of a mobile home park and ambulance facility located along NYS Route 5&20 and some homes on the west side of Dalton Road. While this is managed by the Village of Lima, it is the Town of Lima Sewer District #1. All remaining sanitary sewer is treated by private on-site treatment systems, with a handful regulated by the NYSDEC.

Areas along Rochester Road to the north of the Village and NYS Route 20 to the east of the Village to York Street are primarily commercial and industrial areas with notable properties including a large mobile home park, Lakeland Concrete, GCC Campus, and Bristol ID Technologies. A potential need for sewer in these areas could be a factor in the near future.

Bidwell Creek

Town of York

The Town of York owns and operates a treatment facility located on Retsof Road. The majority of the population in the Town of York is served by public sanitary sewer which is treated at this treatment facility. The Retsof Sewer District includes the Hamlet of Retsof, Sewer District #1 includes the Main Street, Wadsworth areas and the York Central School District, and Sewer #2 includes the Piffard area.

The Town of York most recently connected WNY Cheese Enterprise, LLC to the system, a food producer that is projected to convey up to 0.125 MGD to the system, but primarily "clean" wastewater or wastewater that does not contain solids and therefore requires less intensive treatment. The collection system for these areas is a combination of gravity mains

and lift stations. The remainder of the Town of York is served from private on-site treatment systems.

The Town of York was recently notified by the NYSDEC that they will be required to install a disinfection system at the treatment facility, which treats the wastewater for all areas in the Town. The capacity of the treatment facility, especially with the flow from WNY Cheese, will have little capacity for future development without additional upgrades.

The collection system in the Retsof area is a combined system dating back to the 1940's, resulting in excess flows to the treatment facility. The Town of York has been looking into options to replace the collection system at a cost of almost $2,000,000 which could also be combined with other measures such as improved education for users and disconnection of sump and drain pipes.

Conesus Creek

LCWSA – Lakeville WWTF and Collection System

The LCWSA operates and maintains collection systems that serve several municipalities including portions of the Towns of Avon, Conesus, Geneseo, Groveland and Livonia along with the Village of Livonia—a direct result of the implementation of the 1991 Water Study. The majority of collection systems are around Conesus Lake and were constructed in the late 60's to address failing septic systems that were polluting the Lake. The Lakeville WWTP was constructed at the same time, replacing a WWTP that was owned by the Village of Livonia. In the last 20 years several additional sewer districts were formed including the hamlets of Conesus, Livonia Center, and Hemlock. The collection system is a combination of gravity sewer and force main that diverts all waste to the Lakeville WWTF.

An inflow and infiltration study for the Lakeville wastewater treatment facility collection area is being completed by the LCWSA to investigate problematic areas and propose short-term and long-term solutions. Short-term solutions are expected to take place as soon as 2020.

The planned Gateway Industrial Park in the northwest corner of the Town of Livonia is potentially a significant wastewater contributor, but the limited available treatment capacity at the Lakeville treatment plant may impede development in the Park.

LCWSA - Town of Avon

The LCWSA operates and maintains all public sewer in the Town of Avon. One section of sewer in the Town of Avon encompasses the area along NYS Route 20 between I-390 and the Village of Avon line including Tec Drive, Lakeville Road, and other side roads. This portion of public sewer is connected to the Village of Avon sanitary sewer system and is

known as the East Avon system. An additional small section of the Town of Avon along Lakeville Road south of I-390 to the Town of Livonia line is operated and maintained by LCWSA. This sewer main was installed to service a commercial area just south of I-390. All sewage flows south to the Lakeville treatment plant located on West Lake Road. The majority of the Town of Avon is served by private on-site wastewater treatment systems.

The Village of Avon WWTF currently has very limited treatment capacity available. As a result, no additional development can take place at James M. Steele Commerce Park and the Town of Avon cannot add additional large water users to the collection system discharging to the Village's WWTF.

LCWSA - Town of Conesus

The majority of land in the Town of Conesus is not served by public sewer. However, a significant portion of the population base is served by public sewer including the hamlet of Conesus and the area along East Lake Road. All sewage being discharged into the LCWSA collection system along East Lake Road flows north to the Lakeville WWTF. The remainder of the Town of Conesus is served by private on-site treatment systems.

LCWSA - Town of Geneseo

The LCWSA serves all properties along West Lake Road in the Town of Geneseo. All sewage discharged into the LCWSA collection system flows north along West Lake Road by gravity sewer and force main to the Lakeville treatment plant. The remainder of the Town of Geneseo is served by private on-site treatment systems.

LCWSA - Town of Groveland

Users along West Lake Road are serviced by the LCWSA public sewer system. All sewage discharged into the LCWSA collection system along West Lake Road flows north to the Lakeville WWTF by a combination of gravity sewer and force main. The majority of land in the Town of Groveland is not served by public sewer.

LCWSA - Town of Livonia

The Town of Livonia has both public sanitary sewer and private on-site treatment. The public system serves the hamlet of Hemlock, hamlet of Livonia Center, Lakeville area and East Lake Road. The collection system is operated and maintained by the LCWSA. All sewage is discharged into the LCWSA collection system to the Lakeville WWTF by a combination of gravity sewer and force main.

The planned Gateway Industrial Park in the northwest corner of the Town of Livonia has the potential to produce a significant amount of wastewater as future development continues, but

limited treatment capacity is available and may impede development in the park. Additional infrastructure and/or system improvements may be needed in the near future to meet these demands.

LCWSA - Village of Livonia

The Village of Livonia has an aged collection system composed primarily of clay tile pipe and Orangeburg (bituminized fiber pipe) laterals. In the late 60's the Village of Livonia abandoned their treatment facility and joined a regional effort related to sewer around Conesus Lake. All sewage is currently discharged into the LCWSA collection system to the Lakeville WWTF. All operation and maintenance are completed by LCWSA.

The primary concerns in the Village of Livonia are the age and condition of the collection system combined with illegal connections including sump pumps, roof drains, and other storm water connections that permit ground and rainwater to flow into the system. The system dates back to the early 1900's.

Genesee River

Village of Avon

The Village of Avon plant serves the Village of Avon and a small percentage of Town of Avon customers. In addition to residential customers, 90 commercial users are served by the Village of Avon WWTF. Barilla America and Kraft Foods are the largest producers of wastewater and have separate accounts for billing.

As noted in the previous section, there are significant capacity issues at the Village's WWTF that may potentially delay future development at James M. Steele Commerce Park. The current SPDES permit and treatment infrastructure do not allow for any additional capacity—thereby not allowing for any future commercial development or industrial development within the Livingston County Industrial Complex or the James M. Steele Commerce Park in the Town of Avon. It may be possible to rehabilitate some of the decommissioned infrastructure in the WWTF to gain additional treatment capacity. The age and condition of the collection system combined with illegal connections that permit the flow of ground and rainwater into the system are additional concerns.

Town of Geneseo

The Town of Geneseo Sewer District #1 serves approximately 272 users within the following development areas: Genesee Valley Plaza, Morgan Estates, the Hammocks at Geneseo, and a few other residential users within the service area. All sewage discharged in District #1 flows into the Village of Geneseo collection system and to the Village WWTF.

Village of Geneseo

The entire Village of Geneseo is served by public sanitary sewer. The greatest producer of wastewater comes from SUNY Geneseo with approximately 5,588 students. Other major contributors are Livingston County facilities including the jail and offices buildings.

The primary concerns in the Village of Geneseo are the age and condition of the collection system combined with illegal connections that permit the flow of ground and rainwater into the system. In addition, infrastructure and/or system improvements may be needed in the near future to meet the demand of the projected population increase, especially with the growing community at SUNY Geneseo.

Canaseraga Creek

Town of North Dansville

All public sewer available in the Town of North Dansville is billed, operated, and maintained by the Village of Dansville. All wastewater flows to the Village of Dansville WWTF. However, the extent of public sewer in North Dansville is limited to small areas immediately adjacent to the Village of Dansville including the Airport Plaza. All remaining properties are served by private on-site treatment systems.

Areas including the Airport, Exit 4 Industrial Park, and Main Street south of the Village of Dansville have shown a need for public sewer. Sewer service could be provided to the existing commercial and industrial customers and increase the potential for development in these areas.

Village of Dansville

The majority of the Village of Dansville collection system is clay tile with the exception of a few areas of PVC pipe, flowing into brick constructed manholes. Like the collection system, most sanitary laterals are also clay tile. There are nine (9) lift stations throughout the Village of Dansville equipped with 5 hp pumps or smaller. These lift stations were constructed to keep the collection system at a reasonable depth and to accommodate for changes in topography. The Maple Street, Elizabeth Street, and Arby's pump stations have all been upgraded recently. Upgrades at the remaining stations are being considered in the near future as necessary.

The primary concern is the age and condition of the collection system. There is currently a significant amount of inflow and infiltration throughout the system contributing to increased flow at the treatment facility. Specifically, there has been emphasis on sump pump connections and the additional flow that is contributed in the collection system. The Village

of Dansville has taken some initial steps to investigate the sources of inflow and infiltration but plans to continue the process over the next several years.

LCWSA – Village of Mount Morris WWTF (Towns of Groveland, Mount Morris and Leicester)

Collection systems in the Towns of Leicester and Mount Morris convey sewer to the Village of Mount Morris WWTP for treatment. The section in the Town of Leicester runs along NYS Route 36 north of the Village of Mount Morris and included a large trailer park and Seneca Foods. The section in the Town of Mount Morris runs to the east of the Village along NYS Route 408 and includes connections to American Rock Salt in the Town of Groveland and the Livingston County Gypsy Lane complex. All sewage discharged from the service areas above flows along NYS Route 408 to the Village of Mount Morris wastewater treatment facility by a combination of gravity and force main collection systems.

LCWSA – Groveland Station WWTF (Town of Groveland)

The hamlet of Groveland Station is also serviced by LCWSA, but this service area is treated by the Groveland Station WWTF owned and operated by LCWSA. The collection system consists of a combination of gravity sewer and force main.

Town of Mount Morris

A few areas in the Town of Mount Morris are serviced by public sanitary sewer. These areas include the Murray Hill Livingston County Campus, a section of Fiddler Road, and several users along the sewer connecting American Rock Salt to the Village of Mount Morris sewer system. All wastewater discharged by these entities, served by public sewer, flows to the Village of Mount Morris WWTF. All remaining residents not served by public sanitary sewer have private on-site treatment systems.

Village of Mount Morris

The entire Village of Mount Morris is served by their public sanitary sewer system. The majority of the system is constructed of clay tile piping and brick manholes. Some small improvements and upgrades were made in the early 2000's during street projects. Sanitary laterals throughout the system are either clay tile or cast iron pipe. The major users in the Village of Mount Morris system are American Rock Salt, the Murray Hill Livingston County Complex, and Seneca Foods. The Village is considering implementation of a grease trap monitoring program to increase the longevity of the collection system and treatment infrastructure.

A common problem for most Village systems is the age and condition of the collection system, combined with excess inflow and infiltration. The Village of Mount Morris has generally corrosive soils which may impact the condition of the collection system.

LCWSA – Groveland Station WWTF (Town of Sparta)

The majority of the Town of Sparta is not served by a public sanitary sewer system with the exception of some users along Groveland Station Road connected to the Groveland Station system operated by the LCWSA. All remaining sanitary sewer is treated by private on-site treatment systems, with none of those systems permitted by the NYSDEC.

The Hamlet of Scottsburg does not have public sewer available, but public water is available. There may be a potential need for public sewer in the near future.

6.3.2 Private Sanitary Sewer Systems

Outside of those areas serviced by public sewer systems, the primary land use is agricultural or rural residential. This development trend combined with low residential density and large lot sizes make extensions to public sewer systems cost prohibitive. The need for public sewer in these areas is extremely low and residential septic systems adequately treat the typical single-family home. The following communities rely on private sanitary sewer systems, though in some cases they have considered the possibility of extensions in the future.

Village of Caledonia

The Village of Caledonia is not served by public sanitary sewer. All sanitary sewer is treated by private on-site treatment systems, with several locations permitted by the NYSDEC including Jones Chemical and the Caledonia-Mumford CSD. Wastewater treatment plants are located in the neighboring municipalities of the Village of LeRoy and Village of Avon. The majority of the parcels in the Village of Caledonia are occupied with residential uses, but there are pockets of commercial and industrial properties including the downtown business district. Other properties include the local school district, fairgrounds, and a NYSDEC fish hatchery. Oatka Creek is a local Class B tributary which has recently shown elevated nutrient levels. Possible contamination sources have been traced back to inadequate on-site wastewater treatment systems in the surrounding area. For additional information regarding Oatka Creek water quality, refer to Section 3.

Town of Caledonia

The Town of Caledonia is not served by public sanitary sewer. All sanitary sewer is treated by private on-site treatment systems with several systems permitted by the NYSDEC. This includes Suit-Kote, PJ's Auto Parts, and Purina. Wastewater treatment plants are located in the neighboring municipalities of the Village of LeRoy and Village of Avon.

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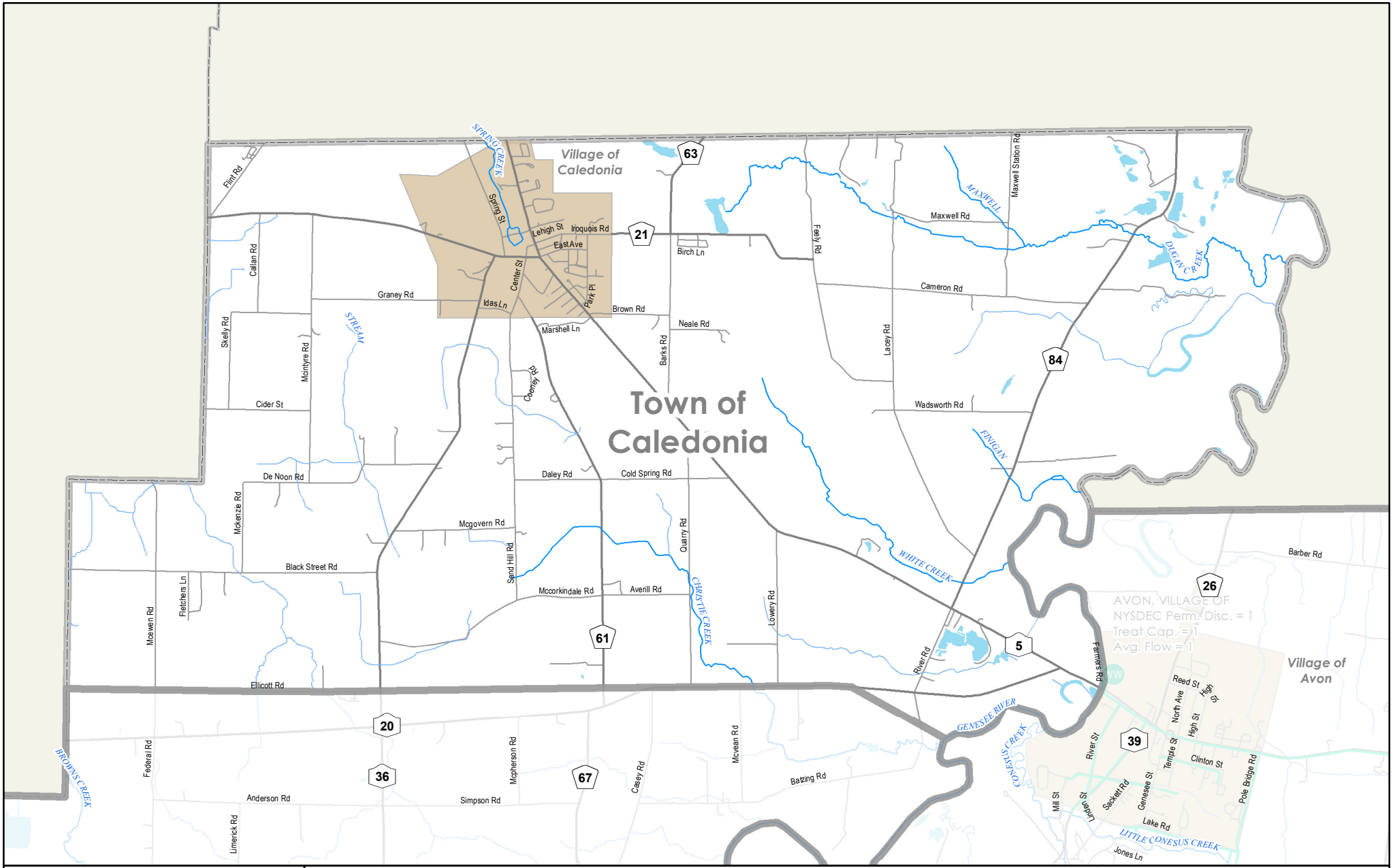
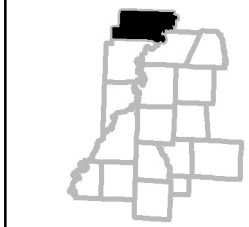


MAP SHEET:
FIGURE 6-1. 1

MAP TITLE:
Caledonia Sewer System

DATE PREPARED:
AUGUST 20, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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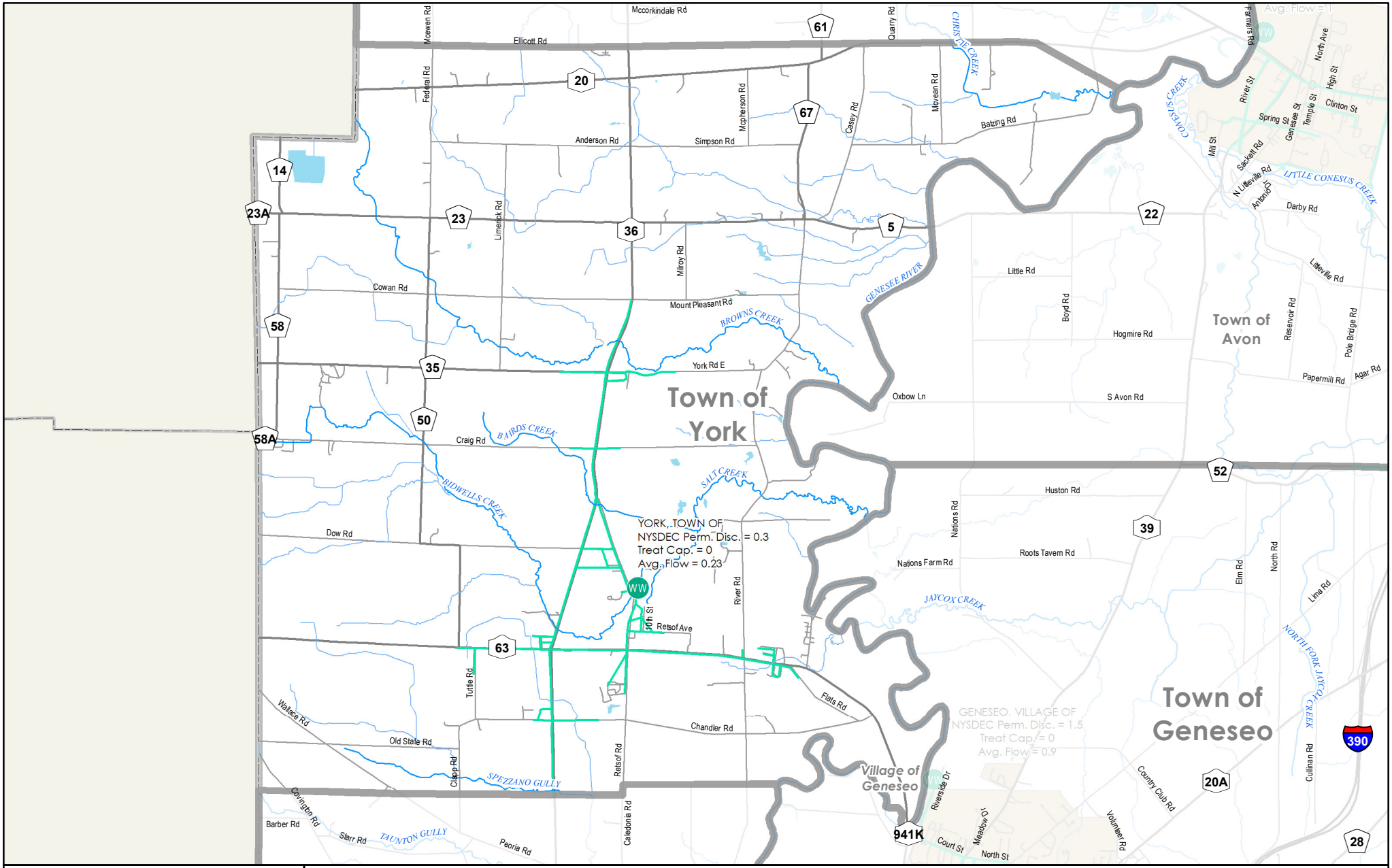

