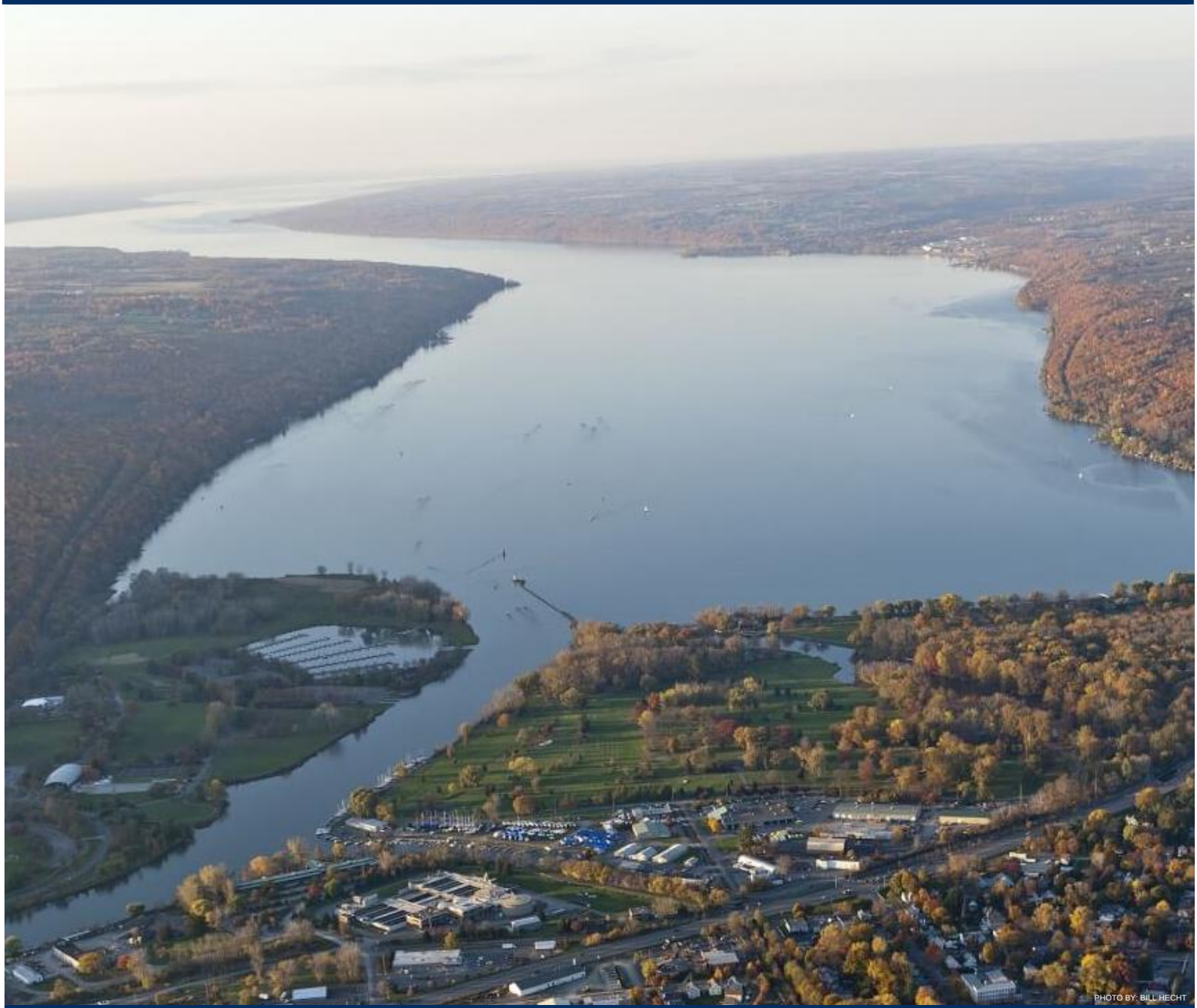
2020 Water and Sewer Evaluation Update

A Project of
Ithaca Area Economic Development



TECHNICAL ASSISTANCE BY:

TOMPKINS COUNTY
DEPARTMENT OF PLANNING
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Preface

The *2010 Countywide Intermunicipal Water and Sewer Feasibility Study* (2010 Study) provided an inventory and technical examination of the municipal water and wastewater facilities across Tompkins County. The 2010 Study assessed existing infrastructure and its potential capacity to support planned growth, identified limitations to system expansion, and documented stated needs of communities without public water and sewer services. Effectively, it served as a snapshot of existing infrastructure, facilities and needs, and proved a useful tool for communities as they developed plans for individual and intermunicipal improvements.

This *2020 Water and Sewer Evaluation Update* (2020 Update) seeks to refresh the 2010 Study by documenting progress in implementing system improvements, but expands its purpose by suggesting forward-looking 'priority objectives' that local utility providers can collectively embrace to bridge capacity gaps, resolve governance issues, and facilitate infrastructure planning. In this context, the 2020 Update is not only a snapshot but also a tool to build consensus for water and sewer system projects that can enhance redundancy and reliability in future years.

With that, we present to you the 2020 Update for your benefit and use. The next decade will undoubtedly present additional challenges in Tompkins County as we accommodate growth, address climate change, and adjust to ever-changing fiscal realities. We hope this document serves as a guide for that period, so that we can advance in the most effective and economical way possible. Thank you to all those who participated and to you, who share in our vision of a better and more prosperous future for Tompkins County!

Sincerely,

Heather McDaniel, CEcD, AICP, EDFP
President, Ithaca Area Economic Development

David Herrick, P.E.
President, T.G. Miller, PC

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SECTION 1 - STUDY OVERVIEW

The *2010 Countywide Intermunicipal Water and Sewer Feasibility Study* (2010 Study) provided an inventory and technical examination of the municipal water and wastewater facilities across Tompkins County. The 2010 Study assessed existing infrastructure and its potential capacity to support planned growth, identified limitations to system expansion, and documented stated needs of communities without public water and sewer services. Effectively, it served as a snapshot of existing infrastructure, facilities and needs, and proved a useful tool for communities as they developed plans for individual and intermunicipal improvements.

The *2020 Water and Sewer Evaluation Update* (2020 Update) seeks to refresh the 2010 Study by documenting progress in implementing system improvements, but expands its purpose by suggesting forward-looking 'priority objectives' that local utility providers can collectively embrace to bridge capacity gaps, resolve governance issues, and facilitate infrastructure planning. In this context, the 2020 Update is not only a snapshot but also a tool to build consensus for water and sewer system projects that can enhance redundancy and reliability in future years.

To achieve these objectives, the following key tasks were completed for the 2020 Update:

1. **Updating 2010 Water and Sewer System Information**

   Information was compiled from utility system operators, engineering and planning professionals, and publicly available data from various sources on: State Pollutant Discharge Elimination System (SPDES) permits and regulatory compliance, scheduled and anticipated facility upgrades, and any substantive advancements in intermunicipal agreements.

2. **Water and Sewer Infrastructure Progress in Support of Housing Development**

   The section devoted to Water and Sewer Infrastructure Progress summarizes the more significant municipal infrastructure improvements completed over the recent 10-year period and identified those improvements that directly or indirectly support housing growth within the Development Focus Areas (DFA's) envisioned by the Tompkins County Housing Strategy.

3. **Integration with the County's Resiliency and Recovery Plan**

   Interviews with the water and sewer treatment plant operators were conducted collaboratively with the Tompkins County Department of Planning and Sustainability (TCDPS) to inform the development of the County's Resiliency and Recovery Plan (RRP). The objectives of the County RRP and 2020 Update were to find common ground relative to new water infrastructure that may improve redundancy between the Southern Cayuga Lake Intermunicipal Water Commission (Bolton Point), City of Ithaca, and Cornell University systems during periods of extended drought or other environmental conditions such as harmful algal blooms (HABs).

4. **Develop Priority Facility Objectives**

   Relative to water facilities, an initial list of possible improvements was compiled taking into account critical infrastructure that will support broader resiliency and redundancy plans, principally between the County's three larger water purveyors. Over a subsequent period of 10

years, dwelling unit growth is projected and the impacts principally to wastewater treatment facilities were evaluated as they relate to opportunities for service area expansion.

SECTION 2 - STUDY APPROACH

The updates of each community's present water and sewer infrastructure once again relied upon the active participation of municipal and utility system staff, operators, municipal leaders, administrators, engineers, and planners. Under the veil of the COVID-19 pandemic, virtual interviews were conducted between August 2020 and July 2021 by T.G. Miller, P.C., with specific participation from IAED and the TCDPS, to collect the following information for the 2020 Update:

- Current rated capacity of water and wastewater treatment systems.
- Principal treatment processes and mechanical systems.
- Scheduled or anticipated facility upgrades or new construction.
- Scheduled or anticipated water distribution or wastewater collection system upgrades or new construction.
- Historical problems and obstacles including operational difficulties, regulatory compliance, land-use restrictions, and public impact or complaints.
- Current population served by the utility and the number of service connections.