MAP SHEET:
FIGURE 6-1. 2

MAP TITLE:
York Sewer System

DATE PREPARED:
AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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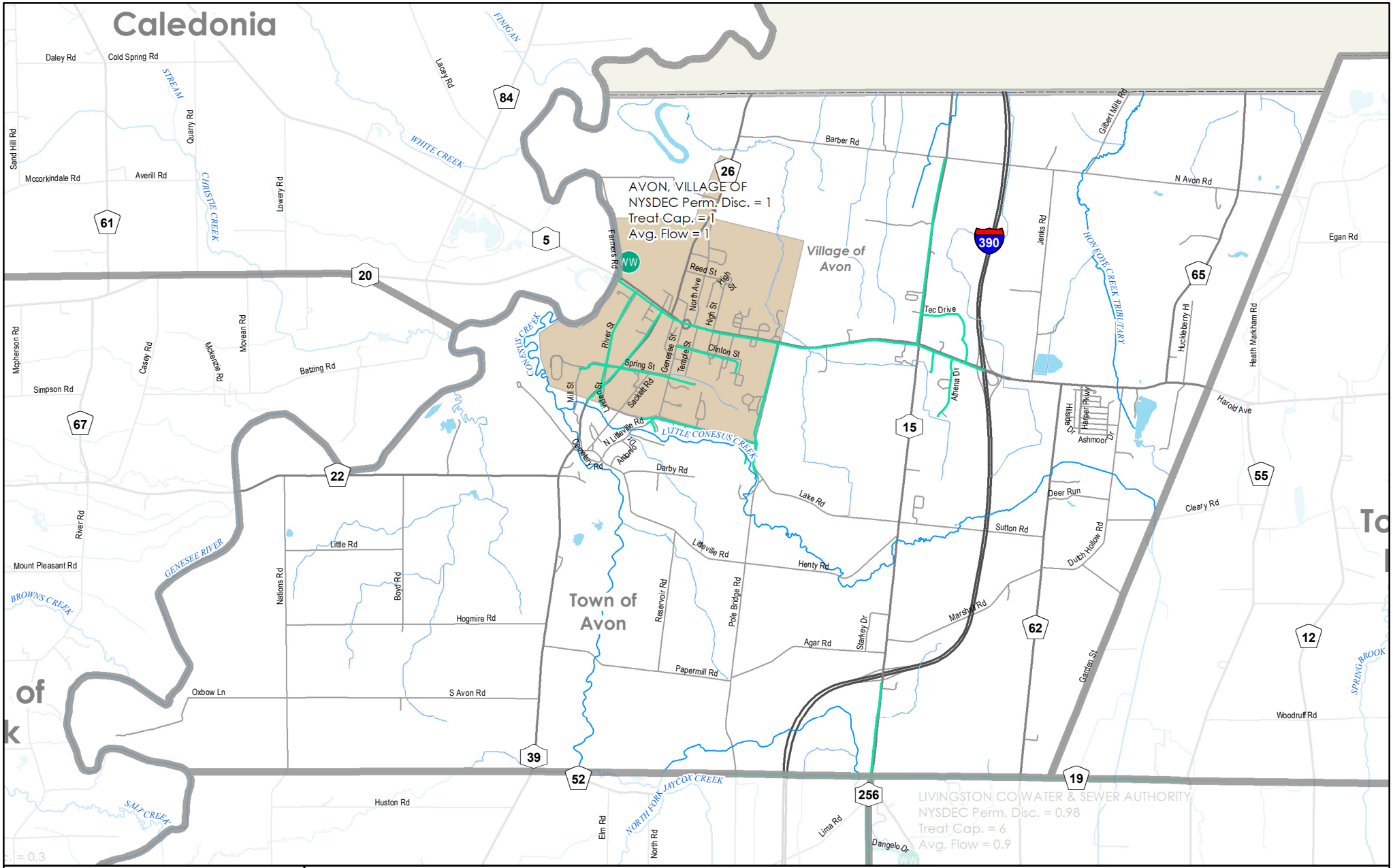

MAP SHEET:
FIGURE 6-1. 3

MAP TITLE:
Avon Sewer System

DATE PREPARED:
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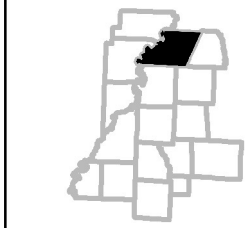

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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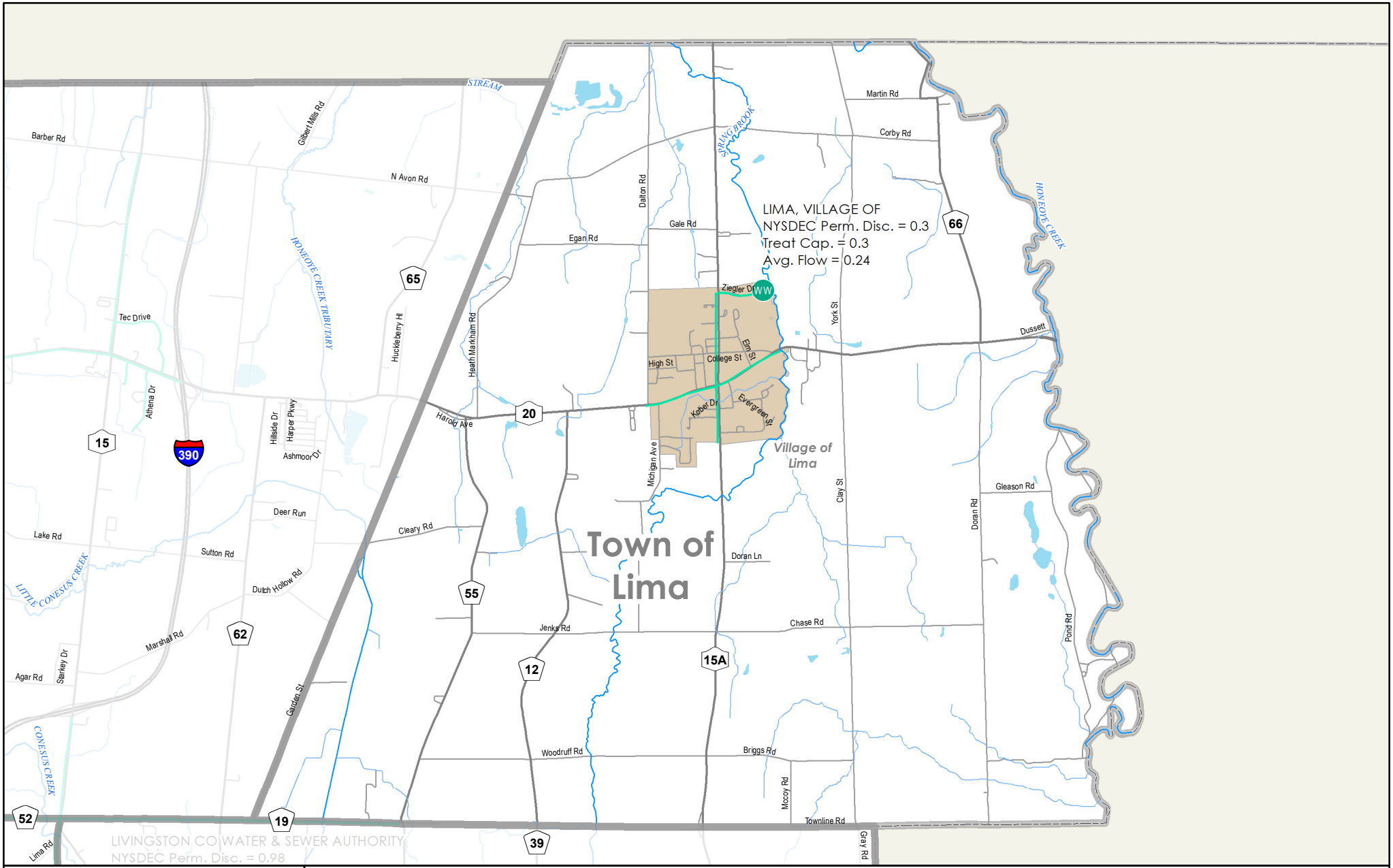
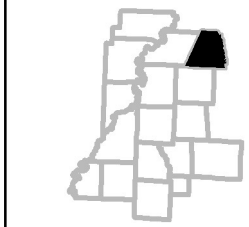


MAP SHEET:
FIGURE 6-1. 4

MAP TITLE:
Lima Sewer System

DATE PREPARED:
AUGUST 20, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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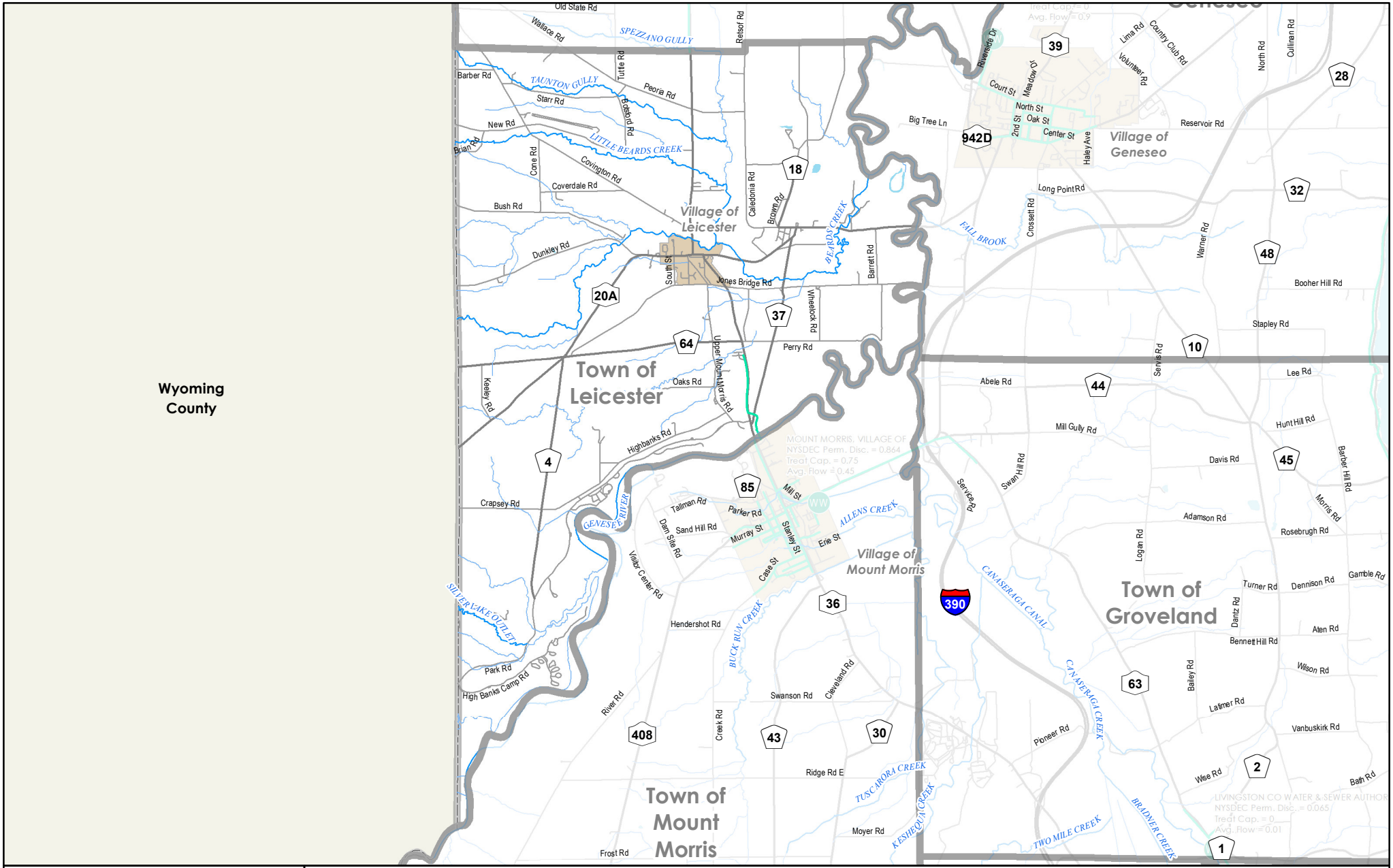

MAP SHEET:
FIGURE 6-1. 5

MAP TITLE:
Leicester Sewer System

DATE PREPARED:
AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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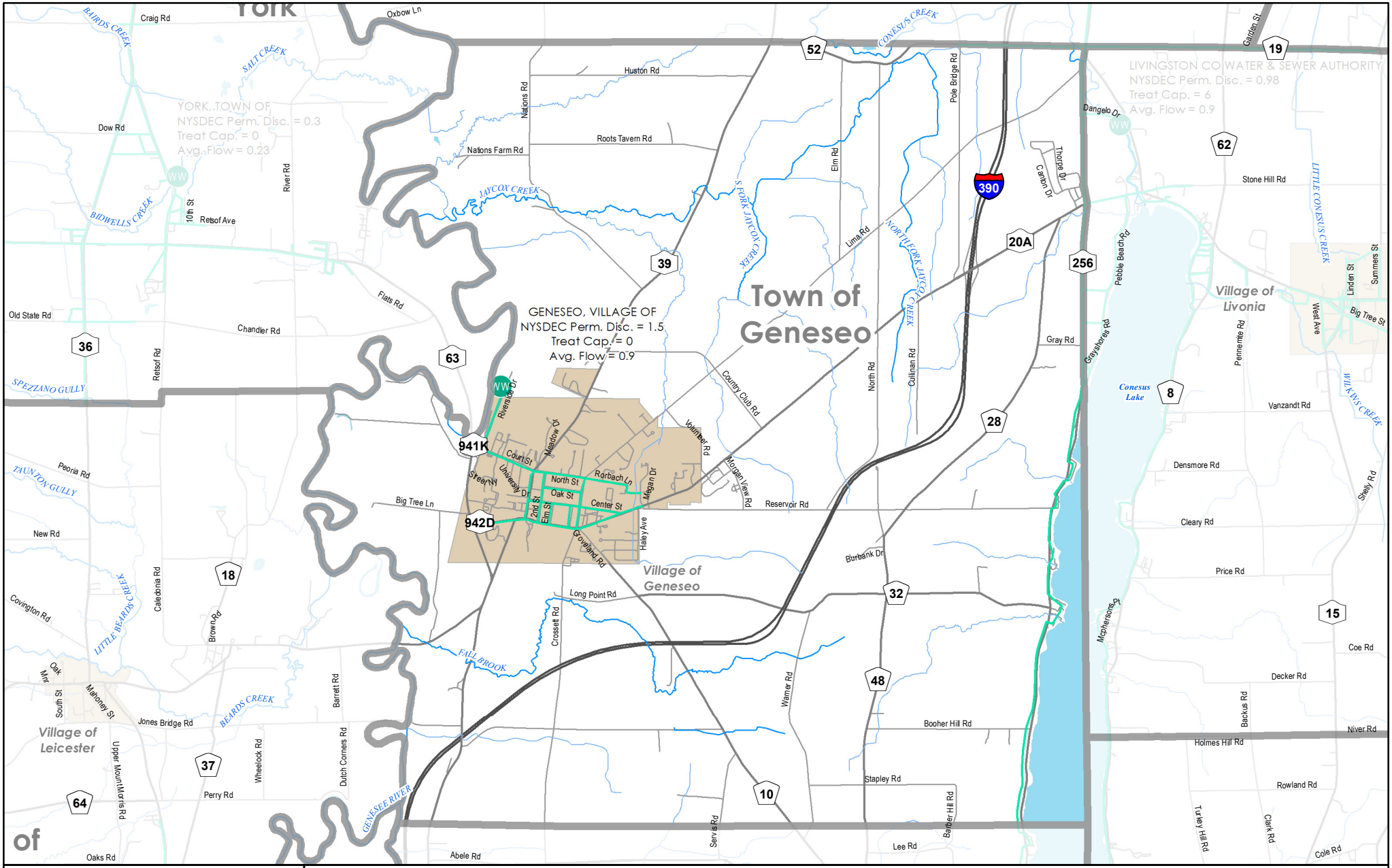

MAP SHEET:

FIGURE 6-1. 6

MAP TITLE:

Geneseo Sewer System

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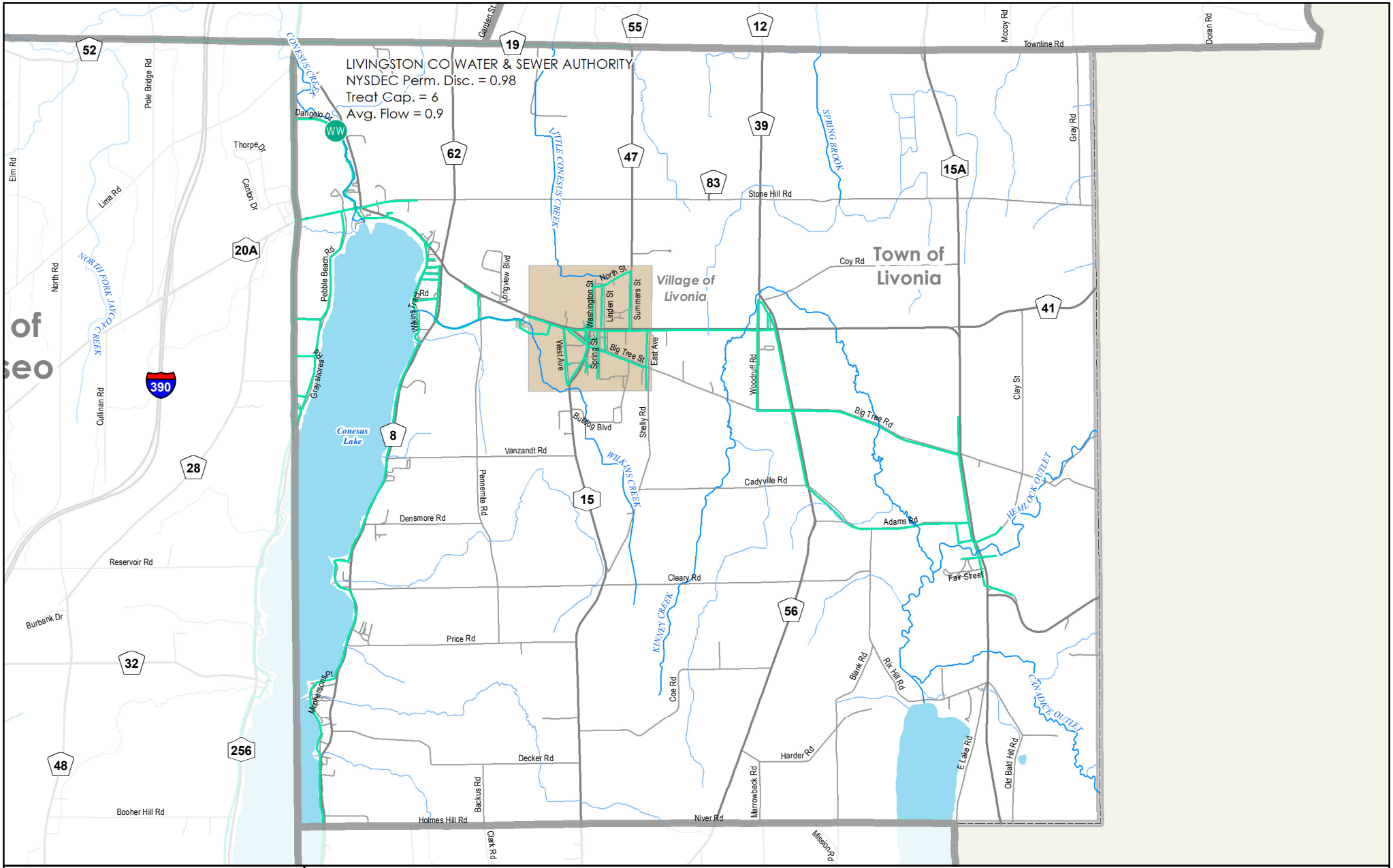
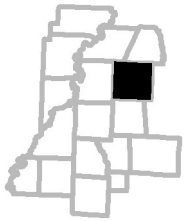


MAP SHEET:
FIGURE 6-1. 7

MAP TITLE:
Livonia Sewer System

DATE PREPARED:
AUGUST 20, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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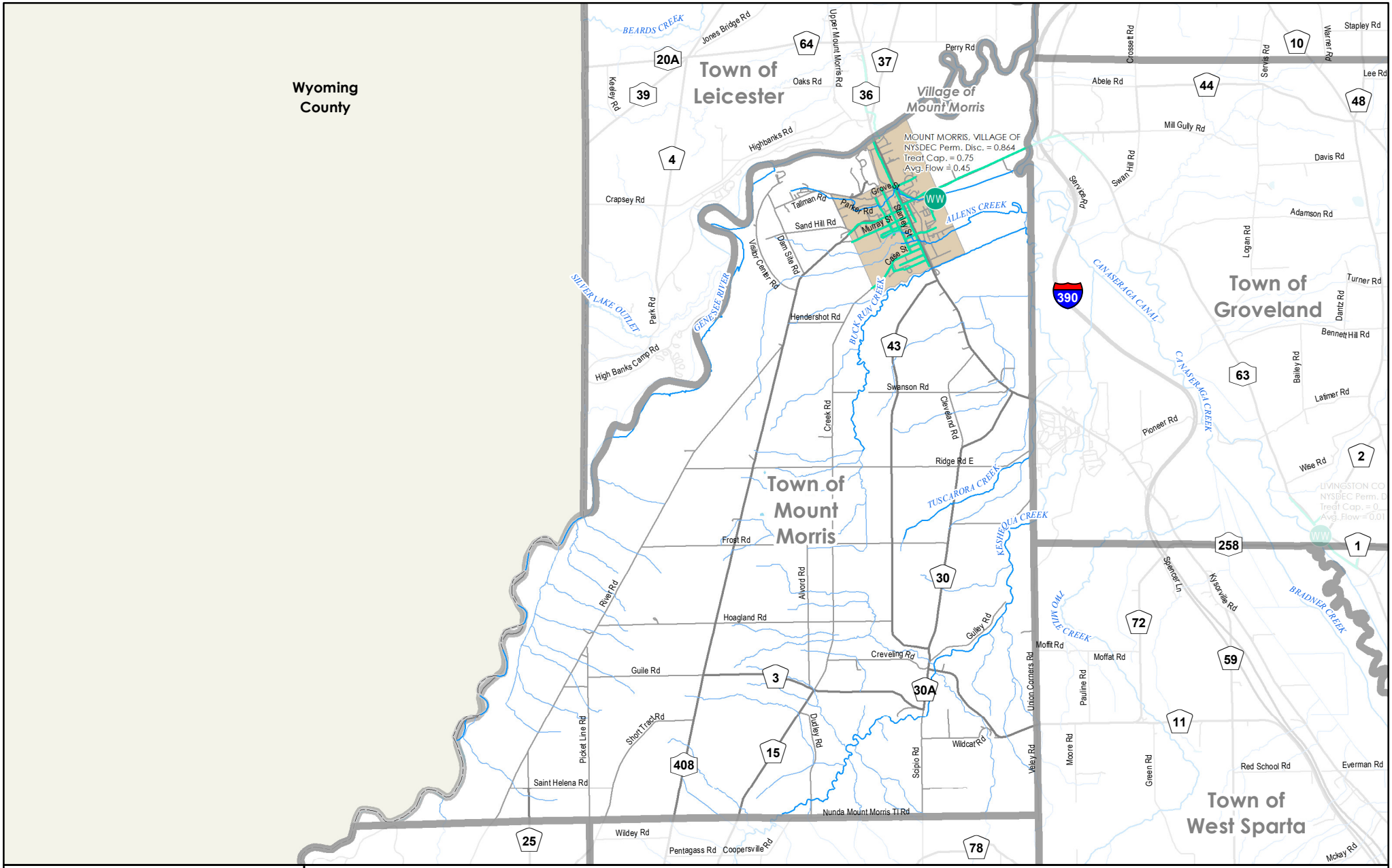
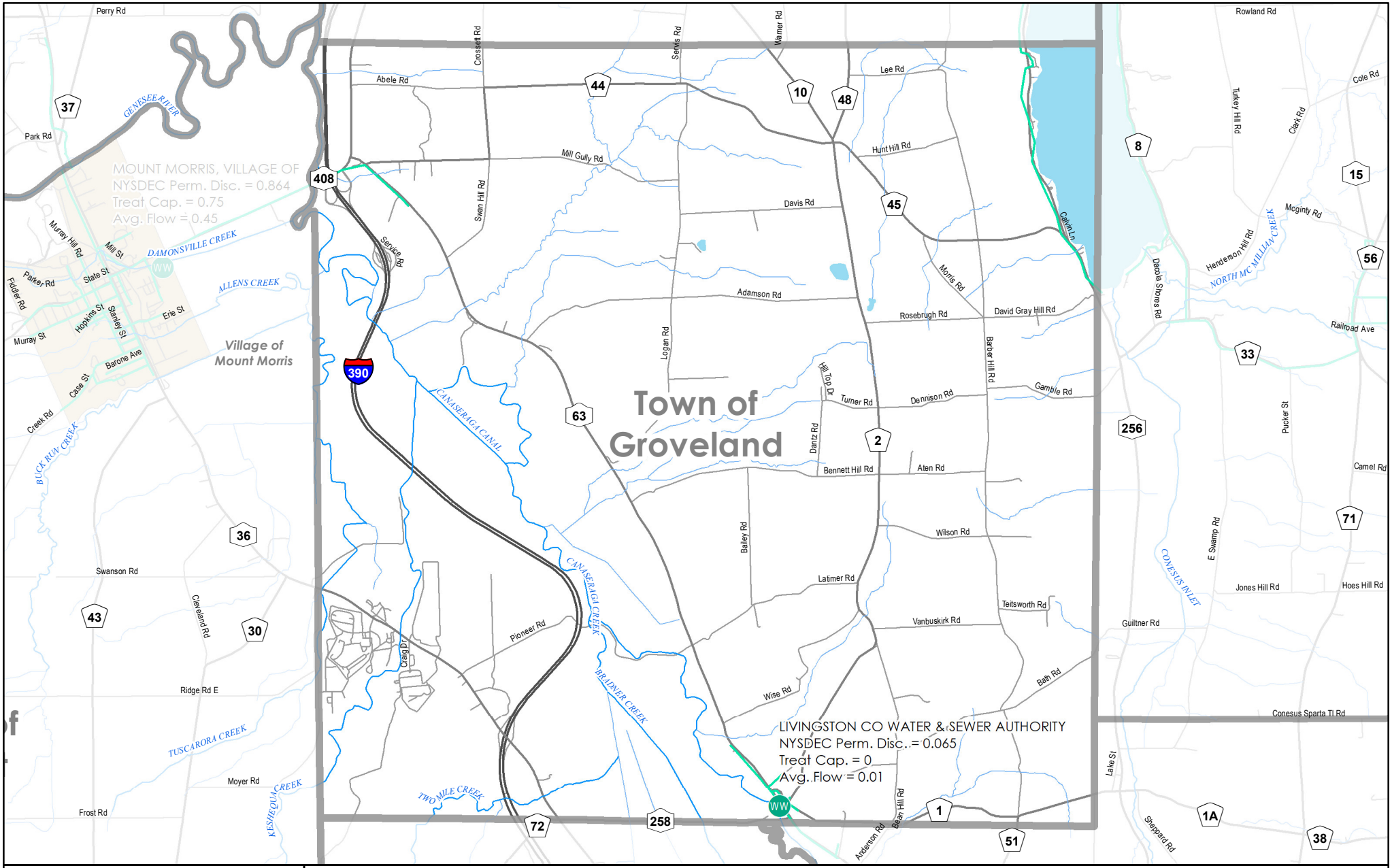


MAP SHEET:
FIGURE 6-1. 8

MAP TITLE:
Mount Morris Sewer System

DATE PREPARED:
AUGUST 20, 2020



MAP SHEET:
FIGURE 6-1. 9

MAP TITLE:
Groveland Sewer System

DATE PREPARED:
AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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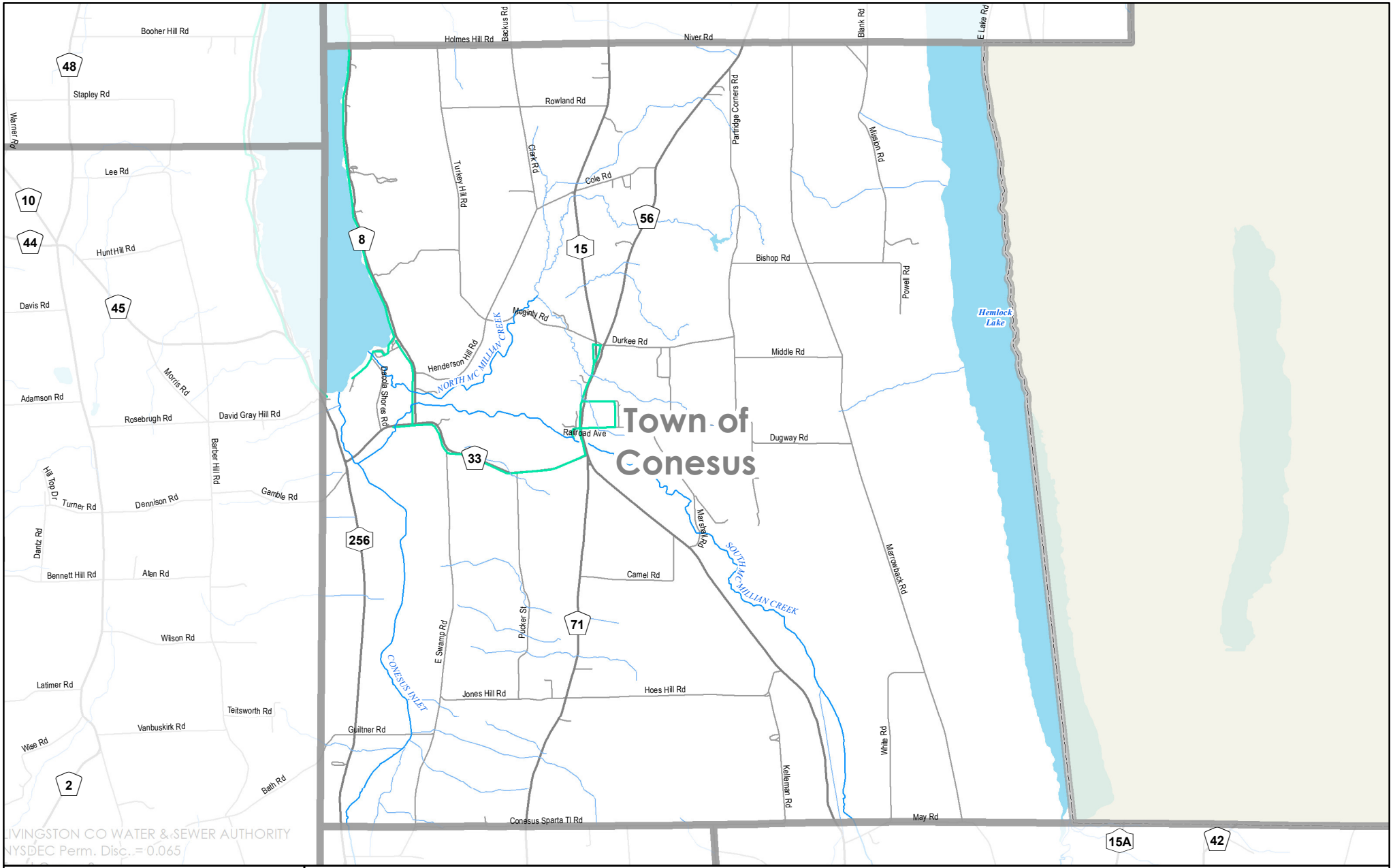
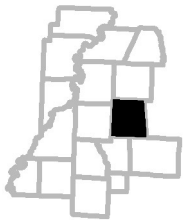


MAP SHEET:
FIGURE 6-1. 10

MAP TITLE:
Conesus Sewer System

DATE PREPARED:
AUGUST 20, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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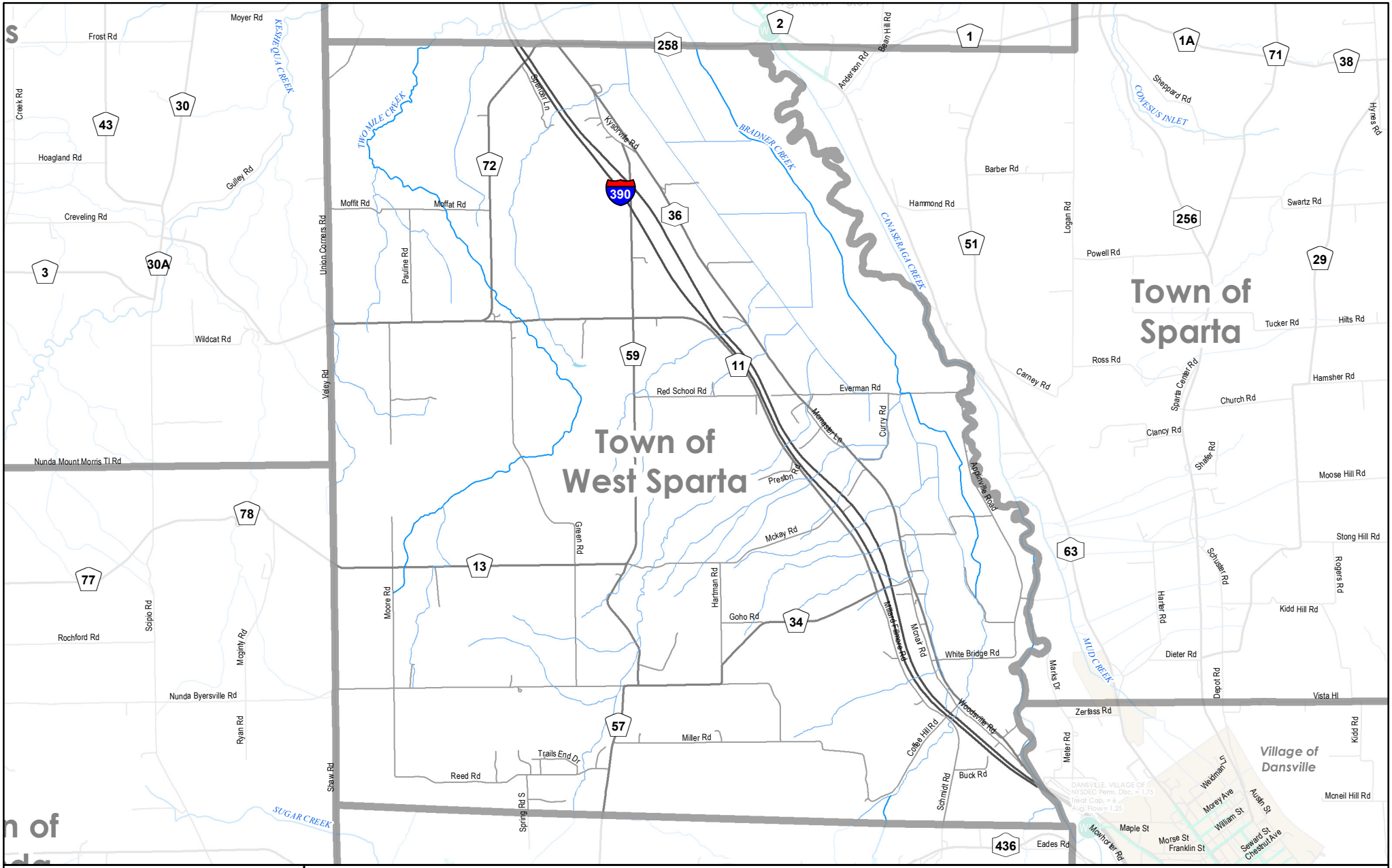
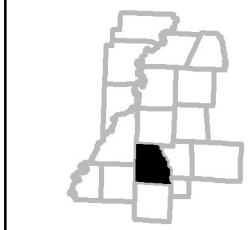