General information related to the existence and maintenance of resiliency and recovery plans, or other disaster preparedness plans, was a new topic presented to operators of the water and sewer treatment plants in anticipation that responses could inform the County's RRP study. Data related to energy use and greenhouse gas emissions attributable to wastewater treatment plants was also solicited in support of the County's effort to quantify community inventories.

In all, interviews were conducted with fifteen municipalities and the facilities managers of the Cornell University water system. The information gathered during the interviews was entered into individual interview forms and reviewed again with the municipalities for accuracy and concurrence. Any system limitations of a physical or regulatory nature that were volunteered during the interviews are noted in the forms appended to this 2020 Update. The new data retrieved from the interview process was compiled into a comprehensive 'Progress Matrix' (Matrix) that reflects advancements each water and sewer provider has made since 2010. The Matrix is intended to be a useful gauge for assessing a facility's ability to meet the infrastructure demands of current and future development. The Matrix also references physical infrastructure extensions and capacity enhancement projects, in the form of water supply and/or wastewater treatment, that have directly supported the development of new housing units within the DFA's identified in the *2017 Tompkins County Housing Strategy*[1]. Support of the housing strategy can also take the form of adopted intermunicipal agreements and on-going detailed engineering assessments that can indirectly benefit access for new housing to water and sewer services. Where known, these forms of indirect support are also noted.

SECTION 3 – STATUS OF WATER AND SEWER INFRASTRUCTURE

GENERAL

In the 2020 Update the term "Infrastructure" refers to water supply facilities (groundwater wells, infiltration galleries, reservoirs, and surface water intakes), water or wastewater treatment facilities, water transmission and distribution systems (pump stations, storage tanks, and pipe), and wastewater collection systems (septic tanks, pump stations, force mains, manholes, and pipe).

As listed in Table 1, the fifteen municipal systems in Tompkins County have varying combinations of water and sewer service access within the communities. In many instances, and most notably in the towns, a municipality with water and sewer infrastructure does not provide service or access to all of the properties within the incorporated boundaries or benefit districts.

Table 1- Overview of Community Water and Sewer Systems

Water and Sewer System	Water System Only	Sewer System Only	No Water or Sewer System*
• City of Ithaca • Village of Cayuga Heights • Town of Dryden • Village of Dryden • Village of Groton • Town of Ithaca • Town of Lansing • Village of Lansing • Town of Newfield • Village of Trumansburg	• Town of Danby • Town of Ulysses • Southern Cayuga Lake Intermunicipal Water Commission	• Village of Freeville • Ithaca Area Waste Water Treatment Facility	• Town of Caroline • Town of Enfield • Town of Groton
*Interviews were not conducted with communities having neither public water or sewer systems			

There are seven municipal water supply and treatment facilities serving twelve communities. Six of these facilities are owned and operated by individual municipalities including: the City of Ithaca, Town of Danby, Village of Dryden, Village of Groton, Town of Newfield, and Village of Trumansburg. Of these six municipalities, the City of Ithaca and Villages of Dryden and Trumansburg supply water to users outside of their municipal boundaries. The seventh municipal water supply and treatment facility is Bolton Point, which is owned and operated by five member-municipalities including: the Village of Cayuga Heights, Town of Dryden, Town of Ithaca, Town of Lansing, and Village of Lansing. Bolton Point is the largest of the seven water treatment facilities. It is noted that the Town of Ulysses purchases water through the Town of Ithaca but is not a member of Bolton Point. An eighth public water supply facility is Cornell University, which treats and supplies water principally to the Cornell University Campus, but also to the Cornell Heights area in the City of Ithaca and a limited area of Forest Home in the Town of Ithaca.

There are seven municipal wastewater treatment facilities that serve eleven communities. Six of these facilities are owned and operated by individual municipalities including the Village of Cayuga Heights, Village of Dryden, Village of Freeville, Village of Groton, Town of Newfield, and Village of Trumansburg. Of these six municipalities, only the Villages of Cayuga Heights, Dryden, and Freeville treat wastewater from users outside of their municipal boundaries. Portions of the Towns of Ithaca, Lansing, and Dryden and the Village of Lansing convey wastewater to the Village of Cayuga Heights Wastewater Treatment Plant (VCHWTP) but are not owners of that

facility. Discharges to the VCHWTP are approved by the Village of Cayuga Heights on a project-by-project basis through the purchase of sewer units. The seventh wastewater treatment facility is the Ithaca Area Waste Water Treatment Facility (IAWWTF), which is owned and operated by three municipalities including: the City of Ithaca, Town of Ithaca, and Town of Dryden. The IAWWTF is the largest of the seven facilities with a greater total permitted treatment capacity than the other six facilities combined. The individual municipalities own, maintain, and operate their respective wastewater collection systems.

Table 2 summarizes the various relationships that currently exist amongst the water supply and wastewater treatment providers.

Table 2 - Water Supply and Wastewater Treatment Summary

Water Supply and Treatment Facility	Municipalities Served	Joint Agreements and Shared Facilities
City of Ithaca	City of Ithaca (Except Small Areas Noted Above), Town of Ithaca (Along East Shore Drive, Renwick Heights, and Taughannock Boulevard)	None
Town of Danby	West Danby Water District	None
Village of Dryden	Village of Dryden, Town of Dryden Areas (Serves TC3, Dryden Central School District, and North Street north of Lee Road)	None
Village of Groton	Village of Groton	None
Town of Newfield	Town of Newfield Water Districts (#1, # 2, and the Frandsen Extension)	Water Districts #2 and the Frandsen Extension have purchase agreements with Water District #1.
Village of Trumansburg	Village of Trumansburg, Town of Ulysses Water Districts (#1 & #2 adjacent to Village), Commercial Area on Seneca Road in Seneca County	None
Southern Cayuga Lake Intermunicipal Water Commission (Bolton Point)	SCLIWC members: Town of Ithaca (serves Ithaca College), Village of Lansing, Village of Cayuga Heights, Town of Lansing Consolidated Water District, Town of Dryden Consolidated Water District, Town of Ulysses (Water Districts #3 & #4), City of Ithaca (limited area of Oakwood Lane, Hector Street, Warren Place, Sunrise Road, and Richards Place)	SCLIWC members own the Bolton Point Treatment Plant, the Transmission Main, and four storage tanks: (2) Burdick Hill Tanks, the Sheldon Road Tank, and the East Hill Tank.
Cornell University Water System (CUWS)	Cornell University Campus, City of Ithaca (serves a limited area of Cornell Heights), Town of Ithaca (serves a limited area of Forest Home on the south Side of Fall Creek)	None

Table 2, continued

Wastewater Treatment Facility	Municipalities Served	Joint Agreements and Shared Facilities
Village of Cayuga Heights (VCHWTP)	Village of Cayuga Heights, Village of Lansing Sewer Benefit Area, Town of Dryden (SS #1), Town of Ithaca (Warren and Hanshaw Road Area), Town of Lansing (Warren Road and Cherry Road Sewer Districts).	Intermunicipal agreements control access to the VCHWTP. The Kline Road by-pass can be utilized to divert sewage to the IAWWTF, when mutually approved.
Village of Dryden	Village of Dryden, Town of Dryden (Cortland Road SD)	Shares a common outfall to Fall Creek with the Village of Freeville.
Village of Freeville	Village of Freeville, William George Agency for Children's Services	Shares a common outfall to Fall Creek with the Village of Dryden.
Village of Groton	Village of Groton	None
Town of Newfield	Hamlet of Newfield	None
Village of Trumansburg	Village of Trumansburg and Commercial area on Seneca Road in Seneca County.	None
Ithaca Area Waste Water Treatment Facility (IAWWTF)	Joint Owners: City of Ithaca, Town of Ithaca, Town of Dryden Consolidated Sewer District. Also, VCHWTP Kline Road by-pass, when mutually approved.	Ownership: City of Ithaca 56%, Town of Ithaca 42%, Town of Dryden 2%. Multiple agreements for joint ownership of interceptor sewers between the City of Ithaca/Town of Ithaca.

The following general descriptions of water and sewer infrastructure were derived from the virtual interviews conducted between August 2020 and July 2021 with utility system staff, operators, municipal leaders, administrators, engineers, and planners. The complete collection of municipal infrastructure interview forms can be found in Appendix B.

CITY OF ITHACA

Water

The source of supply for the City system is Six Mile Creek. The watershed is 46.4 square miles. The 60-foot Potters Falls Reservoir has a reported safe yield of at least 5.4 MGD. The existing water treatment plant at Water Street has a capacity rating of 4.0 MGD. The current process includes a pretreatment dosage of chlorine dioxide and sodium permanganate followed by chemical coagulation, flocculation, sedimentation, filtration, and disinfection. Final treatment includes micro filtration, and disinfection.

Most of the water produced by the treatment plant is distributed by gravity from two clearwell storage reservoirs at the plant. These clearwells have a combined capacity of 1.43 MGD. A pump station located at the plant provides water from the clearwells to higher tank zones throughout the City. The Elm Street tank at the western limit of the City has a storage capacity of 1.5 MG. A pump station was installed in 2016 at the tank to pump water back into the gravity system and West Hill system. Pumps located on Mitchell Street fill the 1.0 MG Cornell Street and 1.0 MG Coddington Road tanks. The East Ithaca pumps fill the 0.615 MG Maple Avenue tank. A third pump station, at Vinegar Hill, pumps water into the 0.75 MG Oakwood Lane and 0.15 MG Cliff Park tanks. In total, the clearwells and tanks provide a gross storage volume of over 6.4 MG for

the City system. The Interconnect Building on Water Street is the primary connection to the Bolton Point water transmission main which crosses beneath Six Mile Creek just south of the Giles Street bridge. Valving in the Interconnect Building can be opened to augment the City's source of treated water during short duration emergencies or planned maintenance activities.

During periods of extended hot weather, the reservoir water quality can change drastically, resulting in higher than normal levels of manganese, ammonia, and iron. The current pre-treatment process utilizes oxidants to bring these compounds out of solution so that they can be removed via flocculation/coagulation. This waste stream is then sent to the waste handling facility at Giles Street where the City holds a SPDES discharge permit. The manganese and ammonia levels at the discharge point are routinely outside of the SPDES permit levels. There is a planned dredging project for the reservoir that will help solve this issue.

Planning is underway for a new intake building at the Potters Falls Reservoir that will provide enhanced monitoring of water quality within the reservoir. The same project will also include some dredging near the intake building.

Distribution system improvements under consideration include looping of the distribution main on Floral Avenue, an extension of a reinforcing main from South Aurora Street to support the Chain Works redevelopment project, and a redundant gravity main between Giles Street and the downtown distribution grid which was originally constructed in the early 1900's.

Lead and copper rules could affect about 600 services of unknown conditions, however, a budget to implement this work would require assistance from other funding sources.

The City does not currently have resource recovery or disaster preparedness plans but is in the process of developing them.

Sewer

Refer to the section titled "Ithaca Area Wastewater Treatment Facility" for a discussion of the City's ownership interest and operational roles in the treatment plant and jointly owned interceptor sewers.

VILLAGE OF CAYUGA HEIGHTS

Water

The Village of Cayuga Heights provides water service throughout the Village via the Sheldon Road tank operated by Bolton Point. The Sheldon Road tank is a 0.5 MG welded steel tank that was rehabilitated in 2007. The Sheldon Road Tank service area is bound on the east by Triphammer Road, south of Upland Road, and The Parkway and Highgate Road to the north of Upland Road. It extends to the north and south Village boundaries and west to Remington Road. The Village distribution system consists of 6-inch through 12-inch ductile iron mains with some mains 80-100 years old. The Village is considering adding hydrants and up-sizing mains on Klinewoods and Midway Roads.

Sewer

The wastewater treatment plant owned and operated by the Village is a trickling filter plant with tertiary phosphorus removal, which treats flow from the Village of Cayuga Heights, part of the Town of Ithaca, parts of the Village and Town of Lansing and the Town of Dryden. The 2.0 MGD capacity of the wastewater treatment plant and the permitted flows allowed by the New York State Department of Environment and Conservation (NYSDEC) allow some additional wastewater to be treated without any major upgrades. The plant headworks was replaced in 2020 as the first of a two-phased improvement project. The second phase is scheduled for 2021-2022 and will include upgrading alarm, SCADA, and electrical systems as well as pump replacements and the installation of a waste gas burner.

The collection system consists of mainly 6-inch to 10-inch mains with a 12-inch main running under NYS Route 13. The system is of an age that inflow/infiltration (I&I) has become an issue prompting the passing of a 2020 law allowing for the inspection of private properties for sources of I&I.

A 2003 intermunicipal agreement was adopted that allows flow 'displacement' between the Village and the IAWWTF using the existing Kline Road bypass. A future Remington Road transmission main could expand the IAWWTF's ability to accept emergency flows from the Village.

The Village does not currently have recovery or disaster preparedness plans but is planning for interconnections to provide for emergencies, allow for diversions during plant maintenance, and aggregate treatment capacity for 'outside' customers.

TOWN OF DANBY

Water

The Town of Danby currently has one water district that serves the Hamlet of West Danby. This district is served by a single drilled well at the Sylvan Lane pump station and is permitted for a maximum 'taking' of 100 gpm. The groundwater quality is good and the water is treated with liquid chlorine for disinfection. Water quality and levels have remained consistent over the last fifty years. The single well deviates from current standards that require two sources of supply, preferably in different aquifers or different locations of an aquifer. Any sizable expansion of the district boundary and distribution system could trigger the need to develop a second well, however, it is not feasible to consider an alternative source at this time. The well pumps water to a 90,000-gallon glass-coated, bolted steel storage tank that was installed new in 2014 to replace a failing welded steel tank. As replaced, the storage volume is more than adequate for the domestic demand and also now supports a fire flow of 500-gpm for a 2-hour duration. Static and residual pressures throughout the district are within an acceptable range.

The primary distribution system is a combination of 8-inch and 6-inch asbestos cement (AC) pipe and 3-inch PVC pipe which adequately serves the domestic needs of the district. There are only three fire hydrants located in the West Danby Hamlet. The capital improvement project in 2014 included replacing below-grade flushing assemblies with above-grade flushing hydrants and also complete replacement of old customer water meters with new, automated reading system meters.

While the water system does not currently have a recovery or disaster preparedness plans, the well house is connected to the emergency generator in the adjacent Fire Station and a spare submersible pump is kept on-hand.

Sewer

The Town of Danby does not have a municipal sewer system.

TOWN OF DRYDEN

Water

The majority of the Town of Dryden is served by private wells. Those areas that do receive municipal water are supplied from either the Village of Dryden or Bolton Point. Properties north of the Village of Dryden including the Dryden Central School District, Tompkins Cortland Community College (TC3), and lands along NYS Route 13 (Cortland Road) north of Lee Road receive water service from the Village of Dryden.

In 2017, the Town of Dryden formally consolidated the number of water districts from six to two. The Yellow Barn Water District (SW7) was established by the Town in 2012 to provide municipal improvements, maintenance and administration of the former Yellow Barn Water Company founded in 1963. SW7 serves the Yellow Barn Road neighborhood and is supplied by four groundwater wells that collectively fill a 0.053 MG water storage tank. Disinfection of raw water is accomplished with a sodium hypochlorite solution. The water is also treated using a greensand filter to remove iron and manganese. The wells have been problematic relative to consistent yield and quality. The Town has employed new filtering technology to improve water quality, but exploring new sources of supply may be warranted. The distribution system consists of 1-1/2-, 4-, and 8-inch pipe and because it was not constructed to conventional municipal standards, the Town has found it difficult to locate and repair leaks. A source water protection plan for SW7 was drafted with technical assistance from the New York Rural Water Association in 2020.

The Consolidated Water District (SW8) serves customers within the Varna Hamlet, the NYS Route 366 (Dryden Road) corridor east of Varna to Hall Road, portions of Hanshaw Road and Royal Road, Sapsucker Woods Road, and a portion of Snyder Hill Road. In the immediate vicinity of the Varna Hamlet, the Town's distribution main is supplied by Bolton Point water through a single connection to the Bolton Point transmission system. This connection is known as the Apple Orchard Pressure Reducing Valve (PRV). The Bolton Point transmission system consists of a 16-inch ductile iron main and the 3.0 MG East Hill Storage Tank. The distribution system in the vicinity of the Varna Hamlet also has a second, emergency source of supply from the 0.39 MG Sapsucker Woods Road Tank owned by the Town of Ithaca. The Sapsucker Woods Road Tank regularly serves Town of Dryden customers along Sapsucker Woods Road and Freese Road. To the east of the Varna Hamlet, customers of SW8 are located in the Town's NYSEG tanks pressure zone which consists of a pair of welded steel tanks having capacities of 0.2 and 0.4 MG, respectively. Both tanks are filled by the Town's pump station in Varna, which in turn is supplied through the Apple Orchard PRV. The NYSEG tanks and the distribution systems are in generally good condition and both NYSEG tanks have been inspected in recent years. Distribution pipe is predominantly ductile iron with diameters ranging between 8-12 inches.

The limited area of SW8 on Snyder Hill Road provides domestic distribution through a booster pump system and relies upon the Town of Ithaca Hungerford Hill Tank as the source of supply. Extensions of the water system in the vicinity of Snyder Hill Road would provide domestic service only. The lack of pressure in that area does not allow for the system to provide fire protection.

Sewer

Following a formal consolidation process in 2017, the Town currently has three sewer benefit districts: Sewer District No. 1 (SS1), Consolidated Sewer District (SS8), and Cortland Road Sewer District (SS3).