MAP SHEET:
FIGURE 6-1. 11

MAP TITLE:
West Sparta Sewer System

DATE PREPARED:
AUGUST 20, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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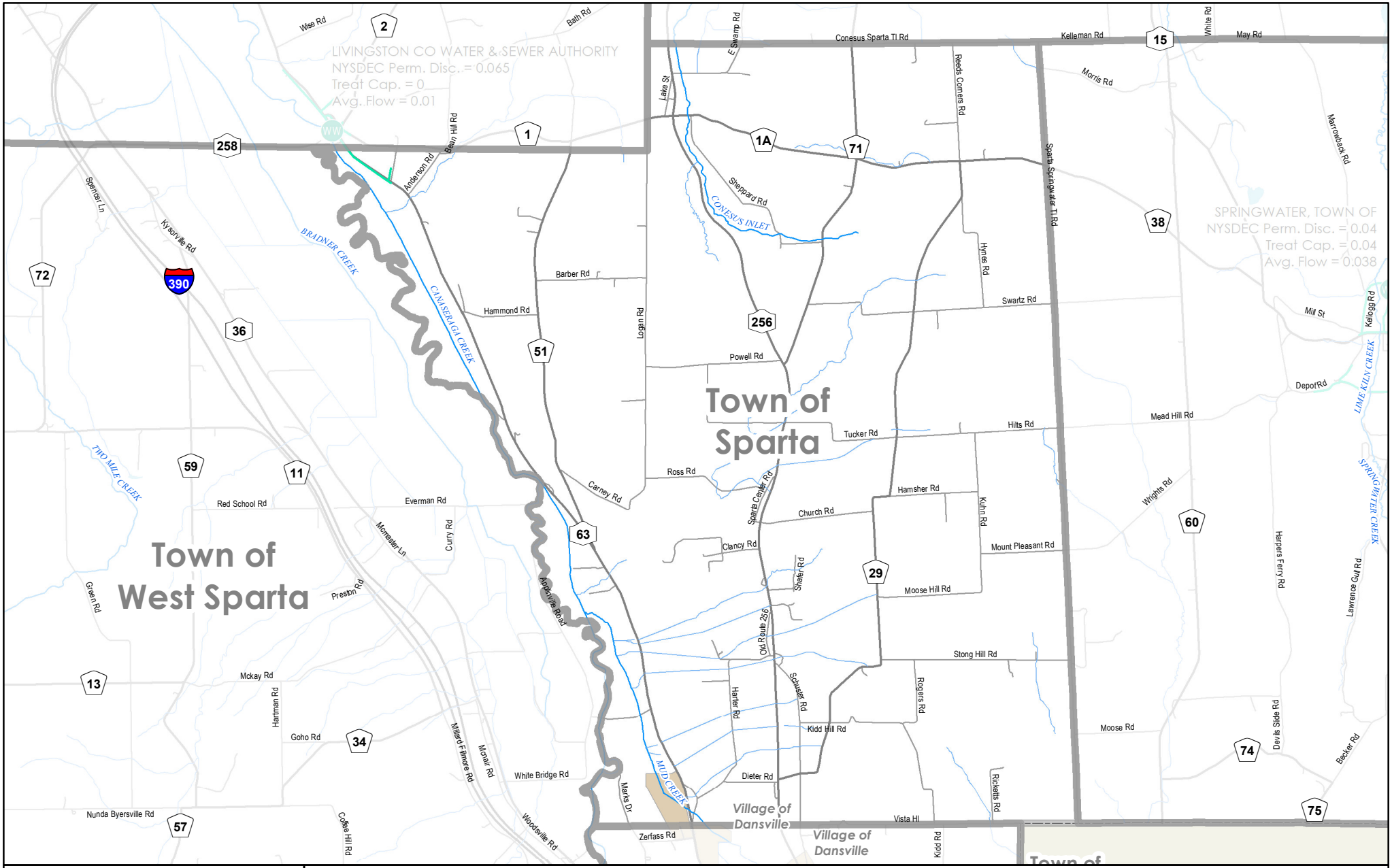
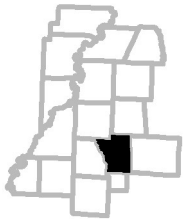


MAP SHEET:
FIGURE 6-1. 12

MAP TITLE:
Sparta Sewer System

DATE PREPARED:
AUGUST 20, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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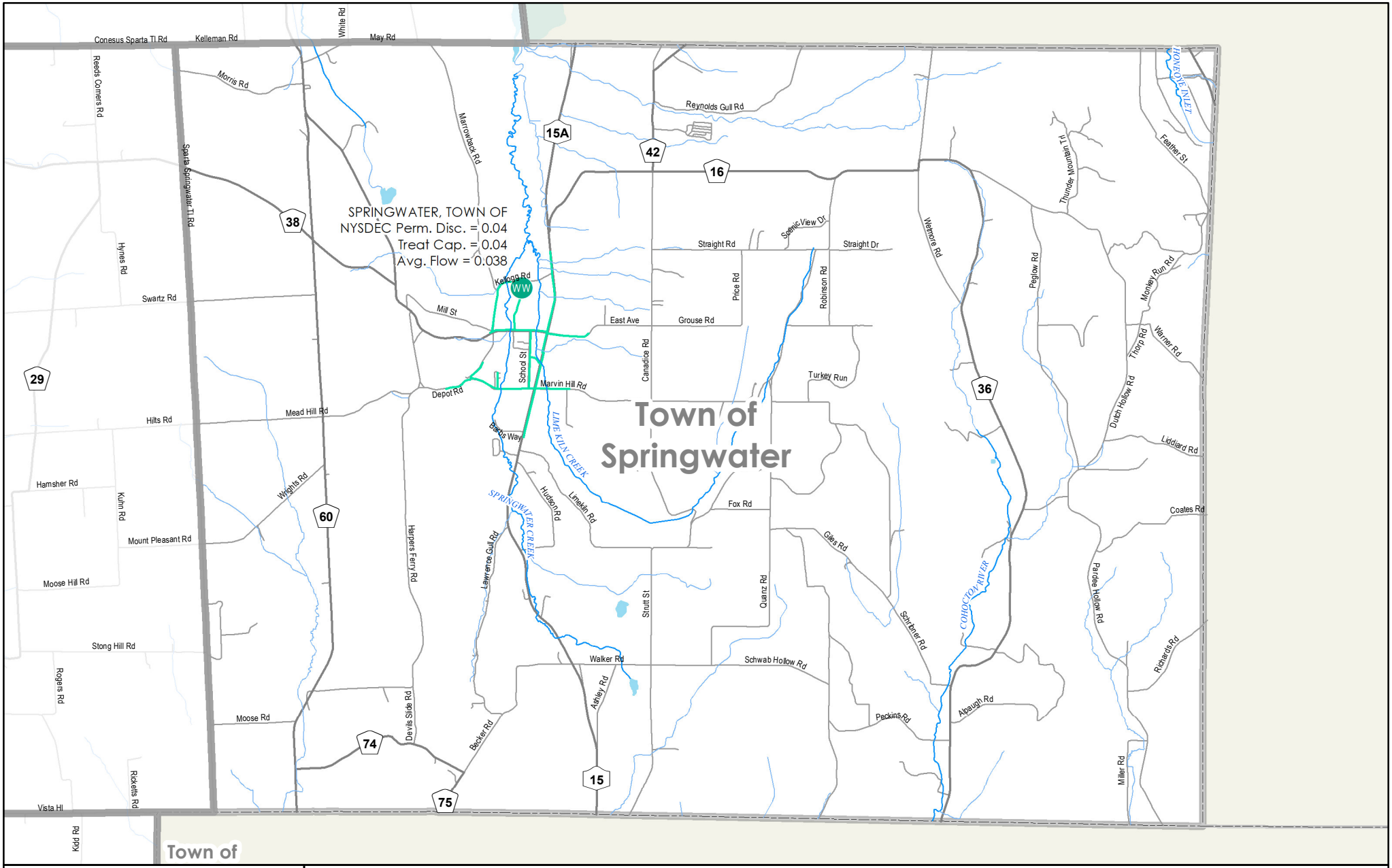

MAP SHEET:
FIGURE 6-1. 13

MAP TITLE:
Springwater Sewer System

DATE PREPARED:
AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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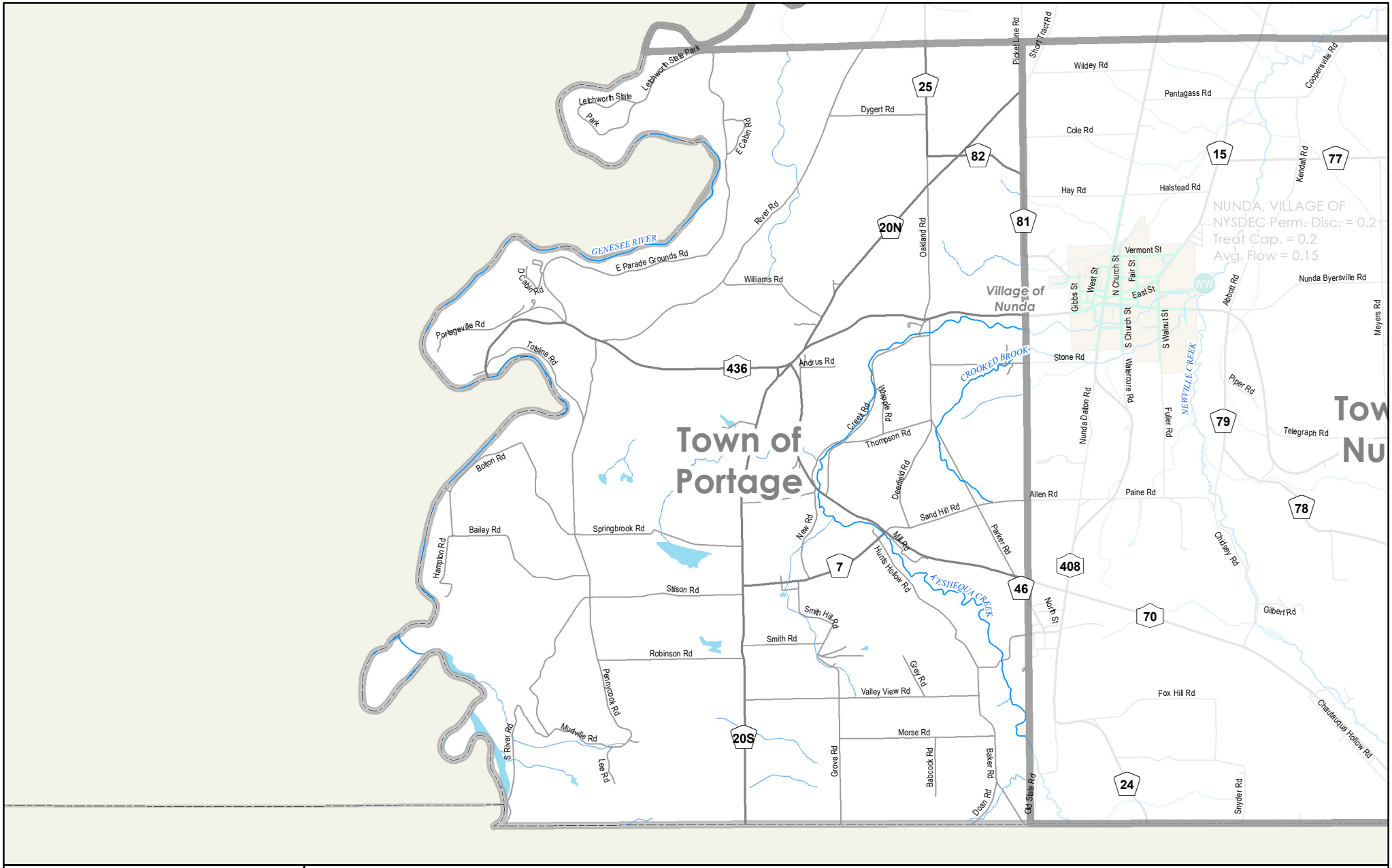

MAP SHEET:
FIGURE 6-1. 14

MAP TITLE:
Portage Sewer System

DATE PREPARED:
AUGUST 20, 2020

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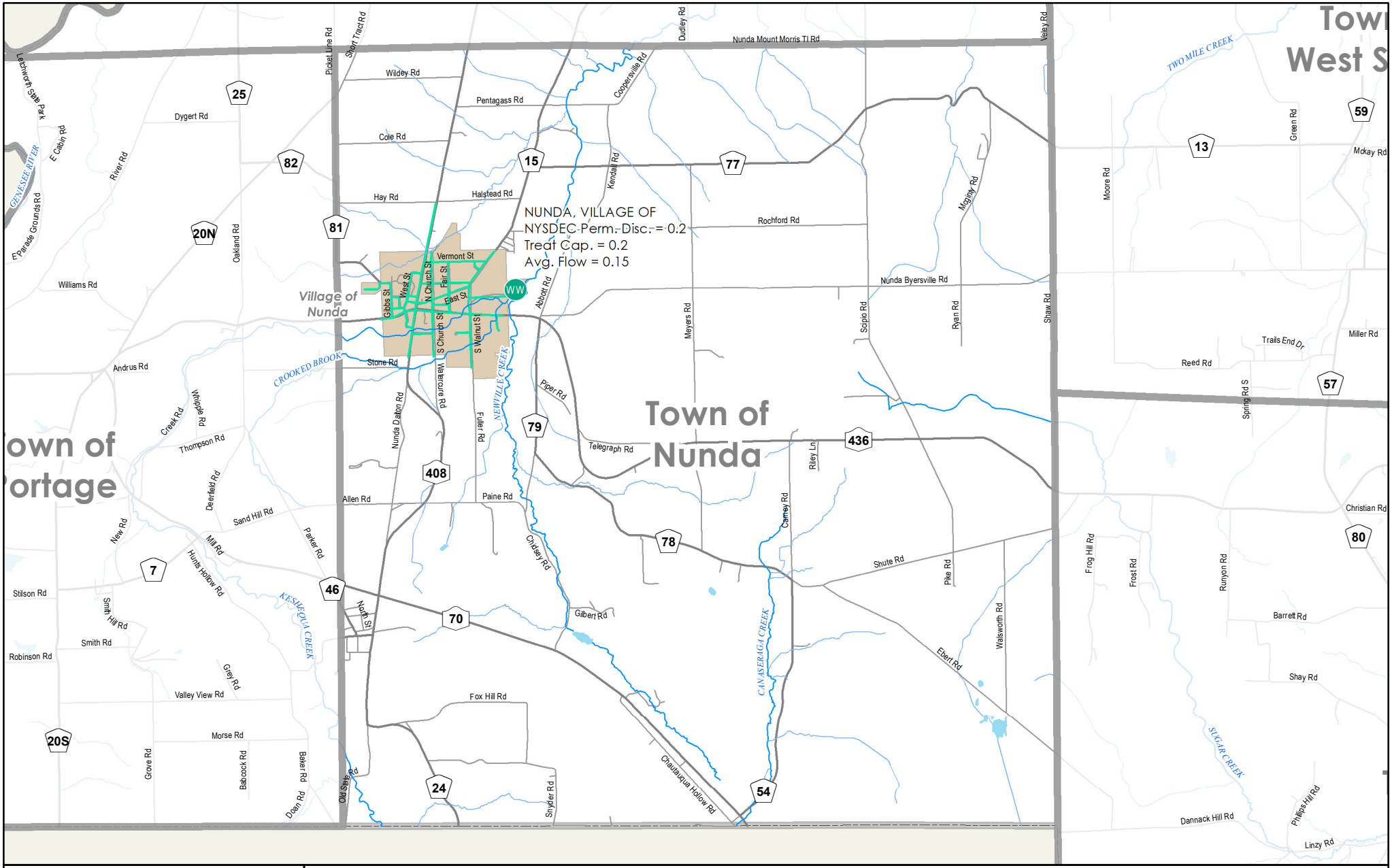
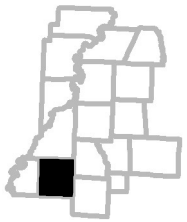


MAP SHEET:
FIGURE 6-1. 15

MAP TITLE:
Nunda Sewer System

DATE PREPARED:
AUGUST 20, 2020



Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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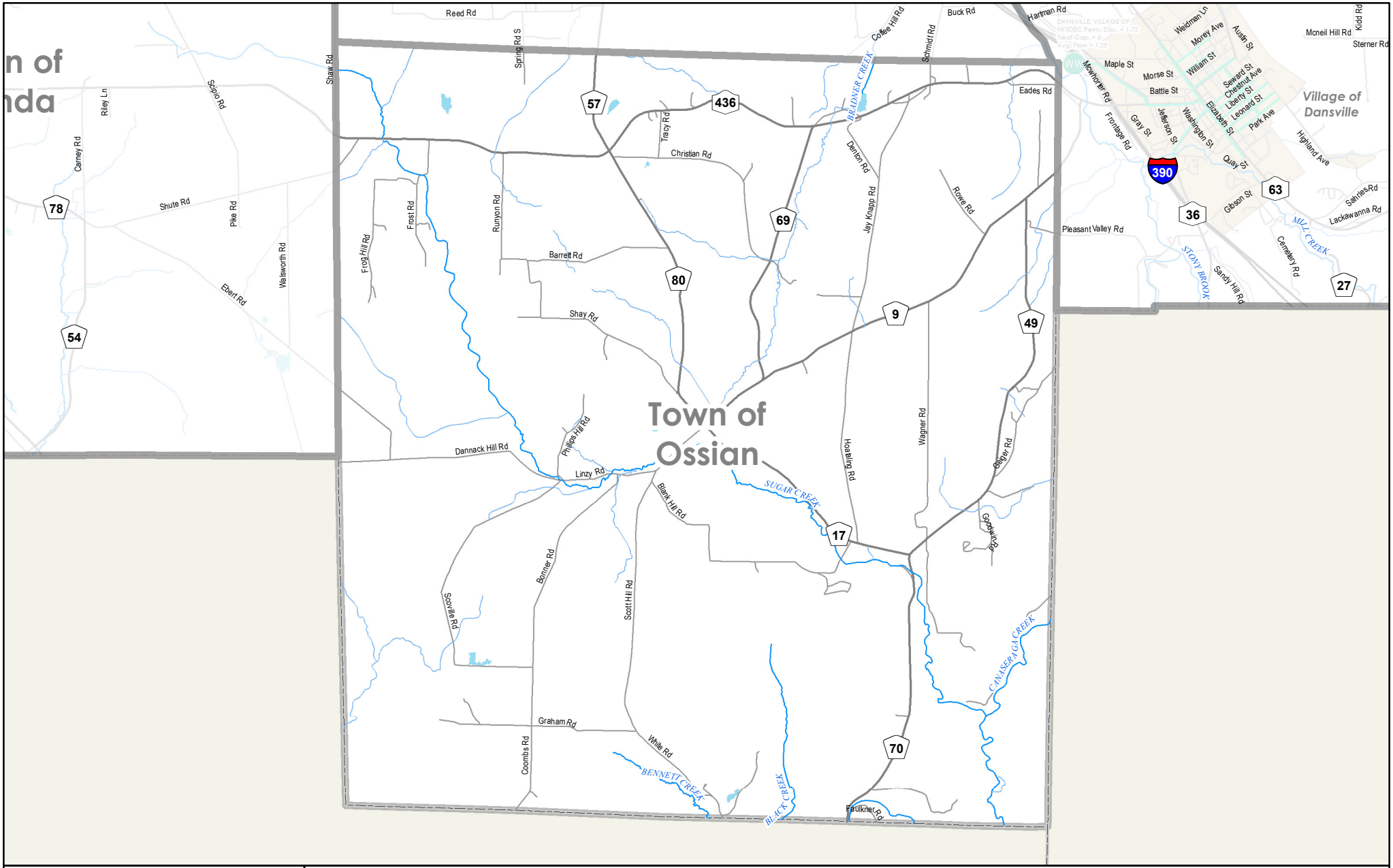