Sewer District No. 1 (SS1) serves Meadowlark Drive, Cardinal Drive and properties along the east side of Sapsucker Woods Road and drains by gravity to the Town of Ithaca system. Sewage is conveyed through the Town of Ithaca and Village of Cayuga Heights collection systems to the VCHWTP. This collection system includes 8-inch AC pipe.

Consolidated Sewer District (SS8) serves the Varna Hamlet area and drains by gravity to the Varna Pump Station. This station has two 535 gpm pumps which lift sewage through an 8-inch, cast-iron force main to a 15-inch Dryden and a 16-inch Cornell University transmission mains on the Cornell campus. Sewage flows through the Cornell collection system to the Town and City of Ithaca interceptor transmission main to reach the IAWWTF. The collection system includes a combination of 8-, 10-, and 15-inch AC and PVC pipe. An agreement between the Town and Cornell for apportioning capacity in the Cornell owned 16-inch transmission main, and any future upgrades to the Varna Pump Station and Force Main, has recently been renewed, increasing the total Town discharge rate to 800 GPM. SS8 also has a small pump station, which serves Freese Road south of Fall Creek, and discharges into the gravity main on NYS Route 366 (Dryden Road). The Hanshaw Road (Armory) area drains by 8-inch PVC gravity piping to the Lower Creek Road Pump Station and then is pumped through a 6-inch PVC force main to the gravity system on NYS Route 366 (Dryden Road). Six commercial properties on Royal Road have individual pump stations that discharge into the Town's common 1-1/4-inch and 2-inch PE force main. This force main connects to the gravity system that flows to the Lower Creek Road pump station. Any sewer service area expansion, or sizable loadings from new development, that will exceed the pumping capacity of the Varna Pump Station will require upgrades to the station as well as possible upsizing of the Cornell and Dryden Transmission mains.

SS8 also includes properties in the Peregrine Subdivision located off Snyder Hill Road. This small service area drains by gravity through 8-inch PVC pipe into the Town of Ithaca system and ultimately to the IAWWTF through Town and City of Ithaca interceptor sewers. An expansion of the district and service connections in this vicinity will trigger the installation of a flowmeter at the Town of Ithaca boundary.

Relative to treatment capacity for SS8, the City of Ithaca, Town of Ithaca, and Town of Dryden jointly own and operate the IAWWTF. An agreement between these parties recognizes the Town of Dryden having approximately 1.98% plant ownership, or 259,000 gpd of owned treatment capacity. Peak flow from the SS8 service areas has been estimated to be 171,000 gpd. Although currently within the owned capacity, future district expansion or large growth within SS8 may trigger purchasing excess capacity from one or both of the other municipalities.

The Cortland Road Sewer District (SS3) serves the area of the Town north of the Village of Dryden including TC3, Dryden Central School District, and the commercial properties along North Road. Sewage flows by gravity to the Village of Dryden and is treated at the Village of Dryden Wastewater Treatment Plant. The collection system includes 8-inch PVC pipe and a small pump station, which lifts sewage collected along a portion of Mott Road into the gravity system near the intersection of North Road.

There are a number of properties in the Town that contract for sanitary sewer service as 'out-of-district' customers. These include; the former Vanguard printing facility on Hall Road which is served by the SS8, the William George Agency for Children's Services (WGS) on Freeville Road which discharges sewage from some of their facilities into the Village of Freeville collection system, and six properties on the east side of Sapsucker Woods Road north of Meadowlark Drive that are Town of Ithaca service area customers.

VILLAGE OF DRYDEN

Water

From publicly accessible information published by the Village in the *Annual Drinking Water Quality Report for 2020*[2], the Village utilizes five ground water wells as the source of supply. The wells are located on South Street, Lake Road, and Dryden Lake Park. The water is disinfected with chlorine gas and treated with CARUS 8100 for corrosion control.

The South Street well provides 30% of the Village's needs, the Dryden Lake Park well 50%, and the Lake Road well 20%. An old well at Jay Street has been abandoned. All the wells are treated with gas chlorine for disinfection and a chemical is added to help sequester iron and manganese. All wells pump directly into the distribution system.

Since 2018 the Village has replaced both the 0.5 MG Lee Road reservoir and the 0.3 MG Ferguson Road storage tank with new concrete tanks. Distribution system improvements include looping of the East Main Street and Lee Road water mains and replacement of 4-inch mains on Rochester, Marsh, Union, and Montgomery Streets.

The water distribution system provides water to the Village, but service also extends outside the Village into the Town of Dryden in three areas. These areas include the TC3 campus, the Dryden Central School District (Middle School and High School), and a commercial area north of Lee Road.

The Village reported having a Water Emergency Plan.

Sewer

The former 0.4 MGD wastewater treatment plant serving the Village and limited areas in the Town of Dryden was replaced in 2011. The main driver behind the new plant was a new lower phosphorus limit of 1.0 mg/l. The new plant is based on the Sequencing Batch Reactor (SBR) process. The new plant has a capacity of 0.6 MGD.

The collection system is principally gravity, with three pumping stations serving specific developments in the Village. One pumping station serves six dwellings and two pumping stations serve Poet's Landing which consists of fifteen buildings that house 120 apartments.

VILLAGE OF FREEVILLE

Water

The Village of Freeville has no municipal water infrastructure.

Sewer

The Village of Freeville 0.125 MGD wastewater treatment facility serves most of the Village of Freeville and the WGA in the Town of Dryden, which is an out-of-village customer. The Village's facility consists of two aerated lagoons, which operate in series. The effluent from the plant is chlorinated with sodium hypochlorite and then discharged to the outfall (shared with the Village of Dryden) to Fall Creek about 2.5 miles away. There is some additional capacity in the existing plant.

The wastewater collection system contains eleven pumping stations, which transport the flow from the Village. All sewage from the WGA flows by gravity to the plant.

There are no known limitations in the system that would prevent expansion of the sewer system. However, expansion of the system outside of the Village would require the creation of a Town of Dryden sewer benefit district.

The Village does not currently have resiliency and recovery or disaster preparedness plans.

VILLAGE OF GROTON

Water

The water service area in the Village of Groton is currently restricted to the Village but also serves approximately fifteen out-of-district users located in the Town of Groton. The Village regularly uses two sources of water; the Conger Boulevard wells and the Morton Works Facility.

Three drilled wells are located on Conger Boulevard, but only the two larger 12-inch wells, fitted with 250 gpm pumps each, are currently used. The smaller, 100 gpm pilot well is not used. The wells pump directly into the distribution system after being treated with chlorine gas for disinfection. A chemical is also added to help prevent iron from precipitating.

The Morton Works, a series of infiltration galleries collecting shallow groundwater outside the Village along Old Stage Road, provides just under half of the daily water for the Village. Water flows from the galleries by gravity to the Clark Street water tank which provides pressure to the majority of the Village.

The 0.5 MG Clark Street tank serves the majority of the Village and the 0.2 MG Elm Street tank serves a higher pressure zone for the east side of the Village. The Elm Street tank is fed from a pump station at Clark Street. Both of the tanks are in good condition. The distribution system

includes 4-inch and 6-inch mains and is generally considered in good condition. The small diameter mains have some flow restrictions due to tuberculation and residents have complained of discolored water.

Sewer

The wastewater treatment plant was upgraded in 2010 from an activated sludge plant with a capacity of 0.35 MGD to a SBR plant with a capacity of 0.5 MGD. The headworks has a bar screen to remove grit and a settling tank for collecting silt. Primary treatment is provided in a 2-tank system designed to provide mixing, aeration, and decanting to reduce BOD and TSS. The plant has been handling all flows hydraulically even after heavy rains and thaws. The plant has a backup generator.

The existing wastewater collection system in the Village of Groton consists of gravity sewers (no wastewater pumping stations) and is around fifty years old. The plant experiences I&I flows of up to 500,000 gpd due to the age of the system. An I&I study is underway to determine sources of I&I and suggest improvements to reduce or eliminate it.

The plant does not currently have resource recovery or disaster preparedness plans but the Village is looking to work with Tompkins County to prepare them.

TOWN OF ITHACA

Water

The Town of Ithaca is a Town-wide water benefit area; however, not all lands in the Town presently have access to municipal water. The majority of Town customers are supplied treated water from Bolton Point. Cornell University has its own supply, but also utilizes Bolton Point water as a customer of the Town of Ithaca. Some Town customers are served off the City of Ithaca water system including lakeshore properties along Taughannock Boulevard and several properties on Trumansburg Road near the City boundary.

There are twelve Town-owned water storage tanks with a combined volume over 5.35 MG. The 16-inch and 18-inch diameter transmission mains owned and operated by Bolton Point stretch from the Burdick Hill Storage Tank in the Town of Lansing to the Pearsall Place PRV station on South Hill. Town owned transmission mains, ranging from 12-16 inches, extend from South Hill through the Inlet Valley to West Hill which link the Town's storage tanks and distribution systems in those areas to the Bolton Point supply. The Town of Ulysses water system is supplied Bolton Point water through the Town of Ithaca infrastructure to the Woolf Lane pump station. The 0.2 MG Town of Ulysses storage tank on Van Dorn Corners Road provides domestic and fire water storage for Town of Ithaca customers in the vicinity of Trumansburg and Iradell Roads.

Ithaca College is connected to the Town's Danby Road tank zone and pumps Bolton Point water to its privately owned and operated 0.5 MG storage tank and campus distribution system. The Danby Road tank was replaced in 2013.

On East Hill, the Town's 0.5 MG Hungerford Hill tank zone supplies water to the Town of Dryden Consolidated Water District (SW8) on Snyder Hill Road. A new tank in the East Hill system was

built in 2018 as a sister tank to the 0.2 MG Pine Tree Road tank. The Pine Tree Road/Ellis Hollow Road tank zones currently serve a majority of the customers located on East Hill, including Cornell University properties along Pine Tree Road and the East Hill Plaza.

In the Northeast area, that portion of the Cornell Business and Technology Park in the Village of Lansing and south of NYS Route 13 is connected to the Town's Sapsucker Woods tank zone. The 0.5 MG ground tank was replaced in 2015 with a 0.39 MG elevated tank. The elevated tank raised pressures in this tank zone which is also the supplemental supply for SW8 in the vicinity of the Varna Hamlet. In 2015 a PRV station was added on Freese Road to regulate pressures within the Varna area. A majority of the SW8 service area is to be fed via the Apple Orchard PRV connected to the Bolton Point transmission main located at the intersection of NYS Route 366 and Palm Road.

The Christopher Circle 0.5 MG ground tank was replaced in 2014 with a 0.5 MG ground tank and the Christopher Lane Pump Station was upgraded in 2015. The 0.2 MG Northview ground tank was replaced with a 0.5 MG tank in 2012. The Town has installed approximately 51,250 feet of water mains since 2010. A majority of the water main installation has been replacement of existing water pipes. The Town invests approximately $2 million per year on water system improvements.

Sewer

The Town of Ithaca is a Town-wide sewer benefit area; however, not all lands in the Town presently have access to municipal sewer. The collection system includes approximately sixty-eight miles of 6 to 15-inch gravity sewer, 14,000-ft of 3 to 8-inch force main, 1,720 manholes, and nine pump stations. Average day flows are approximately 2.3 million gallons. There are six distinct geographic service areas:

The West Hill collection system serves properties on and adjacent to Trumansburg Road, Mecklenburg Road, West Haven Road, and Elm Street. The sewer mains along these highway corridors connect to jointly owned interceptor pipes in the City. The three interceptors converge near the Buffalo Street bridge at the Flood Relief Channel. A combination of gravity and low pressure (siphon) piping convey flow over and under the channel, respectively. Lakefront parcels along Taughannock Boulevard from the City boundary to the Town of Ulysses border are also served by a Town sewer main. The Taughannock Boulevard main connects to a jointly owned interceptor pipe and pump station in Cass Park. A force main from the pump station extends beneath the Cayuga Inlet to Pier Road.

The Inlet Valley system extends from a jointly owned interceptor on Floral Avenue and serves parcels along Five Mile Drive, Elmira Road, NYS Route 327, and the surrounding area. A siphon beneath the Flood Relief Channel discharges to a pump station in the Cherry Street industrial park.

Sewer mains throughout the South Hill neighborhoods converge at jointly owned interceptors in the City on Aurora Street, Hudson Street, and Crescent Place. The Danby Road corridor serves the majority of the Ithaca College facilities, the South Hill Business Campus, and the commercial uses in the vicinity of the West King Road intersection. The collection system along Coddington Road serves a limited number of residential customers between the City boundary and West Northview Road. Therm, Inc. and the residential neighborhoods in the vicinity of Pennsylvania Avenue,

Northview Road, Troy Road, and East King Road (Southwoods and Deer Run developments) connect to the interceptor at Crescent Place.

The East Hill system includes extensions of jointly owned interceptors on East State Street/Slaterville Road from the City boundary to Burns Road and on Mitchell Street from the City boundary to Summerhill Lane. Collection pipes serving residential and institutional uses on Pine Tree Road, Honness Lane, Snyder Hill Road, and the Eastern Heights neighborhood connect to the Slaterville Road interceptor. Commercial and high density residential properties surrounding the East Hill Plaza discharge through the Mitchell Street interceptor.

The Northeast system includes the Town's sewer infrastructure in the vicinity of the Warren and Hanshaw Road corridors north of the Cornell University campus. Sewage from the residential and institutional properties is ultimately discharged into the Village of Cayuga Heights collection system and treated at the VCHWTP.

The Lake Street system includes gravity collection mains along Lake Street and throughout the Renwick Heights neighborhood which extend from a jointly owned interceptor at the Ithaca High School. The East Shore Drive properties, including a few City parcels adjacent to Stewart Park, drain to a jointly owned pump station which lifts sewage to the Lake Street main.

Relative to jointly owned interceptor sewers, the Town of Dryden is a 'customer' of the Town of Ithaca and therefor the Town of Dryden does not own any percentage of the interceptors that are used to convey sewage to the IAWWTF.

TOWN OF LANSING

Water

The contiguous Town distribution system includes five water storage tanks that feed more than eleven individual pressure zones. Two additional isolated extensions from adjacent neighboring municipalities in the Town of Ithaca and Village of Lansing exist along E. Shore Drive. There is one booster station system on Emmons Road that serves a limited number of residential connections where gravity distribution is presently not available at higher ground elevations. The Town has previously combined individual districts to form a single benefit area known as the Consolidated Water District (CWD). Subsequently, there have been three extensions of the CWD on Lansing Station Road, Drake Road and Peruville Road (NYS Route 34B).

The Village Circle and Bean Hill Tanks, with a combined storage volume of 1.35 MG, are supplied by the Burdick Hill Pump Station, which has a direct connection to the Bolton Point transmission system. Pumping capacity in the Burdick Hill station was significantly increased in 2017 to meet the growing water demands in the CWD. The distribution piping is at least 8-inch diameter throughout that portion of the South Lansing area served by these tanks. The pipe network is well looped between North Triphammer Road and Warren Road with interconnected piping on Cherry Road, Hillcrest Road, Asbury Road, and Peruville Road.

The Wilson Road Tank is supplied by the Village Circle/Bean Hill tank grid through pressure reducing valve stations. The 0.2 MG tank provides service to the Lansing Central School District and surrounding residential neighborhoods in Ludlowville and Myers Park.

Filled by the Pine Grove Pump Station in Ludlowville, the 0.25 MG Emmons Road Tank provides volume and pressure for lands between Ludlowville Road and Milliken Station Road along the NYS Route 34 (Ridge Road) corridor.

The Bone Plain Road Tank was placed in service in 2016 and is filled by the Village Circle Pump station. This 0.26 MG tank is physically located in the Town of Dryden and provides a higher pressure zone for the CWD distribution system on Farrell Road, Village Circle, and Bean Hill neighborhoods.

Sewer

The Town presently has sewer collection systems serving the Cherry Road Sewer District (CRSD) and Warren Road Sewer District (WRSD). The CRSD serves primarily residential subdivisions on Horizon Drive and the BorgWarner plant on Warren Road.

The WRSD collection system was constructed in 2010 to serve institutional, commercial and multi-family properties along Cherry Road, Warren Road, Dutch Mill Road, Oakwood Drive, and Farrell Road.

Both the CRSD and WRSD are connected with 8-inch mains to the Village of Lansing collection system on Bush Lane. The WRSD includes two municipal sewage lift stations, one on Farrell Road and the second on Oakwood Drive. A sewage flow monitoring station is located near Bush Lane which collects daily flow data for all of the WRSD and a portion of the CRSD. All of the municipal gravity sewer collection pipes are 8-inch PVC.

Recently formed Sewer District #1 was established to facilitate potential residential growth in the south end of the Town, however, there has been no physical construction of infrastructure.

VILLAGE OF LANSING

Water

The Village is served by gravity from four tank pressure zones and several smaller areas within these zones are served by pressure reducing stations. The Village Circle Tank is a 1.0 MG tank owned by the Town of Lansing. This tank serves the area east of Warren Road north of NYS Route 13 with 8-, 10- and 12-inch cast or ductile iron pipe. The Sapsucker Woods Tank is a 0.39 MG tank owned by the Town of Ithaca. This tank serves the area east of Warren Road south of NYS Route 13 with 8-inch and 12-inch cast or ductile iron pipe. The Airport Ground Tank is a 0.5 MG tank owned by the Village of Lansing. This tank serves the area east of North Triphammer Road to Warren Road and the Shops at Ithaca Mall with 8-inch and 12-inch cast or ductile iron pipe. The Burdick Hill Tanks, owned by Bolton Point, have a combined storage volume of 2.4 MG and serve the balance of the Village. Half of this area is fed by gravity and half by a PRV station with 8-inch cast or ductile iron pipe. This area of the Village used to be served by the Oakcrest Tank which was removed from service in 2010 and the Village shared in

the cost of the construction of the Burdick Hill Tanks with Bolton Point as a replacement.