MAP SHEET:
FIGURE 6-1. 16

MAP TITLE:
Ossian Sewer System

DATE PREPARED:
AUGUST 20, 2020

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Waterbodies
- Major Streams
- Minor Streams
- Sewer lines
- WW Wastewater Treatment Facilities

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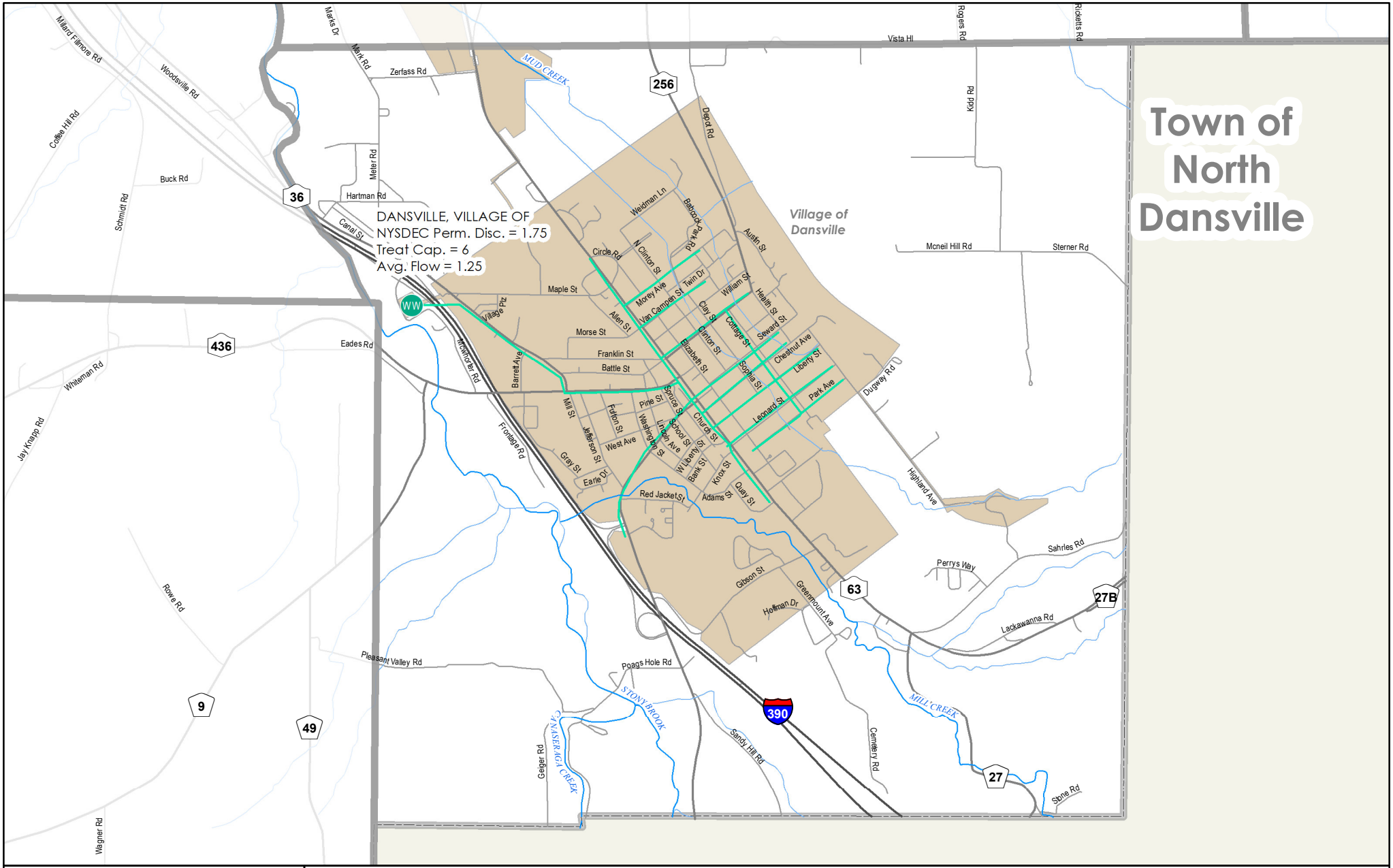

MAP SHEET:
FIGURE 6-1. 17

MAP TITLE:
North Dansville Sewer System

DATE PREPARED:
AUGUST 20, 2020

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Monroe County
Genesee County
Ontario County
Wyoming County
Allegany County
Steuben County
Village of Caledonia
Town of Caledonia
Village of Avon
Town of Avon
Village of Lima
Town of Lima
Town of York
Town of Geneseo
Village of Geneseo
Town of Livonia
Village of Livonia
Town of Leicester
Village of Leicester
Village of Mount Morris
Town of Mount Morris
Town of Groveland
Town of Conesus
Town of Sparta
Town of Springwater
Town of West Sparta
Village of Nunda
Town of Nunda
Town of Portage
Village of Dansville
Town of North Dansville
Town of Ossian
Honeoye Lake
Canadice Lake
Hemlock Lake
Silver Lake
Conesus Lake
SPRING CREEK
MAXWELL CREEK
DUGAN CREEK
STREAM
FINIGAN CREEK
CHRISTIE CREEK
WHITE CREEK
GENESEE RIVER TRIBUTARY
CONSTIS CREEK
SPRING BROOK
HONEOYE CREEK
BROWNS CREEK
BAIRDS CREEK
BIDWELLS CREEK
SALLY CREEK
JAYCOX CREEK
SPEZZANO GULLY
TAUNTON GULLY
LITTLE BEARDS CREEK
BEARDS CREEK
FALL BROOK
DAMONSVILLE CREEK
ALLENS CREEK
BUCK RUN CREEK
GENESEE RIVER
CANASERAGA CANAL
TUSCARORA CREEK
TWO MILE CREEK
BRADNER CREEK
CANASERAGA CREEK
COHOCTON INLET
LIMEKILN CREEK
HONEOYE INLET
COHOCTON RIVER
MUD CREEK
WILKINS CREEK
HEMLOCK OUTLET
CANADICE OUTLET
CROOKED BROOK
KESHEQUA CREEK
NEWTILLE CREEK
STONY BROOK
SUGAR CREEK
BENNETT CREEK
BLACK CREEK
WW
390
256
436
258

MAP SHEET:
MAP 6-3

MAP TITLE:
Livingston County Municipal Sewerage Areas

DATE PREPARED:
AUGUST 20, 2020

Livingston County

Legend

- County Boundaries
- Town Boundaries
- Villages
- Local Roads
- County Roads
- Interstate
- State Routes
- Major Streams
- Minor Streams
- Waterbodies
- Wastewater Treatment Facilities
- Local Sewer Operations
- LCWSA

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Areas designated for development include the areas outside of the Village of Caledonia along NYS Route 5 to the south and the west. Other notable locations without public sewer include several mobile home parks and residential development in the Sand Hill Road area. All of these areas may have a potential need for sewer as development continues.

Village of Leicester

The Village of Leicester is not served by public sanitary sewer. All sanitary sewer is treated by private on-site treatment systems, with none of those systems permitted by the NYSDEC. There are existing wastewater treatment plants located in neighboring municipalities including the Town of York, Village of Geneseo, and Village of Mount Morris.

The Town of Leicester completed a sewer study in 2015 that evaluated the potential for public sewer in areas of the Town, but also investigated public sewer in the Village of Leicester. This is not the first time that public sewer was evaluated in the Village, as in 1999 a study was completed that ultimately led to a vote for public sewer that was defeated. The majority of the parcels in the Village of Leicester are occupied with residential uses. However, there are vacant parcels along NYS Route 36 that could be developed but lack public sewer which limits the potential for development.

Town of Leicester

The Town of Leicester is not served by public sanitary sewer with the exception of a small portion along NYS Route 36 from the mobile home park to the southern Town line, as discussed previously.

The Town of Leicester completed a sewer study in 2015 that evaluated the potential for public sewer in areas of the Town, specifically the hamlet of Cuylerville, NYS Route 36 north of the Village of Leicester, and the area in the vicinity of Jones Bridge and Wheelock Roads. The study evaluated different combinations of the service areas along with options for treatment at exiting wastewater treatment facilities and a new wastewater treatment facility. The 2015 sewer study also included a public survey with approximately half the respondents indicating they would be interested in a public sewer system—the annual cost being the main determining factor. The hamlet of Cuylerville showed the largest need with evidence of many failed or inadequate septic systems.

The majority of the remaining areas of the Town of Leicester are primarily agricultural with no need for public sewer, with the exception of the five-corners area that does include a residential pocket and commercial/industrial uses.

Town of Ossian

The Town of Ossian is not served by public sanitary sewer. All sanitary sewer is treated by private on-site treatment systems, with none of those systems permitted by the NYSDEC. There is an existing wastewater treatment plant located in the neighboring municipality of the Village of Dansville.

Town of Portage

The Town of Portage is not served by public sanitary sewer. All sanitary sewer is treated by private on-site treatment systems, with none of those systems permitted by the NYSDEC. There is an existing wastewater treatment plant located in the neighboring municipality of the Village of Nunda.

Town of West Sparta

The Town of West Sparta is not served by public sanitary sewer. All sanitary sewer is treated by private on-site treatment systems, with none of those systems permitted by the NYSDEC. There are existing wastewater treatment plants located in the neighboring municipalities of the Village of Dansville and Town of Groveland.

6.3.3 Wastewater System operators

Wastewater operators are responsible for treating wastewater through several different physical and chemical processes and conducting effluent sample tests to ensure water quality compliance and standards. The operator grades are based on experience and whether the operator has acquired an activated sludge WWTF. Below is a table provided by the New York Department of Environmental Conservation which describes the requirements needed for each operating grade available. The letter "A" next to the grade number depicts that activated sludge experience is met.

Grade	Types of Experience		B.S. Degree*	Approved A.A.S.**	A.A.S.***	High School
4A	Operating Experience	May be acquired at any WWTP.		1½ Years	3 years	6 Years
	Approved Operating Experience	Must be acquired at an activated sludge WWTP with a point score of 76 or greater.	2 Years	2 Years	2 Years	2 Years
		Total	**2 Years**	**3½ Years**	**5 Years**	**8 Years**
4	Operating Experience	May be acquired at any WWTP.		1½ Years	3 Years	6 Years
	Approved Operating Experience	Must be acquired at a WWTP with a point score of 76 or greater.	2 Years	2 Years	2 Years	2 Years
		Total	**2 Years**	**3½ Years**	**5 Years**	**8 Years**
3A	Operating Experience	May be acquired at any WWTP.			1½ Years	3 Years
	Approved Operating Experience	Must be acquired at an activated sludge WWTP with a point score of 56 or greater.	1½ Years	1½ Years	1½ Years	1½ Years
		Total	**1½ Years**	**1½ Years**	**3 Years**	**4½ Years**
3	Operating Experience	May be acquired at any WWTP.			1½ Years	3 Years
	Approved Operating Experience	Must be acquired at a WWTP with a point score of 56 or greater.	1½ Years	1½ Years	1½ Years	1½ Years
		Total	**1½ Years**	**1½ Years**	**3 Years**	**4½ Years**
2A	Approved Operating Experience	Must be acquired at an activated sludge WWTP with a point score of 31 or greater.	1 Year	1 Year	1 Year	1 Year
2	Approved Operating Experience	Must be acquired at a WWTP with a point score of 31 or greater.	1 Year	1 Year	1 Year	1 Year
1A	Approved Operating Experience	Must be acquired at an activated sludge WWTP.	6 Months	6 Months	6 Months	6 Months
1	Approved Operating Experience	May be acquired at any WWTP.	6 Months	6 Months	6 Months	6 Months

Table 6-3 below and on the following page provides an overview of the sewer operators within each community or Authority, as applicable. The length of experience, if known or provided by each community and the County Department of Health (DOH) is shown as well. Similar to water operators, this information provides some insight, though limited, into the level of experience of operators, the gaps in institutional knowledge among older and newer operators, and the potential loss of that knowledge as a result of retirement or other jobs.

Table 6-3
Livingston County Wastewater Operators

Municipality	Number of Operators	Operating Class					Experience (Years)
		1	2	2A	3	3A	
Avon (T)	N/A						
Avon (V)	1			■	■		
	2		■				
	3	■					
Caledonia (T)	N/A						
Caledonia (V)	N/A						
Conesus (T)	N/A						
Geneseo (T)	N/A						
Geneseo (V)	1				■		29
	2		■				6
	3	■					32
	4		■				
	5		■				12
	6				■		
	7		■				2
Groveland (T)	N/A						
Leicester (T)	N/A						
Leicester (V)	N/A						
Lima (T)	N/A						
Lima (V)	1		■				
	2		■				
	3		■				
Livonia (T)	N/A						
Livonia (V)	N/A						
Mount Morris (T)	N/A						

Table 6-3
Livingston County Wastewater Operators

Municipality	Number of Operators	Operating Class					Experience (Years)
		1	2	2A	3	3A	
Mount Morris (V)	1		■				3
	2		■				12
North Dansville (T)	N/A						
Dansville (V)	1					■	8
	2			■			
	3						In Training
	4						In Training
Nunda (T)	N/A						
Nunda (V)	1			■			17
	2			■			12
	3					■	8
Ossian (T)	N/A						
Portage (T)	N/A						
Sparta (T)	N/A						
Springwater (T)	1	■					
	2	■					
West Sparta (T)	N/A						
York (T)	1		■				
	2		■				
LCWSA	YAWS						

6.3.4 Finances

Similar to water finances, each community in the County maintains their own billing and finances whether it includes a treatment plant or only a collection system. Rates vary between municipalities, but generally include a yearly or quarterly flat rate for residential users and a cost per 1,000 gallons for non-residential users. **Table 6-4** on the following pages provides a summary of sewer rates as of 2019 for each receiving water body and community serviced by it.

Table 6-4
Livingston County Existing Wastewater Rates

Discharge Waterbody	Municipality	Town Billing		Village Billing		
		In-District	Non-Residential	In-Village	Out-of-Village	Non-Residential
Springwater Creek	Town of Springwater					
	Flat Quarterly Charge	$100.00				
Keshequa Creek	Village of Nunda					
	Service Charge (per 1,000 gal)			$4.39		
	Operations and Maintenance			$72.00		
	Town of Nunda					
	Service Charge (per 1,000 gal)	$4.39				
	Operations and Maintenance	$94.00				
Spring Brook Creek	Village of Lima					
	Minimum Quarterly Charge (0-5,999 gal)			$62.50		
	Minimum Quarterly Charge (0-5,999 gal)			$125.00		
	Additional per 5,000 gallons (>30k gal)			$24.20		
	Town of Lima					
	Minimum Quarterly Charge (0-5,999 gal)				$68.00	
	Minimum Quarterly Charge (0-5,999 gal)				$136.00	
	Additional per 5,000 gallons (>30k gal)				$24.20	
Bidswell Creek	Town of York Retsof Sewer District					
	Flat Quarterly Charge	$95.00				
	Town of York Sewer District #1					
	Flat Quarterly Charge	$90.00				
	Debt Charge	$306.55				

Table 6-4
Livingston County Existing Wastewater Rates

Discharge Waterbody	Municipality	Town Billing		Village Billing		
		In-District	Non-Residential	In-Village	Out-of-Village	Non-Residential
Bidswell Creek	Town or York Sewer District #2					
	Flat Quarterly Charge	$90.00				
	Debt Charge	$338.59				
Conesus Creek	Town of Avon (South of I-390) - LCWSA Billing					
	Minimum Yearly Charge	$322.00				
	Additional per 1,000 gal		$4.47			
	Debt Charge	116.00	$116.00			
	Town of Conesus (East Lake Rd) - LCWSA Billing					
	Minimum Yearly Charge	$322.00				
	Additional per 1,000 gal		$4.47			
	Debt Charge	$76.00	$76.00			
	Town of Conesus (Hamlet) - LCWSA Billing					
	Minimum Yearly Charge	322.00				
	Additional per 1,000 gal		$4.47			
	Debt Charge	$76.00	$76.00			
	Town of Geneseo (West Lake Rd) - LCWSA Billing					
	Minimum Yearly Charge	322.00				
	Additional per 1,000 gal		$4.47			
	Debt Charge	$76.00	$76.00			

Table 6-4
Livingston County Existing Wastewater Rates

Discharge Waterbody	Municipality	Town Billing		Village Billing		
		In-District	Non-Residential	In-Village	Out-of-Village	Non-Residential
Conesus Creek	Town of Groveland (West Lake Rd) - LCWSA Billing					
	Minimum Yearly Charge	$322.00				
	Additional per 1,000 gal		$4.47			
	Debt Charge	$ 76.00	$76.00			
	Town of Livonia (Hemlock) - LCWSA Billing					
	Minimum Yearly Charge	$322.00				
	Additional per 1,000 gal		$4.47			
	Debt Charge	$76.00	$76.00			
	Town of Livonia (Livonia Center) - LCWSA Billing					
	Minimum Yearly Charge	$322.00				
	Additional per 1,000 gal		$4.47			
	Debt Charge	$76.00	$76.00			
	Town of Livonia (Conesus Lake) - LCWSA Billing					
	Minimum Yearly Charge	$322.00				
	Additional per 1,000 gal		$4.47			
	Debt Charge	$76.00	$76.00			

Table 6-4
Livingston County Existing Wastewater Rates

Discharge Waterbody	Municipality	Town Billing		Village Billing		
		In-District	Non-Residential	In-Village	Out-of-Village	Non-Residential
Conesus Creek	Village of Livonia - LCWSA Billing					
	Minimum Yearly Charge			$322.00		
	Additional per 1,000 gal					$4.47
	Debt charge			$56.00		$56.00
Genesee River	Village of Avon					
	Minimum Quarterly Charge			$57.00		
	Village of Avon (Lakeville/Polebridge Ext.) - LCWSA Billing					
	Minimum Yearly Charge	$316.00				
	Additional per 1,000 gal		$4.39			
	Debt Charge	$60.00	$60.00			
	Town of Avon (East Avon) - LCWSA Billing					
	Minimum Yearly Charge	$316.00				
	Additional per 1,000 gal		$4.39			
	Debt Charge	$60.00	$60.00			
	Town of Geneseo - Village of Geneseo Billing					
	Minimum Quarterly Charge			$80.00		
	Village of Geneseo					
	Minimum Yearly Charge			$240.00		

Table 6-4
Livingston County Existing Wastewater Rates

Discharge Waterbody	Municipality	Town Billing		Village Billing		
		In-District	Non-Residential	In-Village	Out-of-Village	Non-Residential
Canaseraga Creek	Village of Dansville					
	Minimum Quarterly Charge			$83.00		
	Additional per 1,000 gal			$3.50		
	Town of North Dansville - Village of Dansville Billing					
	Minimum Quarterly Charge				$98.00	
	Additional per 1,000 gal				$4.00	
	Town of Groveland (ARS) - LCWSA Billing					
	Minimum Yearly Charge	$652.00				
	Additional per 1,000 gal		$9.05			
	Debt Charge	$60.00	$60.00			
	Town of Groveland (Groveland Station) - LCWSA Billing					
	Minimum Yearly Charge	$382.00				
	Additional per 1,000 gal		$5.31			
	Town of Mount Morris - Village Billing					
	Minimum Quarterly Charge (0-15,000 gal)	$90.00				
	Additional per 1,000 gallons (>15k gal)	$4.00				
	Murray Hill Campus (12k gal per Unit)					$46.60

Table 6-4
Livingston County Existing Wastewater Rates

Discharge Waterbody	Municipality	Town Billing		Village Billing		
		In-District	Non-Residential	In-Village	Out-of-Village	Non-Residential
Canaseraga Creek	*Murray Hill Campus Surcharge*					15%
	Village of Mount Morris					
	Minimum Quarterly Charge (0-15k gal)			$80.00		
	Additional per 1,000 gallons (>15k gal)			$3.00		
	Town of Leicester (NYS Route 36) - LCWSA Billing					
	Minimum Yearly Charge	$652.00				
	Additional per 1,000 gal		$9.05			
	Town of Sparta - LCWSA Billing					
	Minimum Yearly Charge	$382.00				
	Additional per 1,000 gal		$5.31			

One avenue for providing a comparison to these sewer rates is utilizing the average single-family home as shown in **Table 6-5** on the following pages. Based on the quarterly or yearly sewer rates tabulated above, yearly sewer expenses to users range from $160 to $816.