Sewer

Only a portion of the Village of Lansing has sewer service, which can generally be described as the southeast two-thirds of the Village and all of the area of the Village south of NYS Route 13. The Village sanitary sewer system south of NYS Route 13 is an extension of the mains in the Village of Cayuga Heights (VCH). There are two connections to the VCH system: the corner of Uptown Road and Burleigh Drive and the intersection of Berkshire and Highgate Roads. Sewers that were installed prior to the formation of the Village in 1974 are mainly 8-inch AC pipe and are generally located north of NYS Route 13 in the vicinity of N. Triphammer Road, Graham Road, Dart Drive, and Warren Road along with the sewers west of Warren Road and south of NYS Route 13. More recent re-construction and extensions within this area have been with 8-inch PVC pipe. The remainder of the sewered portion of the Village along Cedar Lane, Beckett Way, Oakcrest Road, and Bush Lane consists of 8 to 15-inch ABS Truss pipe installed in 1982. The 15-inch interceptor pipe connects to the inlet side of the VCHWTP. The Town of Lansing further extends this system north from two connections on Bush Lane. Extensions of the 1982 sewer system within the Village are generally PVC pipe.

An expansion of Sewer Benefit Area to serve properties along E. Shore Drive, Cayuga Heights Road, and Twin Glens Road is currently in the design and permitting phase. At present, existing residential and commercial land utilize on-site septic systems for sewage disposal. Once completed, the northern terminus of the new Village sewer main will facilitate the connection for the Town of Lansing Sewer District #1.

TOWN OF NEWFIELD

Water

The source of supply for the Town's water districts is the West Branch Cayuga Inlet and Fish Kill Valleys Aquifer (aka Newfield Aquifer). There are two well sites, identified as Pine Circle and Armstrong. The largest producing well is Pine Circle Well #2 with a current production rate of 190 gpm. The current combined pumping capacity of Pine Circle Wells #2 and #3, and the Armstrong well is 350 gpm. Groundwater quality and level have remained consistent over the last thirty-five years; however, the aesthetic quality of the Armstrong water is less desirable and is used less frequently. Sodium hypochlorite is injected for disinfection and to maintain appropriate residual levels in the distribution system. Polyphosphate (Aqua-Pure) is a sequestering agent injected at the Pine Circle Wells for controlling iron and manganese.

The Town currently has three water benefit districts: Water District No. 1, Water District No.2 and the “Frandsen Water District”. Water District No. 1 encompasses the Main Street area of the Town and is served by the combination of 0.1836 MG Trumbull Corners Tank and 0.158 MG Van Kirk Road Tank. The distribution system includes roughly 41,200 feet of 6-, 8- and 10-inch mains comprised of AC and PVC pipe. Water District No. 2 serves the Inlet Valley Area on NYS Route 34/96. Water District No. 2 maintains two storage tanks. The Main Street Tank is a 0.15 MG transfer tank to fill the 0.3 MG Shelter Valley Tank which provides the distribution storage and pressure within Water District No. 2. The distribution system includes about 27,000 feet of 8- and 10-inch PVC or HDPE pipe. The Frandsen Water District is an extension of Water District No. 1

and includes 144 affordable-housing units and an existing residence along NYS Route 13 just north of the intersection of South Main Street and NYS Route 13. The Frandsen District is served by the combined Trumbull Corners and Van Kirk Tank grid.

Pine Circle Wells #1 and #2 have been in operation since 1967 and while they are still in operation, the pumps have become lodged in the well casings and removing them for proper maintenance has not been possible. The loss of these pumps due to a mechanical failure would be detrimental to the source capacity for the water districts. A groundwater source study was completed in September 2020 which identified and recommended additional sources of supply within the adjacent aquifers. A new well was recently drilled in the vicinity of Pine Circle (known as Well #4) with a reported sustainable yield of 200 gpm. Permitting of Well #4 is in process. Once in service, the Town can pull the pump from Well #2 for maintenance.

Sewer

The Town's treatment works at Taber Road consist of two 5,700 gallon settling tanks which discharge into another 5,700 gallon tank. There are two 7.5 HP pumps that transfer the effluent to four absorption fields for distribution. The distribution of effluent between the fields is automatically controlled based on the pump start time and is alternated between the fields. The pumps are Flygt 3127.180. The well empties in about 4.5 minutes and if the pumps fail the effluent will overflow and flow by gravity into the fields. There is space available on site to add an additional 2-4 absorption fields, however, the Town had been informed in the past by NYSDEC that this space needs to be reserved as replacement area for the current system loading.

The sanitary sewer system was originally installed in 1984 and collects effluent discharged from privately owned septic tanks. Septic tank effluent is collected and conveyed to the wastewater treatment facility by a combination of pumping and gravity. There are currently five pump stations that lift sewage to the gravity portions of the system. The gravity mains and manhole covers continue to be checked and replaced when necessary to minimize I&I. The flow rates have not reduced significantly and increases are noted during wet weather periods. Individual gravity collection grids drain to a total of five pump stations which lift the effluent to the Taber Road treatment works. New level sensors have recently been installed in the pump stations. In the last year, pumps have been replaced in Station #2 at Depot Road and Station #3 at Trumbulls Corners/Main Street. A *Sanitary Sewer System Inflow & Infiltration Study*[3] recently completed for the Town approximated that 57% of flow within the system is I&I originating in the septic tanks alone. The Study recommended that "*Undertaking system-wide improvements, including both septic system rehabilitation and also installation of new meters and manholes, will reduce extraneous flows into the collection system, thus opening up infrastructure capacity to support future growth"*.

The Town does not currently have recovery or disaster preparedness plans. However, it does have stationary emergency generators for the Pine Circle Water Pump House and Sanitary Pump Stations #1 and #2. A spare pump is available to serve any of the five sanitary pump stations. The Town also has a portable generator that can be used at the Armstrong Well site during a power emergency.

VILLAGE OF TRUMANSBURG

Water

The Village of Trumansburg system is supplied by four active wells: the Frontenac Point Well (Well #1), the Taughannock Park Road Well (Well #2), and two wells at Taughannock Falls State Park (Wells #3 and #4). Village Well #1, located along Frontenac Road near Camp Barton, is active and permitted for 500 gpm. Well #1 was recently flushed and a new pump installed during the 2015 Well & Water System Improvement Project. Sodium hypochlorite is introduced at the well head for disinfection. Well #2 was the existing NYS Department of Parks, Recreation & Historic Preservation (NYS Parks) well for Taughannock Falls State Park. This well has a pumping capacity of 60 gpm. Two new wells were drilled at Taughannock Falls State Park for a redundant supply. Well #3 is located at North Point, to the west of Taughannock Creek, and is permitted for 300 gpm. Well #4 is located to the east of Taughannock Creek and is permitted for 500 gpm. These two wells are interconnected prior to sodium hypochlorite being introduced for treatment. A fifth, inactive, well (the Hoffmire Well) located along Indian Fort Road is for emergency use only. This well has not been operated in several years and has poor water quality. The Village is approved for 720,000 gpd from permitted wells.

Well #1 pumps to a 0.15 MG ground storage tank at the corner of Route 89 and Frontenac Road. Three pumps convey water from the storage tank to the 0.5 MG elevated storage tank at the corner of NYS Route 227 and Halsey Street in the Village. The elevated tank was constructed in 2004. Wells #2, #3, and #4 pump to a 0.2 MG ground storage tank off Taughannock Park Road that was formerly owned and operated by the NYS Parks. Ownership of the tank and piping was transferred to the Village as part of a 2015 Well and Water System Booster Pump Station Project. Water from the tank is then pumped to the elevated tank in the Village by a triplex booster pump station.

Sewer

The existing wastewater treatment facility serving the Village has a capacity of 0.25 MGD and was designed for a hydraulic peak flow of 1.0 MGD. Upgrades to the facility started in 2015 and were completed in 2019. The upgrades did not increase the permitted capacity of the plant but vastly improved the effluent water quality discharged to Trumansburg Creek and ultimately Cayuga Lake. Influent to the plant is through a 15-inch gravity main. Influent passes through a mechanical screen, to a vortex grit chamber with classifier, then to two aeration tanks for biological treatment. The flow is then lifted by two screw pumps to two peripheral feed secondary clarifiers. Treated water from the secondary clarifiers is conveyed by gravity to two mechanical disc filters then is disinfected via an open channel UV disinfection system. Flow runs through a post-aeration tank followed by a flow meter before being discharged to Trumansburg Creek. Sludge removed from the secondary clarifiers is treated in aerobic digesters prior to dewatering by a belt press. The dewatered sludge is removed from the facility and disposed of by land application in Seneca County.

Flow to the plant is by gravity and the majority of the collection system is small diameter piping (6 to 12-inch). There are two pump stations in the network: one on South Street and one on Prospect Street. Record drawings from original collection system indicate approximately 53,400 feet of sewer main and approximately 215 manholes.