Table 6-5
Livingston County Municipal Wastewater Systems
Example Yearly Costs (2019 rates)

Discharge Waterbody	Municipality	LCWSA Billing	Town Billing	Village Billing
Springwater Creek	Springwater (T)		$400.00	
Keshequa Creek	Nunda (V)			$576.00
	Nunda (T)		$664.00	
Spring Brook Creek	Lima (V)		$816.00	$750.00
	Lima (T)			$160.00 (per mobile home)
Bidswell Creek	York (T) *Retsof* *District #1* *District #2*		 $380.00 $666.00 $699.00	
Conesus Creek	Avon (T) *South of I-390*	 $438.00		
	Conesus (T)	$398.00		
	Geneseo (T)	$398.00		
	Groveland (T) *Lake/Lakeville*	 $398.00		
	Livonia (T) *Town/Lakeville* *Out-of-Hemlock*	 $398.00 $626.00		
	Livonia (V)	$378.00		
Genesee River	Avon (V) *Village* *Lakeville/Polebridge Ext.* *East Avon*	 $376.00 $376.00		$228.00
	Avon (T) *East Avon*	 $376.00		
	Geneseo (T)		$320.00 (per unit)	
	Geneseo (V)			$240.00

Table 6-5
Livingston County Municipal Wastewater Systems
Example Yearly Costs (2019 rates)

Discharge Waterbody	Municipality	LCWSA Billing	Town Billing	Village Billing
Canaseraga Creek	Dansville (V)			$562.00
	North Dansville (T)		$655.00	
	Groveland (T) *ARS Service Area*	$712.00		
	Groveland (T) *Groveland Station*	$382.00		
	Mount Morris (T)		$396.00	
	Mount Morris (V)		$383.00	$337.00
	Leicester (T) *NYS Route 36*	$652.00		
	Sparta (T) *Groveland Station*	$382.00		

The final component in regards to the financial aspects of sewer systems in the County is existing capital improvement bonds that are currently (2019) being paid. Those communities that have bonds (debt) associated with sewer system improvements are noted in **Table 6-6** along with the associated project, start/end date, and original/remaining balance as of 2019.

Table 6-6
Wastewater Related Bonds

Town/Village	Project/Allocation Funds	Original Balance	Start Date	End Date	Remaining Balance
Avon (T)					
Avon (V)	NYS EFC 10C RTS 5&20 Sewer	$434,000.00	2016	2029	$250,000.00
	WWTP Improvements Bond	$1,998,164.00	2018	2044	$1,800,000
	EFC 01B 5&20 Sewer	$150,000.00	2011	2021	$30,000.00
Caledonia (T)					
Caledonia (V)					
Conesus (T)					

Table 6-6
Wastewater Related Bonds

Town/Village	Project/Allocation Funds	Original Balance	Start Date	End Date	Remaining Balance
Geneseo (T)					
Geneseo (V)	NYS EFC CWSRF Sewer bond	$3,500,000.00	2005	2023	$1,075,000.00
Groveland (T)	EFC Groveland Station Sewer				$541,000.00
Groveland (T)	ARS Sewer				
Leicester (T)					
Leicester (V)					
Lima (T)					
Lima (V)	NYS EFC Sewer Bond	$2,195,001.00	2003	2032	$1,105,000.00
Livonia (T)	Hemlock Sewer				
	Livonia Center				$175,000.00
Livonia (V)					
Mount Morris (T)					
Mount Morris (V)	WWTP Phase 2 Serial Bond	$1,653,968.00	2005	2034	$826,980.00
	Sewer Plant/Outfall Improvements Bond	$3,373,283.00	2003	2033	$1,610,000.00
North Dansville (T)					
Dansville (V)	EFC/M&T WWTP Composting		2016	2045	$9,994,400.00
	DTC WWTP Land Acquisition		2014	2038	$100,000.00
	DTC Meters		2014	2022	$60,000.00
Nunda (T)					
Nunda (V)	Roosevelt & Cross, Inc. Sewer System Improvements	$130,000.00	2010	2022	$39,000.00
Ossian (T)					
Portage (T)					

Table 6-6
Wastewater Related Bonds

Town/Village	Project/Allocation Funds	Original Balance	Start Date	End Date	Remaining Balance
Sparta (T)	EFC Groveland Station Sewer				$541,000.00
Springwater (T)	Sewer System Improvements	$3,208,571.00	2009	2038	$1,784,391.00
West Sparta (T)					
York (T)	Sewer #1 Phase 2 Serial Bond		2006	2037	$779,201.00
	Sewer #2		2008	2037	$576,546.00
LCWSA*	NYS EFC Various Sewer Projects	$2,921,000.00	2009	2039	$2,060,000.00
	NYS EFC Various Sewer Projects	$1,322,692.00	2012	2042	$1,040,000.00

*LCWSA's bonds are consolidated debt from any municipality operated and maintained by LCWSA.

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7 Summation of Wastewater Needs

The collection and wastewater treatment issues that the County faces are largely driven by capacity limitations. **Table 7-1** summarizes the permitted flows for the County WWTFs along with the existing average flows, existing peak flows, and available capacities.

The peaking factors were calculated by comparing peak flows to average flows. The peaking factors indicate the severity of Inflow & Infiltration (I&I) issues for the collection systems discussed in Section 7.3. For systems with populations of 3,000 to 4,000, the average peaking factor, not including inflow and infiltration is 3.5 times the average daily flow. For older systems that experience greater I&I issues, the peaking factor can be significantly greater. For mid to large systems such as Lakeville and Avon, large peak flow events limit the capacity for development within the collection system.

Commercial, industrial, and high-density residential development within the County is also limited by the available treatment capacities of the WWTFs. The available capacities of the WWTFs were calculated from the allowable 95 percent of the permitted monthly average flow minus the existing average flow. The available Equivalent Dwelling Units (EDUs) were then calculated by considering 300 gpd/EDU.

Table 7-1
Wastewater Treatment Facility Existing Flows

WWTF	Permitted Monthly Average Flow (MGD)	95 % Capacity	Average Flow (MGD)	Peak Flow (MGD)	Peaking Factor (MGD)	Available Capacity (MGD)	Available EDUs
Town of Springwater	0.040	0.038	0.38			No Capacity	
Village of Nunda	0.20	0.19	0.14	0.19 †	1.4	0.05	167
Village of Lima	0.30	0.29	0.20	0.71 †	3.6	0.09	283
Town of York	0.30	0.29	0.23	0.252 †	1.9	0.06	517
LCWSA-Lakeville	0.98 (1.27)**	1.21	0.94	6.0	8.5	0.27	1655
Village of Avon	1.0 (2.75)***	0.95	1.00	4.13	5.4	No Capacity	600
Village of Geneseo	1.50	1.43	0.83	2.7 †	3.3	0.60	1983
Village of Dansville	1.75	1.66	1.12	1.9 †	1.7	0.54	1808
LCWSA-Groveland Station	0.065 (0.03)*	0.03	0.013	0.071	7.3	0.02	63
Village of Mount Morris	0.864	0.82	0.39	1.21 †	3.1	0.43	1436

*Groveland Station WWTF is in the process of a SPDES permit update
**Lakeville WWTF is in the process of a SPDES permit update
***Avon WWTF de-rated their facility in 2017
†Limited data set available, instantaneous max flows not included

7.1 Development Capacity Limitations

Approximately 40 percent of Livingston County residents are currently served by public sewer. Based on projected growth in the County for the next 30 years, the population is expected to increase approximately 1.73 percent. Discussions with many of the municipalities in the County identified that there are residents currently not connected to public sewer but supportive of connecting in the future if feasible.

As more municipalities are connected to public water systems, it is likely that more wastewater will be generated. The available capacity of the County WWTFs may limit the

development made available by investment in water infrastructure. As the Towns of Caledonia, Avon, Lima, Leicester, Livonia, Conesus, and Groveland connect to public water, there may be an increased need for public sewer.

There is limited treatment capacity in the existing WWTFs in the County, as shown in Table 6-1. Development of several of the planned industrial parks may be hampered to the limited capacity of the collection and treatment systems. For example, development of the planned Gateway Industrial Park in the northwest corner of the Town of Livonia is greatly limited by the available treatment capacity at the Lakeville WWTF. In the Village of Avon, the current SPDES permit and treatment infrastructure does not allow for additional capacity required for the Livingston County Industrial Park and James M. Steele Commerce Park.

7.2 Discharge Permit Regulations

Greater focus on nutrient removal including ammonia and phosphorus from wastewater discharges is a growing trend in New York State. As discussed in Section 5.2, HABs have become a major concern for the Finger Lakes Region. The NYSDEC may begin enforcing stricter discharge permit limits to reduce nutrient loading from WWTF discharges. As the need for nutrient removal increases, significant upgrades to treatment processes may be required.

Currently in the Great Lakes watershed, municipal sewage SPDES permits over 1 mgd are required to meet a phosphorus limit of 1 mg/l. The majority of WWTFs in Livingston County discharge to tributaries of or directly to the Genesee River which then flows into Lake Ontario. Future guidance from NYSDEC could require that smaller WWTF also require phosphorus removal.

The Village of Caledonia lies within the Oatka Creek watershed. Aquatic life has been evaluated as stressed due to nutrient loading that has led to algal and aquatic plant growth. Agriculture practices and municipal wastewater discharge are the main sources of nutrients present in the Creek. It is suspected that inadequate on-site wastewater systems have also been a large contributor which could include private systems within Caledonia. With the dense population of residents in the Village and the trend of inadequate on-site treatment systems, the Village will need to implement a plan to address these concerns.

7.3 Inflow & Infiltration Issues

Inflow & Infiltration (I&I) is a common issue for aging sewer collection systems and combined sewer systems which collect both domestic sewage and rainwater runoff. I&I is caused by groundwater/stormwater entering a sanitary sewer system either by breaks in the pipe or from illegal or planned stormwater connections to the sewer collection system. Inflow is associated with water entering a sewer system through connections and infiltration is associated with groundwater entering the system.

I&I creates difficult problems for any sewer system. Collection systems and WWTFs are designed and built for maximum wastewater flows. Additional water from I&I, such as heavy rain events and snows thaws, takes up capacity and limits the available flow capacity for development within collection systems. Greater flows put more wear and tear on infrastructure including sewer pipes and equipment at the WWTF which increases operations costs. I&I can also cause sewer backups and reduced treatment efficiencies. When flows increase, the wastewater can move through the WWTF too quickly for adequate treatment to occur or can spill over the tank walls. This overloading results in WWTFs violating their SPDES discharge permits which not only increases costs but can result in penalties.

As the sewer pipes age, the joints between the pipes may become misaligned, root growth may shift or break the pipes, and corrosion may deteriorate the pipes causing points for groundwater infiltration to occur. Manholes or wet wells can also be an area of concern if they have cracks, poor pipe penetrations or poor joint connections. Roof down spouts, basement drains, and sump pumps are common connections for inflow to occur. At the time the sanitary sewer systems were installed in the County, these types of connections were common. These are considered "illegal" connections. Unfortunately, these connections are not recorded which makes locating these I&I sources difficult and expensive, but essential to significantly reducing flows and operation costs.

The first step to reducing I&I is to locate the sources. Because collection systems are large and complex, it is important to identify the most problematic areas to focus on. These sources can be located through televising the pipes, performing smoke tests, and flow monitoring to identify the areas of the system contributing most to I&I.

Lakeville WWTF

As indicated by the 8.5 peaking factor in Table 6-1, the Lakeville WWTF experiences significant increases in flow during storm events. On February 4, 2019, LCWSA was issued a consent order from NYSDEC for exceeding their permitted discharge of 0.98 mgd a total of nine (9) times since April 2017. To address this, LCWSA is performing upgrades on the Lakeville WWTF to increase treatment capacity. The SPDES permit is being modified by NYSDEC to 1.27 mgd. Prior to 2013, the WWTF was permitted at 1.27 mgd capacity and was decreased to 0.98 mgd in 2013. Currently, the SPDES permit has been reviewed and is in the final stages of being issued. With this greater permitted discharge, the Lakeville WWTF will have 0.50 mgd of available capacity or 1,655 equivalent residential units (ERUs).

In addition to increasing the treatment capacity of their discharge SPDES permit, LCWSA is currently in the process of completing an I&I study where many of the methods of testing described above are being used to locate and identify the source of these issues. Upon completion of the I&I Study, LCWSA will review the results and implement a schedule to address any issues.

Village of Dansville WWTF

The Village of Dansville continues to address I&I concerns throughout their system. There are several locations where new sewer main has been installed, addressing areas of significant infiltration. Over the course of the next few years, the Village plans to complete investigation of their entire system.

Village of Avon WWTF

As indicated by the 5.4 peaking factor in Table 6-1, the Village of Avon WWTF experiences significant increases in flow during storm events. The facility was de-rated in 2019 from 2.75 mgd to 1.0 mgd. The facility is now permitted for less treatment capacity. The I&I issues may delay future development within the collection system such as the James M. Steele Commerce Park.

7.4 Collection System Maintenance

The majority of collection systems in Livingston County are aged, dating prior to the 1991 Comprehensive Water Study and require some level of rehabilitation. As discussed above, the growing age of many of the collection systems is leading to substantial I&I issues. Asset management involves the practice of proper maintenance and prevention practices to prolong the useful life of infrastructure. To provide cost-effective asset management, the most problematic sources of I & I should be located within the collection systems and plans put in place for addressing these issues.

There are several methods for locating I&I sources which include:

- Flow monitoring
- Manhole inspections
- Smoke testing
- Dye testing
- Closed-circuit televising (CCTV)

Each method has its pros and cons and the more information available to municipalities for dealing with I & I issues, the more effective the results of the chosen asset management plans. To deal with I & I, there are several methods which include:

- Relining and grouting the mainline/lateral pipes with cured-in-place pipe (CIPP)
- Sewer main replacement
- Manhole rehabilitation; rebuilding/resetting manholes and sealing
- Removing illegal sewer connections

Additionally, good maintenance practices should be implemented to prolong the useful life of collection and treatment infrastructure. For collection systems, this includes:

- Instituting and maintaining grease traps for fats, oils, and grease producers
- Removing root encroachment into sewers
- Equipment and pump maintenance

For treatment facilities this includes:

- Maintaining and servicing equipment on schedule
- Cleaning screens and weirs to prevent undue stress on equipment
- Cleaning and resealing aging concrete tanks

7.5 Public Sewer Access

A developing topic of discussion in the wastewater treatment industry is centralized vs. decentralized treatment. Should smaller municipalities invest in their own smaller treatment systems or should they invest in infrastructure to connect their wastewater to larger systems? Approximately 60 percent of Livingston County residents are not served by public sewer. The Town of Leicester and the Village of Caledonia are not connected to a centralized sewer system and all sanitary sewer is treated by private on-site treatment systems with several systems permitted by the NYSDEC.

The Village of Caledonia is connected to the MCWA water system for their water supply and they use an average of 0.22 mgd of public water. The 2050 projections estimate that this usage will increase to 0.46 mgd. Growth within this community may be limited by requiring developers to construct private on-site treatment systems. For the Village of Caledonia, there are existing wastewater treatment plants located in the neighboring municipalities of the Village of LeRoy and Village of Avon. Alternatively, a smaller package plant style treatment plant could be constructed within the Village to treat large wastewater generators or new developments.

The Town of Leicester completed a sewer study in 2015 that evaluated the potential for public sewer in areas of the Town, but also investigated public sewer in the Village of Leicester. This was not the first time that public sewer was evaluated in the Village. In 1999 a study was completed that ultimately led to a vote for public sewer that was defeated. The 2015 sewer study also included a public survey with approximately half the respondents indicating they would be interested in a public sewer system—the annual cost being the main determining factor.

7.6 Operation and Maintenance

A common trend throughout Livingston County is the lack of new operators and lack of training and education, as briefly discussed in Section 4.3.2. This struggle is being experienced by many wastewater systems across the state. The wastewater operating field is not growing. Certified operators are hard to find. Smaller municipalities in Livingston County are limited by revenue to compensate the proper number of operators required to run the system. As a result, the lack of funding limits the amount of work and maintenance

operators can complete on the systems. Additionally, some operators may have to juggle maintenance on water and wastewater due to limitations in staff.

Moving forward with consideration of system improvements and expansions, many municipalities or collection systems throughout the County will need operators to fill existing positions as well as new positions. Emphasis on proper training and the importance of all aspects of water systems should be strongly reinforced across the County. Regular training should be held for all operators in the County.