The Village does not currently have recovery or disaster preparedness plans but similar plans are being considered.

TOWN OF ULYSSES

Water

The Town of Ulysses currently has four water benefit districts: Water District No. 1, Water District No. 2, Water District No. 3, and Water District No. 4. Water District No. 1 serves the Cayuga Addiction Recovery Services (CARS) facility on NYS Route 227. This facility is fed off the 0.5 MG Village of Trumansburg elevated tank. The CARS facility is served by a 4-inch lateral off an 8-inch main. Water District No. 2 serves the Sure Save grocery store on NYS Route 96. This facility is also fed off the elevated tank. Water District No. 3 serves properties along NYS Route 96 in the Hamlet of Jacksonville, Cold Springs Road, Swamp College Road, Jacksonville Road, Perry City Road, and Van Dorn Corners Road. This district is fed off the 0.2 MG Town of Ulysses tank located on the corner of Iradell and Van Dorn Corners Roads. The distribution system includes a 12-inch pipe and was intended to adequately serve the domestic and fire needs of the district. Water is supplied to the district through the Wolf Lane pump station located in the Town of Ithaca. The water supplier is Bolton Point. The agreement with the Town allows Ulysses to draw up to 159,000 gpd. Water District No. 4 serves three properties on Dubois Road just north of the Town of Ulysses/Ithaca border. This district is fed off the 0.5 MG Town of Ithaca Trumansburg Road Tank. The agreement with the Town allows Ulysses to draw up to 3,000 gpd.

Sewer

The Town of Ulysses does not have municipal sewer infrastructure.

SOUTHERN CAYUGA LAKE INTERMUNICIPAL WATER COMMISSION (BOLTON POINT)

Bolton Point is an intermunicipal organization dedicated to providing water to its member municipalities. The current members include the Village of Cayuga Heights, Town of Dryden, Town of Ithaca, Town of Lansing, and the Village of Lansing. The Bolton Point Treatment Plant on NYS Route 34 in the Village of Lansing is permitted to produce 6 MGD of water using conventional surface water treatment processes. Cayuga Lake is the source of raw water. In 2020 the Plant produced an average of 2.59 MG of water per day with a maximum day production of 3.9 MG. The system also provides water to some City of Ithaca customers on Oakwood Lane, Hector Street, Warren Place, Sunrise Road, and Richards Place.

Treated water is initially pumped from the Bolton Point clearwell to a pair of wire-wound concrete storage tanks on Burdick Hill Road that have a combined volume of 2.4 MG. These tanks were installed new in 2013-2014 to replace an aging welded steel tank. The Sheldon Road tank is a 500,000-gallon welded steel tank, which provides distribution water to the Village of Cayuga Heights. This tank is in good condition as it was rehabilitated in 2007. The East Hill Tank is a 3.0 MG wire-wound concrete tank, which was constructed in 2006 off of Ellis Hollow Road in the Town of Ithaca. This tank is sited at an elevation higher than the Burdick Hill and Sheldon Road Tanks and provides transmission storage at higher pressures to distribution system connections in the Towns of Dryden and Ithaca. The East Hill Tank is filled through the Oakcrest Pump Station which is operated and maintained by Bolton Point. The three pumps in the Oakcrest Pump Station

have the capacity to deliver 3.0-5.3 MGD depending on the combination of control valves that are open or closed.

The Bolton Point transmission system has interconnections with the City of Ithaca and Cornell University treatment plants which can be utilized during emergencies and planned maintenance periods. Bolton Point also maintains over 12 miles of ductile iron transmission main ranging in size from 12 to 20-inch diameter.

Although distribution facilities are owned by the individual member municipalities, Bolton Point provides services related to distribution system operation, maintenance, and administration.

Bolton Point has published a public version of the *Water Emergency Plan*[4] dated November 27, 2018. The Plan "*is intended to be a resource to the Commission, the Department of Health, the City of Ithaca, Cornell University, and any other associated party. It addresses the actions to be taken by the Commission in order to anticipate and respond to water supply emergencies, and to enhance the ability of the Commission to serve the needs of the urban and suburban areas of Tompkins County during water supply emergencies*." In addition, a monitoring and reaction plan for the increasing threat of HABs on Cayuga Lake was implemented in 2019. If cyanotoxins are ever detected in the raw water supply, the necessary responses in Bolton Point operations will reduce treated water production and, depending on the duration of a cyanotoxin event, may trigger water use restrictions within the Bolton Point system. A concurrent prolonged period of drought in the region with a cyanotoxin event at the Bolton Point Plant would challenge the ability of the interconnected water systems to share their respective sources of supply.

The Bolton Point plant has sufficient treatment capacity to provide additional water for the purposes of supporting development within the member municipalities and potentially other communities. Short-term emergency supply to the City of Ithaca and Cornell University can also be provided, but reliance on long-term supply during periods of regional drought is not yet a feasible strategy. Operational and physical challenges to overcome to improve resiliency, at a minimum, include:

- Changes in Bolton Point production hours and staffing.
- Increased filter backwash cycles and limited land area to create additional settling lagoons.
- Increasing transmission main capacity between Oakcrest Pump Station and existing points of interconnection requires duplicative piping to be installed, maintained and repaired.
- Degraded water quality in the transmission system during the majority of 'non-emergency' conditions.

CORNELL UNIVERSITY WATER SYSTEM (CUWS)

Fall Creek is the source of surface water for the CUWS. The raw water intake is along Forest Home Drive. Fall Creek originates in Lake Como and has a watershed area of approximately 125 square miles. Flow in Fall Creek for most of 2020 averaged 168 cfs. Cornell is permitted to withdraw a maximum of 5.5 cfs from Fall Creek. In 2020, the CUWS produced an average of 0.906 MGD. The Cornell water system serves the University's campus and also supplies water to City of Ithaca customers in the Cornell Heights area and to Bolton Point-Town of Ithaca customers on the south side of Fall Creek in the Forest Home area.

From the clearwell at the Water Filtration Plant, water is pumped to a 1.5 MG storage reservoir near NYS Route 366 (Dryden Road). This reservoir provides distribution storage for the campus pressure Zone 1. Pumping from the reservoir fills the 1.0 MG Hungerford Hill storage tank. The Hungerford Hill tank serves campus pressure Zones 2-3 and is interconnected with the Bolton Point 3.0 MG East Hill Tank. There is approximately thirty-six miles of water main in the distribution system.

Cornell maintains an updated Emergency Response Plan and Vulnerability Assessment focused on the threat of intentional contamination of the water supply and cyberattacks. Through existing physical interconnections with the Bolton Point water system, there is the ability to supplement the CUWS source of supply during short-term emergency events. Naturally occurring emergencies, such as the prolonged regional drought experienced in 2016, drew attention to the need for a closer examination of impacts on the Bolton Point water treatment plant operations as well as infrastructure improvements that would be needed to support longer-term emergency relief.

ITHACA AREA WASTE WATER TREATMENT FACILITY (IAWWTF)

The IAWWTF is jointly owned and operated by the City of Ithaca, Town of Ithaca, and Town of Dryden. The IAWWTF is the largest facility in the region with a total permitted treatment capacity of 13.1 MGD. There is significant additional capacity in the treatment works as daily flows average around 6 MGD. The main process, where capacity would be limited, is in the final settling tanks and the Actiflo system. The primary settling tanks are able to be run with one out of service except under very high flows, and the aeration tanks are capable of being reconfigured, if required, to accept additional loading. Flow monitoring is via a Parshall Flume in the effluent channel.

The facility has made substantial improvements since 2010 including new digester mixers and a co-generation system, new bar screens, new septage screening, and an aeration system. Improvements underway include grit removal upgrades, effluent water reuse, a new vacuum truck dumping pad, new tank rails and troughs, and two generators to run the entire plant.

The SPDES permit expired in May 2020 but a permit renewal was applied for in 2019. Septage handling facilities receive over 4 million gallons per year.

There continue to be occasional wet weather sewer capacity problems with the jointly owned interceptor mains that serve the West Hill collection systems. In partnership with the joint owners, the IAWWTF has recently completed the refurbishment of fourteen flow metering stations with improved flow measuring equipment and real-time data acquisition and monitoring at IAWWTF. These flow meter improvements will facilitate subsequent investigations of I&I sources.

SECTION 4 - SUMMARY OF WATER AND SEWER PROGRESS

Subsequent to the 2010 Study, municipalities have been proactively planning and undertaking repairs and upgrades to existing treatment facilities and piped systems, as well as initiating studies for additional near and long-term improvements. A vast majority of the substantive infrastructure deficiencies and/or limitations identified in the 2010 Study have been reconciled. Notable facility and system improvements included:

- Completion of the City of Ithaca Water Treatment Plant Replacement Project.
- Relative to water systems utilizing groundwater sources, the Villages of Dryden and Trumansburg have supplemented their well fields and, as applicable, discontinued objectionable raw water quality sources, added redundancy, and increased withdrawal rates to meet demands.
- Upgrades in sewage treatment processes for plants in the Villages of Dryden, Groton, and Trumansburg.