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8 Wastewater Alternatives

The Summation of Wastewater Needs in Section 7 identified a wide range of topics including:

- Lack of available capacity in designated County development areas.
- Discharge permit restrictions and quality concerns.
- Desire for reduction of I&I throughout the various collection systems.
- Interest in obtaining equipment for the proper operation and maintenance of the collection and treatment systems.
- Reduction of annual expenses related to operation and maintenance.
- Reduced number of new operators and reduction in the number of certified operators.

To address these needs, they will be broken down by capital improvements, capacity limitations, and operational improvements. Some of these improvements can be completed at the local level, while others can be completed at the County level. The improvements are discussed in the section below.

8.1 Wastewater Capital Alternative #1 – Village and Town of Leicester WWTF & Collection

The Town of Leicester and the Village of Leicester are primarily serviced by private wastewater systems, with only a small portion of the southeast corner of the Town connected to a public sewer system. The lack of public sewer in the densely populated areas of the Town and Village are viewed as a deterrent to economic development. In addition, the Town recognizes that private systems likely contribute to water quality impairments in the Genesee River Drainage Basin.

The Town completed a comprehensive study in 2017 that recommended a conventional collection system and package WWTF to serve the Village of Leicester and a portion of the Town. Since the completion of that study, surveys were sent out to property owners which showed significant support of public sewer.

The estimated capital cost of the package WWTF is approximately $6,500,000.

8.2 Wastewater Capital Alternative #2 – Village of Caledonia WWTF & Collection

The Village of Caledonia relies on private wastewater disposal systems, as they do have public sewer. While there is not a strong desire to pursue public sewer primarily due to favorable ground conditions, the lack of public sewer does deter development and is likely harmful to the local environment. A new WWTF and collection system would provide a

solution to inadequate on-site treatment systems and environmental concerns, but consideration should be given to conveying flow to Monroe Count Pure Waters.

The estimated capital cost of the package WWTF is approximately $12,000,000.

8.3 Wastewater Capital Alternative #3 – Avon WWTF Upgrades

The Village of Avon WWTF does not have any available capacity for the industrial parks located in the Town and Village of Avon. Permitted for 1.0 mgd, the average monthly flows have exceeded the permitted value on a regular basis.

The Village of Avon WWTF could be upgraded to ensure capacity is available for development at the Village or Town industrial parks. If the County invested in the upgrades, a portion of the capacity gained through the upgrades could be reserved for County use. Operation and maintenance could be handled by the Village through an agreement. This arrangement would be similar toan existing agreement between the City and Town of Batavia.

Past conversations with the Village of Avon have indicated costs approaching $8,000,0000 for an additional 1.0 mgd of capacity. Should this option be considered, detailed evaluations would be required to provide cost estimates at varying flow levels.

8.4 Wastewater Capital Alternative #4 – Lakeville WWTF Upgrades

The Lakeville WWTF does have some available capacity for development, but not enough to handle the projected 1.1 mgd from Gateway Park in Livonia. To ensure the Park is shovel ready, upgrades to the Lakeville WWTF could be completed. Similar to Alternative #3, if the County invested in the upgrades, a portion of the capacity gained through the upgrades would be reserved for the County. Operation and maintenance could be performed by the LCWSA through an agreement.

Preliminary estimates put the capital investment between $8,000,000 and $10,000,000.

8.5 Wastewater Capital Alternative #5 – Correctional Facility WWTF

The Groveland Correctional Facility owns and operates a WWTF permitted for 0.55 mgd, with average annual flows of 0.35 mgd. These flows are expected to drop to 0.25 mgd with the closure of the Livingston County Correctional Facility.

The County should consider either purchasing some of the available capacity or taking over the facility in its entirety. The facility could be used to accommodate potential development near the NYS Route 36/Interstate 390 interchange or the repurposing of the former Livingston County Correctional Facility.

8.6 Wastewater Capital Alternative #6 – County Decentralized WWTF's

The primary concern from a County development perspective is related to the industrial parks in Livonia and Avon. This is detrimental to development, especially when competing against other communities that are truly shovel ready from a wastewater capacity standpoint.

The Village of Avon WWTF does not have any available capacity for the industrial parks located in the Town and Village of Avon. Permitted for 1.0 mgd, the average monthly flows have exceeded the permitted value on a regular basis. Instead of upgrading the Village of Avon WWTF, the County could consider constructing a decentralized WWTF at each industrial park. The anticipated flow rate is 250,000 gpd for both parks but could be higher depending on the actual industry.

The Lakeville WWTF does have some available capacity for development, but not enough to handle the projected 1.1 mgd from Gateway Park in Livonia. Instead of upgrading the Lakeville WWTF, the County could consider constructing a decentralized WWTF.

The decentralized approach would also open up more opportunities in other municipalities, not normally targeted or prioritized by the County.

Costs for new WWTF's typically start at $2,000,000 for a 0.1 mgd facility. Flows higher than 0.1 mgd can cost between $10 and $15 per gallon. For example, at 2.0 mgd a WWTF would cost between $20,000,000 and $30,000,000. These values can be used as a starting point, but more detailed estimates would be required at a later date.

The decentralized WWTF's noted above would be operated and maintained by the LCWSA.

8.7 Wastewater Operations Alternative #1 – Shared Services

County-wide shared services could simplify operations and improve efficiency within some wastewater systems in Livingston County. Some of the main items that would be included are billing, water related purchases, and operations. Pooling resources and streamlining operations and decision making can greatly increase efficiency, reduce costs, and increase water quality.

The thought of full consolidation is concerning for most municipalities but entering into an agreement with an entity such as the LCWSA to complete a segment of the services such as cleaning and televising should be considered.

Wastewater related purchases would include any equipment or supplies that are used frequently such as alum and lab supplies. Most municipalities make these purchases on their own, eliminating the potential for discounted costs based on bulk purchases.

Shared operators and operation services would have a significant impact on every wastewater system, but more importantly on smaller municipalities with low and limited budgets. As

discussed previously, it has become more difficult to find and hire certified water operators. Many municipalities do not have the resources or funding to train new operators. Livingston County could work through the hiring process and manage wastewater operators amongst wastewater systems, eliminating this task for individual municipalities. An alternative would be entering into an agreement for back-up coverage from a neighboring municipality during emergencies or scheduled vacation time.

8.8 Wastewater Operations Alternative #2 – Shared Equipment

Shared sewer system equipment available for all systems in Livingston County would be a significant cost savings for each municipality and indirectly for all sewer users. Some equipment used to maintain a sanitary sewer collection system is rarely used and can be extremely expensive. In most cases, this equipment cannot be justified for purchasing by a single municipality. This equipment can be crucial to ensure well maintained and sustainable collection systems. Crucial equipment includes televising, jetting, vacuum trucks, portable flow meters, software, and GIS.

Televising:

Televising is a method of visually observing the interior of a collection system. Closed circuit television video (CCTV) is the most common method of pipe inspection. The process consists of sending a robotic, remotely controlled camera through the interior of a pipe. This technology assists with:

- Leak detection
- Pipe restrictions
- Inflow and infiltration
- Illegal connections

Most sewer operators do not have televising equipment available and will generally hire a televising contractor to complete the task. This cost can range between $2-$4 per linear foot. Unfortunately, for larger collection systems this cost can become quite expensive. Typically, the cost of new CCTV equipment can range between $30,000 to $80,000.

Jetting:

Jetting is a sewer main cleaning method where a high-pressure water hose combined with a jet nozzle is fed through a sewer pipe, dislodging any build up that has accumulated over time. When this build up continues to increase, it restricts flow through the collection system and in return decreases capacity in the system. Jetting technology is an effective tool for operators to utilize for maintaining system capacity and increasing the lifespan of their collection systems. There are a few municipalities in Livingston County that own a jetting system, but the majority do not have this equipment available.

There are several different styles and manufacturers of jetting systems available. Generally, the cost for a new jetter system can range between $100,000-$200,000.

Vacuum Truck:

Vacuum trucks can be used for several different purposes, generally for cleaning liquids, sludges and grit that builds up in a sanitary sewer and storm sewer systems. In most applications, a vacuum truck is used with a cleaning technique, such as a jetter to remove any deposits that are removed during the cleaning process.

Basic models of a vacuum truck start with only the vacuum option available, but the upgraded models include additional attachments such as a jetter system, as mentioned previously. Typically, there are cost savings by purchasing these pieces of equipment together on one truck versus separately.

Due to the wide range of additional items and attachments available, there is a wide cost range varying between $200,000-$400,000.

Portable Flow Meters:

Overtime, sanitary sewer systems age and experience inflow and infiltration. As discussed in the Summation of Needs, there are several ways to locate areas of significant I&I, one of which is portable flow meters. Typically, these meters are placed in manholes and/or wet wells where flow can be monitored and observed during storm events.

There are several benefits of portable flow meters such as:

- Preventative maintenance
- Locating inflow and infiltration
- Billing purposes
- Developing current capacities

There are a few municipalities in Livingston County that own portable flow meters, but the majority do not have any readily available.

Typically, the cost of a portable flow meter can range between $5,000 to $10,000.

GIS Equipment

Although some systems have geographic information systems (GIS) available to document any work associated with their water systems. This technology should be available in every water system. Some municipalities, such as the Villages of Geneseo and Mount Morris have experienced the benefits and efficiency that GIS provides for operation and would prefer having it available in the near future.

The levels of GIS equipment vary significantly with costs ranging from $5,000 to $50,000, plus the costs of software, data management, and annual licensing.

Software

Asset management is a process water and wastewater utilities can use to make sure that planned maintenance can be conducted and capital assets (pumps, motors, pipes, etc.) can be repaired, replaced, or upgraded at the appropriate time and that there is enough money to pay for it.

Asset management is the practice of managing infrastructure capital assets to minimize the total cost of owning and operating these assets while delivering the desired service levels. Many utilities use asset management to pursue and achieve sustainable infrastructure. A high performing asset management program includes detailed asset inventories, operation and maintenance tasks, and long-range financial planning.

Each utility is responsible for making sure that its system stays in good working order, regardless of the age of its components or the availability of additional funds. Asset management programs with good data including asset attributes (e.g., age, condition, and criticality), life-cycle costing, proactive operations and maintenance, and capital replacement plans based on cost-benefit analyses can be the most efficient method of meeting this challenge.

In the past, asset management consisted of listing equipment and scheduled maintenance on index cards. Over time this has evolved into computer-based software that can speed up the adoption of an asset management strategy as well as make it more successful. These systems are designed to help utilities meet their asset management goals including:

- Lifecycle planning and management
- Organization of unique asset hierarchies
- Seamless integration with GIS (Geographic Information Systems)
- Strict regulatory compliance
- Infrastructure condition assessment
- Inspection schedule for predictive maintenance
- Timely corrective maintenance and repair
- Effective risk management
- Adherence to stringent industry regulations
- Creation and management of work orders and schedules
- Integration with external websites for utility systems

- Development and monitoring for levels of service
- Mobile CMMS features for user convenience
- Funding forecast and capital prioritization

Many levels of asset management software exist, at a wide range of up-front costs and annual costs, but a single municipality could expect costs between $10,000 and $30,000 per year.

8.9 Wastewater Operations Alternative #3 – Program Development

Regulatory agencies including the EPA and NYSDEC continue to increase the requirements for existing public sewer systems in the County. Specific requirements include the following:

- Develop or update to the Sewer Use Law
- Development of an asset management plan
- Industrial user requirements including permits and reporting
- Reduction in inflow and infiltration
- CMOM (Capacity, Management, Operation, and Maintenance Report)
- Mercury minimization
- Flow management plan

The response from most communities is "we need help with this", resulting in legal and engineering expenses. When multiplied by the nine (9) different wastewater departments in the County, these expenses are significant.

While each of the items above will have some specific requirements for each community, the majority of the requirements are generic. Therefore, versus the "go alone" approach, the County or the nine (9) different departments should combine resources and develop a common template for each requirement that could be used by everyone.

Besides the potential cost savings, this would also result in standardized policies and procedures across the County.

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9 Water Study Implementation

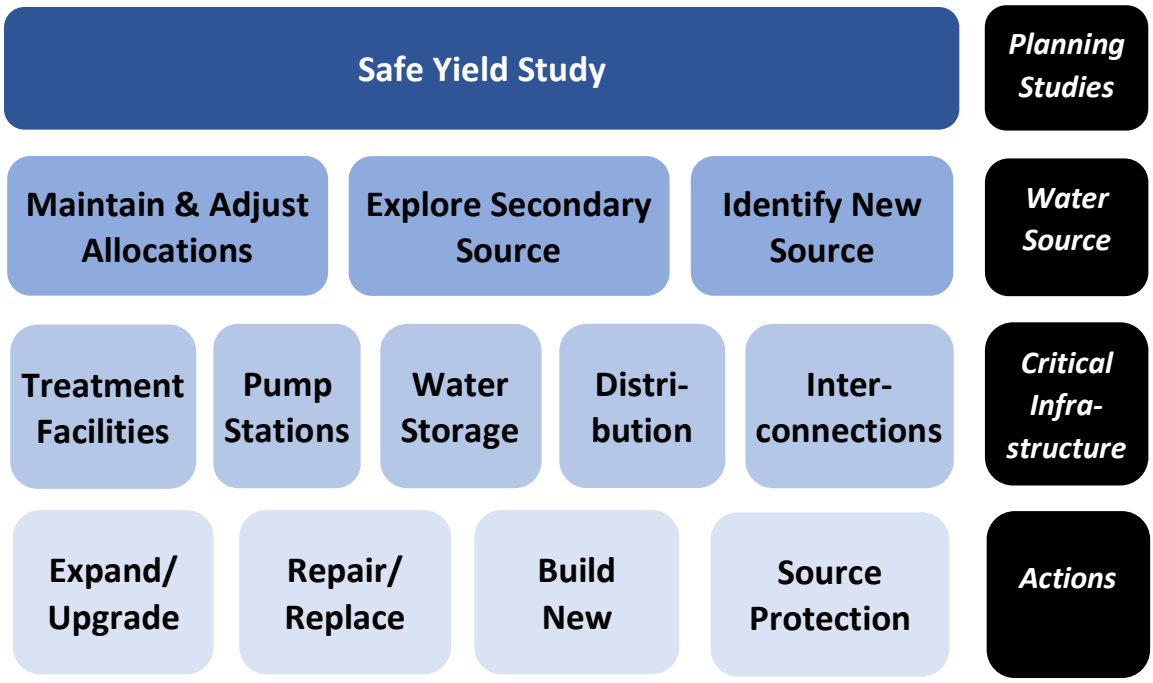
With the various water systems that are in place in Livingston County, implementation of water infrastructure improvements is a complex system whereby changes made in one area result in a different set of responses to another area. In some instances, a definitive first step is needed to determine subsequent actions, i.e. development/update of safe yield studies.

Beyond these initial studies, in order to carry out water system improvements and upgrades, three (3) key elements are needed – funding, political will/leadership, and community support. Many project alternatives involve significant financial undertakings that will rely on local funds, bonds/loans, and grants, or a combination thereof. Some will take deeper conversations with other suppliers in the area and the development of intermunicipal agreements. Others may result in taking existing operations offline resulting in the relocation, decrease, or removal of staff. In any of these instances, the three (3) key elements above will help to determine which of the alternative(s) to consider, and subsequently, the path to be taken. The flowchart, alternatives ratings, regional considerations, and critical actions contained within this section of the study have been provided to guide the decision-making by the various stakeholders. It is then that a more detailed engineering analysis and design can be undertaken on individual projects to improve the water/sewer systems in the County.

9.1 Decision-Making Model

This study identifies known needs and deficiencies and various means to address them. The alternatives are still conceptual, therefore a "project by project" approach is impractical at this point without additional data. Rather than identifying definitive actions, besides initial safe yield and other critical "first step" planning studies, the preferred approach for implementation is a decision-making model to assist the County and other local leaders with identifying appropriate improvement paths to take. In addition, general guidelines and recommendations are provided at a regional level with the fundamental premise that "economies of scale" yield the most efficient and effective means for delivering public services (i.e. water and sewer).

As the delivery of public water and sewer throughout the County involves not only the County but also individual communities, each of these stakeholders must be involved in this process for implementation to succeed. The decision-making model on the following page provides the approach for all of these stakeholders to implement this study. It is generally agreed upon that these critical "first steps" are needed for all involved as they influence further decisions.



9.2 Alternatives Rating

As part of the decision-making process, weighing the various alternatives provides additional insight for identifying the "effectiveness" of each with respect to several technical factors. While this rating provides some background on how each alternative addresses those needs in a technical manner, it should not be the sole determining factor for future actions—rather it should be an element in the process.

Each of the alternatives were rated or weighed against several technical factors including (in no particular order or relevance):

A. *Existing source allocation availability* – The ability and capacity (in mgd) of the source water to provide raw water to existing and future users given existing source allocations.

B. *Capacity available for economic development* – What each existing source has for available capacity to provide public water for future economic development at existing industrial parks within the County (quantity of water needed at full conceptual build out) or other identified areas (supported by Comprehensive Plans and zoning).

C. *Overall available water capacity* – Ability of the existing water source to meet existing water demands as well as anticipated demands out to year 2050.

D. *Transmission main or water treatment plant (WTP) infrastructure sizing* - Ability of the existing water transmission main or water treatment plant to meet existing water demands as well as anticipated demands out to year 2050.

E. *High-risk infrastructure* – Does the alternative address the replacement of aging or high-risk infrastructure such as treatment plants, transmission mains, or pump stations?

F. *Infrastructure longevity* – For treatment or transmission main only, the length of "useful life" remaining in these facilities.

G. *Interconnections* – Does the alternative provide an interconnection between two (2) water districts/systems to provide supplemental water or redundancy when needed for emergency use?

H. *Water storage tank capacity* – Does the existing water tank(s) provide storage to meet existing water demands as well as anticipated demands out to year 2050?

I. *Increase efficiency through shared service opportunities* - Does the alternative provide avenues for an increase in efficiency with shared services including staff, materials, operations, supplies, services, etc.

J. *Impact to water rates per 1,000* – What is the increase in water rates to users based on the cost per 1,000 gallons of usage for each alternative?

K. *Furthers regionalization efforts/additional municipalities served* – Does the alternative service the existing municipality or a number of others (promotes further regionalization)?

L. *Raw water source quality (based on cost of treatment)* – What is the quality of the raw water source in terms of the local cost to treat the water per current standards? What is the susceptibility of the water source to contamination based on yearly assessments, quality reports, harmful algae blooms (HABs), and other reporting?

M. *TTHM (disinfection by-products) levels*: Does the alternative maintain TTHM at current levels or lower it from current levels and below the maximum contaminant level (MCL)?

N. *Source protection* – Does the alternative include water source protection measures?

O. *Addresses existing water quality violations* – Does the alternative address consent orders and/or any other water quality violations?

The matrix on the following page provides a summary of the rating scores for each alternative based on the above factors/criteria.

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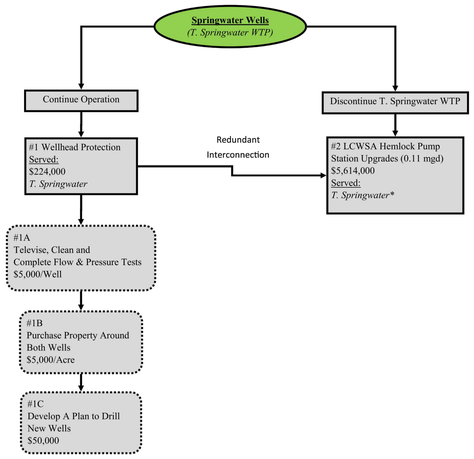
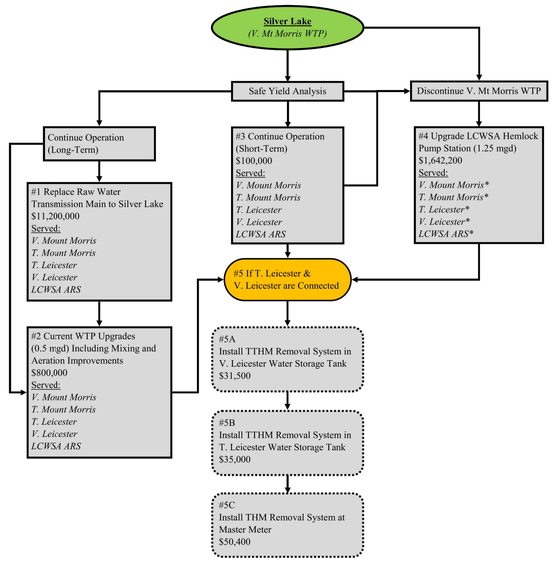
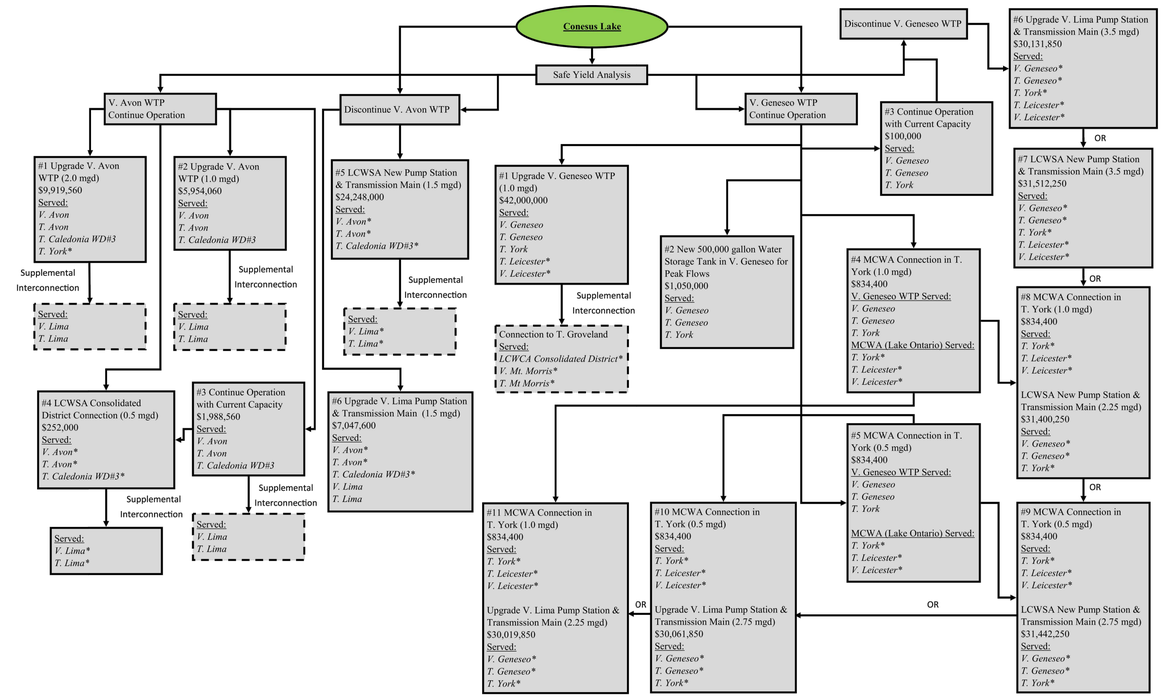
	Springwater Wells		Chidsey Reservoir/ Secondary Wells						Silver Lake					Mill Creek/ Perkinsville Wells			Conesus Lake																	Hemlock Lake									Lake Ontario																				
																	V. of Avon WTP						V. of Geneseo WTP											V. of Lima			LCWSA					V. of Caledonia			New Connection MCWA System																				
Criteria	#1	#2	#1	#2	#3	#4	#5	#6	#1	#2	#3	#4	#5	#1	#2	#3	#1	#2	#3	#4	#5	#6	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#1	#2	#3	#1	#2	#3	#4	#5	#1	#2	#3	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13
Existing Source Allocation Availability	1	4	1	1	1	1	4	4	1	1	1	4	0	2	2	2	3	3	3	4	4	4	1	1	1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1	1	1	4	4	4	4	4	4	4	4	4	4	4	4
Capacity Available for Economic Development	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	3	2	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	3	3	3	3	0	3	0	0	0	3	3	3	3	3	3	3	3	3	3	3
Overall Available Water Capacity	2	2	1	1	1	2	2	2	2	2	1	2	0	2	2	2	2	2	0	0	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2	0	0	2	2	2	2	2	2	2	2	2	2	2
Transmission Main or WTP Infrastructure Sizing	1	2	1	1	1	2	2	2	2	2	1	2	0	2	2	2	2	2	0	0	2	2	2	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
High-Risk Infrastructure	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
Infrastructure Longevity (Treatment or Transmission only)	2	2	2	2	2	0	2	2	4	4	0	2	0	1	1	4	4	4	1	2	4	4	4	1	1	1	1	4	4	4	4	4	4	3	4	4	4	4	4	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Interconnections & Community Cooperation	0	2	0	0	0	1	2	2	0	0	0	2	0	0	0	1	1	1	1	1	1	1	1	0	0	2	2	2	2	2	2	2	2	1	2	2	2	2	2	0	2	0	1	1	2	2	2	2	2	2	2	2	2	2	2
Water Storage Tank Capacity	1	1	1	1	1	2	2	2	2	2	2	2	0	1	1	1	1	1	1	1	2	2	1	2	1	2	2	2	2	2	2	2	2	1	2	2	2	2	2	0	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Increased Efficiency Through Shared Service Opportunities	0	1	0	0	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
Impact to Water Rates Per 1,000 Gallons	5	0	4	5	5	0	0	0	2	5	5	5	5	5	5	3	4	4	5	5	1	4	1	5	5	5	5	2	1	1	1	1	1	5	4	3	3	3	0	5	1	5	5	4	1	0	1	0	1	1	0	1	0	0	0	2	1
Furthers Regionalization Efforts/Additional Municipalities Served	0	1	0	0	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
Raw Water Source Quality (as measured by treatment cost)	2	4	1	1	1	2	4	4	2	2	2	4	0	1	1	4	2	2	2	4	4	4	1	1	1	1	1	4	4	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
TTHM Levels	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
Source Protection	1	0	1	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Addresses Existing Water Quality Violation	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	15	19	12	13	12	12	20	20	16	19	12	26	7	17	17	23	25	22	13	19	23	26	15	12	11	21	21	24	23	22	22	22	22	22	27	28	28	28	25	17	24	19	19	18	27	26	27	26	27	27	26	27	26	26	26	28	27

SCORING CRITERIA:

Existing Source Allocation Availability
None Available = 0, 1 mgd or less available = 1,1-2 mgd available = 2, 2-3 mgd available = 3, 3 mgd or more available = 4
Capacity Available for Economic Development
No capacity/no impact = 0, 0.5 mgd or less capacity = 1, 0.5 mgd to 1.0 mgd capacity = 2, 1.0 mgd capacity or more = 3
Overall Available Water Capacity
No change/not applicable = 0, Increase to current demands = 1 , Increase to 2050 demands = 2
Transmission Main or WTP Infrastructure Sizing
Inadequate/not applicable = 0, Sized for current demand = 1 , Sized for demand in 2050 or more = 2
High-Risk Infrastructure
No change = 0, Yes addressed = 1
Infrastructure Longevity (treatment or transmission only)
5 years or less/not applicable = 0, 5 – 10 years =1, 10 – 20 years = 2, 20 – 30 years = 3, 30 years or more = 4
Interconnections
No interconnections = 0, Supplemental interconnection = 1 , Redundant interconnection = 2
Water Storage Tank Capacity
No additional storage = 0, Provides storage for current demands = 1 , Provides storage for 2050 demands = 2
Increased Efficiency Through Shared Services Opportunities
No changes in operations (i.e. staff, materials, supplies, services)/not applicable = 0, Provides operational efficiency opportunities = 1
Impact to Water Rates Per 1,000 Gallons
Increase in cost per 1,000 gallons is greater than $5 = 0, Increase in cost per 1,000 gallons is between $4 - $5 = 1, Increase in cost per 1,000 gallons is between $3 - $4 = 2, Increase in cost per 1,000 gallons is between $2 - $3 = 3, Increase in cost per 1,000 gallons is between $1 - $2 = 4, Increase in cost per 1,000 gallons is less than $1 = 5
Furthers Regionalization Efforts/Additional Municipalities Served
No additional municipalities/not applicable = 0, 1 additional municipality = 1, 2 additional municipalities = 2, 3 additional municipalities = 3, 4 additional municipalities = 4, 5 additional municipalities or more = 5
Raw Water Source Quality (based on cost of treatment)
Source water unusable/not applicable = 0, Treatable minor quality issues, elevated susceptibility to contamination costing more than $3/1,000 gallons = 1, Treatable minor quality issues, moderate susceptibility to contamination costing between $2-$3/1,000 gallons = 2,
Treatable minor quality issues costing between $1-$2/1000 Gallons = 3, No quality issues costing less than $1/1,000 gallons = 4
TTHM Levels
TTHMs remain at current levels = 0, TTHMs improved from current levels = 1
Source Protection
No protection = 0, Yes additional protection included = 1
Addresses Existing Water Quality Violation
No/no current violations = 0, Yes = 1







*Served by new source of supply or infrastructure

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DECEMBER, 2020

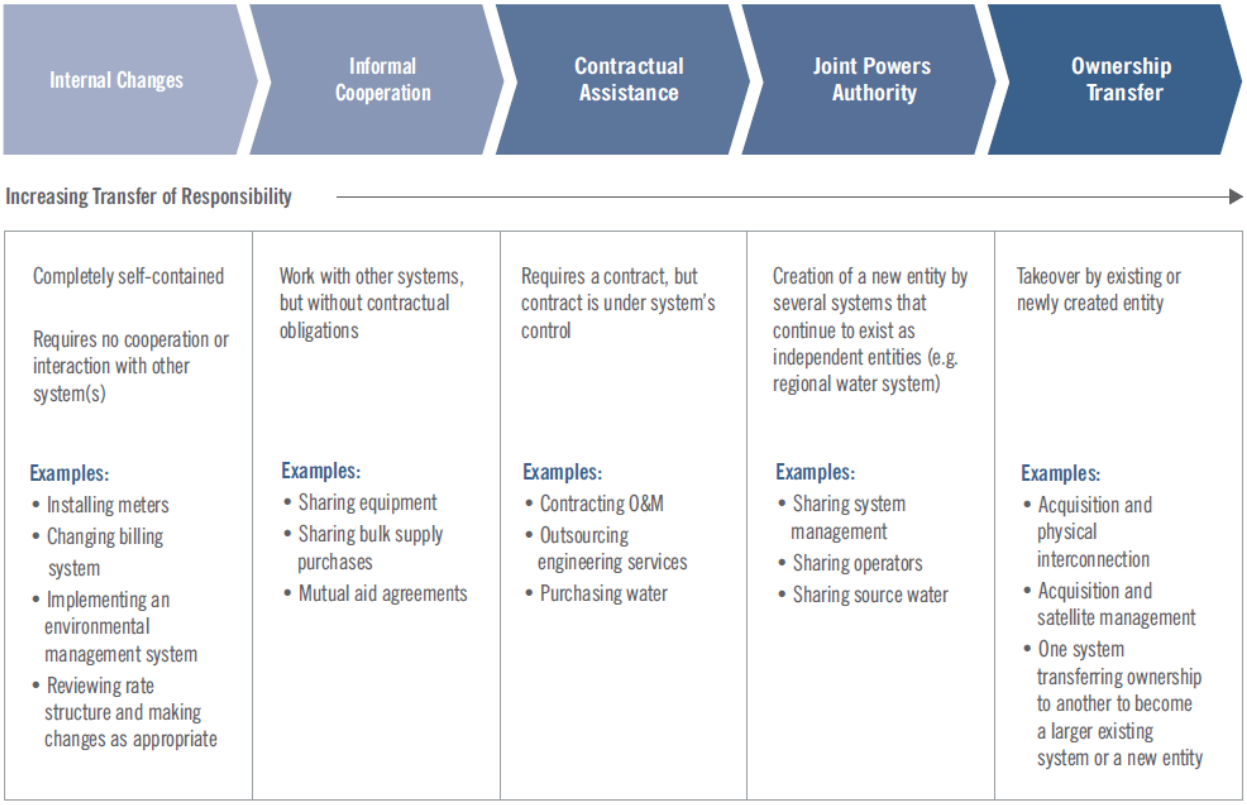
9.3 Regional Guidelines

In addition to the decision-making model, the following regional level guidelines should also be considered:

1. The design and installation of transmission mains in districts and/or service areas should take into consideration future expansions and the regional approach of providing water within the County. Upsizing pipes where applicable should be considered.
2. In the interest of regional planning and delivery of public utilities, the consolidation of water production with other capable suppliers can help stabilize water rates in the long term due to economy of scale that is inherent in public water supply.
3. All water distribution systems should continue efforts to upgrade pipes, meters, and other appurtenances to minimize water losses.
4. The Town of Springwater and Villages of Avon, Dansville, Geneseo, Nunda, and Mount Morris as well as the LCWSA each have water departments. These communities/entities should continue to evaluate opportunities for reducing costs and improving efficiency by sharing staff, equipment, services (e.g. meter reading), and materials.
5. Increase collaboration and communication between LCWSA, water providers, and distributors throughout the County by holding regular stakeholder meetings (quarterly, biannual, or annual) to review progress, assess changing priorities within the County and among the individual public water systems, and facilitate implementation of this study. Other County entities including Planning and IDA should be included in order to provide economic development perspectives and encourage sustainable growth.
6. Identify or encourage the development of "local champion(s)" or collaborator(s) in order to help lead the effort to a more coordinated, regional approach for delivering public water to County residents. Efficient, cost-effective, and safe public water treatment and delivery can only be achieved through improved and well-maintained systems – a difficult task to undertake for smaller communities with far reaching districts and limited budgets. Regional approaches to public water can preserve varying degrees of local control and management while providing a means for cost savings through economies of scale, greater access to capital, an increased customer base, and additional technical assets. Community education can provide support for this approach.

While not a true regional approach, the existing water systems provide public water to a variety of users throughout Livingston County through a semi-fragmented, semi-connected framework. Partnerships and collaboration should continue to be built upon within the

County to further the regional approach for public water treatment, transmission, and distribution. Various options, as shown on the following page can be pursued during the interim as the regional system is slowly improved and upgraded with collaboration falling anywhere along this spectrum.



"Safeguarding Water Affordability," Bipartisan Policy Center, September 2017.

9.4 Recommended Follow-up Actions

The magnitude of investments and improvements that are needed throughout the County to address aging infrastructure, regulatory compliance, and provide adequate capacity for emergencies and future growth have necessitated this study update. To strategically respond to these challenges, there are critical "first steps" that are needed as well as specific "triggers" that will influence and help narrow down future alternatives.

Safe Yield Studies

Updates to Safe Yield Water Studies for Conesus Lake, Silver Lake, and Hemlock/Canadice Lakes are critical to determine a safe allocation level of the raw water available in these sources. The results of these studies will determine whether existing levels are sustainable or

if they need to be modified; therefore, having an impact on the amount of raw water available for potable use and whether other sources need to be more seriously considered.

Critical Improvements or Actions

Improvements to specific facilities or infrastructure in several municipalities may result in critical impacts on not only the adjoining systems that they provide water to, but also have significant long-term costs associated with them that would be borne by local users (i.e. higher rates). Determining appropriate implementation avenues to take from these "trigger points" will affect decision-making on alternatives and likely create a "domino effect" leading to other improvements.

As supported by the needs identified in this study update, these critical improvements or actions include, but are not limited to:

- Replacement of the Village of Mount Morris raw water transmission main from Silver Lake to address issues with capacity, efficiency, and age
- Upgrading the Village of Avon water treatment plant to provide necessary peak capacity and future demand
- Upgrading the Village of Geneseo water treatment plant (i.e. rebuilding on a new site due to existing expansion limitations) to provide necessary peak capacity and future demand
- Switching the Town of York to a new water source for efficiency, reliability, and cost savings
- LCWSA upgrading or increasing capacity from the Hemlock Lake transmission main to provide necessary peak capacity and future demand
- Determining if any municipality is leaving the water treatment business or switching their current supply of water

Public Sewers

While this study update has predominantly been focused on public water systems, public sewer systems are important facilities that also influence development and economic growth. The overview, needs and alternatives outlined in this study update provide sufficient baseline information. The County should undertake a County-wide public sewer study for deeper analysis and review of these systems using a similar approach to this study, moving towards a more regional approach to these systems as well.

9.5 Conclusion

Since the development of the 1991 Water Supply Study, Livingston County as a whole has made significant progress in upgrading and improving water and wastewater infrastructure for maintaining operations and accommodating growth. The goal of this Study Update is to establish a new set of goals for the County and municipalities to continue to build on this progress for the next 20-30 years—with the understanding that development patterns have changed, limitations exist at existing facilities, and significant benefits have been derived from increasing regional efforts.

Unlike the 1991 Water Supply Study, the 2020 Study Update provides many more options and alternatives as a result of additional water suppliers and a much larger distribution system. As time progresses over the next few years, there will be several significant decisions made that will essentially come down to three (3) major factors discussed within this study - financial considerations, political will/leadership, and community support. The decision-making tools and recommended critical actions in this Study Update provide the County and municipalities with guidance to determine the best path for implementation.

The ultimate goal for the County as a whole is to look outside the boundaries of each individual community and emphasize the opportunities and alternative(s) that will provide the greatest benefit to users, promote economic development, capitalize on efficiency, utilize financial and physical resources to the greatest extent feasible, and continue to keep up with a growing population in the County for the next 20-30 years.

Appendix O

Engineering Report Certification

Engineering Report Certification

To Be Provided by the Professional Engineer Preparing the Report

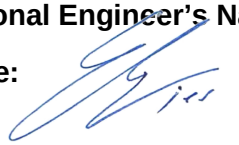
During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which assistance is being sought from the New York State Clean Water State Revolving 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: Leicester/York Regional Water Supply Expansion

Date of Report: July 2022

Professional Engineer's Name: Eric Wies

Signature:



Date:
07/26/2022