Tables 3 through 6 provide a brief summary of the infrastructure progress following the 2010 Study as either reported by the municipalities during the interviews or disclosed in publicly accessible documents such as a NYSDOH Annual Water Quality Report. With respect to water and wastewater treatment facilities listed in Tables 3 and 5, the improvements identified are not exhaustive and were selected to reflect those completed projects showing significant strides toward satisfying regulatory compliance, providing source redundancy, or enhancing facility operations. Similarly, Tables 4 and 6 list representative improvement projects that can result in increased capacities within the water distribution and sewage collection systems, respectively.

Table 3 - Water Treatment Facility Progress

Facility	Source of Supply	Permitted Production Capacity (MGD)	Average Day Production (MGD)	Facility Improvements 2010-2020
Ithaca (C)	Surface Water Six Mile Creek	4.000	2.02	Completed a multi-phased, multi-year project to replace the water treatment process with microfiltration/membrane technology.
Danby (T) West Danby WD	Groundwater from 1 Well	0.144	0.017	No significant improvements identified.
Dryden (T) Yellow Barn WD (SW7)	Groundwater from 4 Wells		0.011	No significant improvements identified.
Dryden (V)	Groundwater from 5 Wells	0.680	0.149	Drilled two new wells at Dryden Lake Park and decommissioned the Jay Street Well.
Groton (V)	Groundwater from 2 Wells plus Infiltration Gallery	1.000	0.38	No significant improvements identified.
Newfield (T)	Groundwater from 4 Wells	0.300	0.156	Drilled new well at Pine Circle.

Table 3, continued

Trumansburg (V)	Groundwater from 3 Wells	0.720	0.184	Completed the Well & Water System Improvement Project which added two drilled wells at Taughannock Falls State Park and refurbished the Frontenac Well.
Bolton Point	Surface Water Cayuga Lake	6.000	2.590	Raw water pump addition and redundant transmission main. Finished water pump motor replacements. SCADA system replacement. Oakcrest Booster Pump Station pump and electrical upgrades and emergency generator.
CUWS	Surface Water Fall Creek	3.600	1.166	Completed the replacement of all finished water pumps, associated piping and controls in the Water Filtration Plant and upgraded the electrical service to the plant. Replaced one raw water pump.

Table 4 - Water System Capacity Progress

Municipal System	Service Area	Approximate # Connections	Storage Volume Owned (MG)	Capacity Improvements 2010-2020
Ithaca (C)	City-wide	5,500	6.40	Constructed interconnection station between Treatment Plant and Bolton Point Transmission Main.
Cayuga Heights (V)	Village-wide	1,000	0	No significant capacity improvements identified.
Danby (T)	West Danby Water District	125	0.09	Constructed 0.09 MG replacement storage tank increasing capacity by 0.04 MG.
Dryden (T)	Consolidated Water District (SW8)	274	0.60	No significant capacity improvements identified.
	Yellow Barn Water District (SW7)	79	0.053	Constructed new 0.053 MG storage tank.
Dryden (V)	Village-wide	800	1.00	Constructed replacement storage tanks at Lee Road and Ferguson Road increasing capacity by 0.2 MG
Groton (V)	Village-wide	760	0.70	No significant capacity improvements identified.
Ithaca (T)	Town Benefit Area	3,219	5.35	Completed the replacement of many existing storage tanks and constructed new 0.6 MG Ellis Hollow Road Tank.
Lansing (T)	Consolidated Water District incl. Ext #1, #2, and #4	1,433	2.06	Constructed new 0.26 MG Bone Plain Road Tank and pressure zone. Upgrade of the Burdick Hill Pump Station to increase pumping capacity.
Lansing (V)	Village-wide	683	0.50	No significant capacity improvements identified.
Newfield (T)	Water Districts #1, #2, and Frandsen	436	0.79	Constructed 0.18 MG replacement tank at Trumbull Corners and new 0.158 MG tank at Van Kirk Road.
Trumansburg (V)	Village-wide	838	0.85	Acquired 0.2 MG storage tank from NYS Parks.
Ulysses (T)	Water Districts #1-#4	264	0.2	No significant capacity improvements identified.
Bolton Point	Member Municipalities	-	5.9	Constructed two new tanks at Burdick Hill with combined storage of 2.4 MG increasing capacity by 0.5 MG. Began installation of redundant transmission main at Six Mile Creek crossing.
CUWS	Campus	259	2.5	Constructed interconnection station between Filtration Plant and Bolton Point Transmission Main.

Table 5 - Wastewater Treatment Facility Progress

Facility	Permitted Treatment Capacity (MGD)	Average Day Flow (MGD)	Maximum Month Flow (MGD)	Facility Improvements 2010-2020
VCHWTP	2.000	1.300	1.600	A two-phased project has replaced mechanical and grit removal equipment and will further upgrade alarms, electrical systems, pumps, digester covers, SCADA, and waste gas burner.
Dryden (V)	0.600	0.148	0.590	New SBR plant built in 2011 achieved new SPDES phosphorous limit.
Freeville (V)	0.125	0.040	0.045	No significant improvements identified.
Groton (V)	0.500	0.290	0.340	New SBR plant built in 2010 achieved new SPDES phosphorous limit.
Newfield (T)	0.030	0.028	0.040	No significant improvements identified.
Trumansburg (V)	0.250	0.210	0.310	Upgrades to the plant in 2015 to improve the discharged effluent water quality.
IAWWTF	13.100	6.069	7.925	New digester mixers and a co-generation system, new bar screens, new septage screening and aeration system, grit removal upgrades, effluent water reuse, new vacuum truck dumping pad, new tank rails and troughs, and two backup generators to run entire plant.

Table 6 - Wastewater Collection System Progress

Municipal System	Service Area	Approximate # Connections	Approximate Population Served	System Improvements 2010-2020
Cayuga Heights (V)	Village-wide	750	1,600	Installed flow meters and initiated I&I investigations in the collection system to recapture capacity already owned.
Dryden (T)	Consolidated Sewer District (SS8) Sewer District #1 (SS1) Cortland Road Sewer District (SS3)	360	3,000	Initiated I&I investigations within the Varna Hamlet (SS8) collection system and proceeding with capital improvement project to repair/replace mains and pump station to recapture pipe and treatment plant capacity.
Dryden (V)	Village-wide	750	2,000	Initiating an I&I study and applying for funding to make corrections.
Freeville (V)	Village-wide	300	750	None reported.
Groton (V)	Village-wide	715	2,470	Initiated an I&I study to determine sources and mitigations.
Ithaca (T)	Town Benefit Area	3,219	8,000	I&I investigations of the collection system have been completed and a significant annual investment is made for rehabilitation.
Lansing (T)	Cherry Road Sewer District Warren Road Sewer District	131	650	Completion of the sanitary sewer system in the Warren Road Sewer District facilitated the construction of multi-family housing projects, serves commercial properties on Dutch Mill and recent NYSDOT Residency.

Table 6, continued

Lansing (V)	Sewer Benefit Area	683	3,500	Planned expansion of the Sewer Benefit Area will extend sanitary sewer service to properties along E. Shore Drive, Cayuga Hts Road, and Twin Glens Road. Installed flow meters to monitor I&I and initiated investigations to inform repair techniques.
Newfield (T)	Sewer District #1	170	*500*	Level sensors installed in pump stations and pumps replaced in Stations 2 and 3. Recent I&I Study identified sources of I&I that once corrected will open up capacity to support future growth.
Trumansburg (V)	Village-wide	750	1,800	Village is proactively working to identify and mitigate I&I sources which may facilitate an increase in permitted hydraulic capacity.

SECTION 5 - WATER AND SEWER CAPACITY TO SUPPORT NEW HOUSING

Relative to the ability of municipal infrastructure to support new housing growth, the 2010 Study predicted that throughout Tompkins County over 12,700 units of additional housing could be served with the surplus capacities that existed at that time in the water supply and wastewater treatment facilities. Applying a similar analysis in this 2020 Update to the Maximum Day Demands and Maximum Month Flow reported by facility operators for the water supply and wastewater treatment facilities, respectively, suggests that significant surplus capacities remain available to support additional housing units.

Table 7 – Available Water Supply Capacities by Facility

Facility	Permitted Production Capacity (MGD)	Maximum Day Demand (MGD)	Estimated Surplus Capacity (MGD)	Potential Housing Units*
Ithaca (C)	4.000	2.460	1.540	4,750
Dryden (V)	0.680	0.542	0.138	400
Groton (V)	1.000	0.736	0.264	800
Newfield (T)	0.300	0.333	-	-
Trumansburg (V)	0.720	0.402	0.318	1,000
Bolton Point	6.000	3.9	2.100	6,450
			Total Potential Housing Units	13,400

* 325 gallons per day/Housing Unit Rounded to the Nearest 50 Units

Table 8 – Available Wastewater Treatment Capacities by Facility

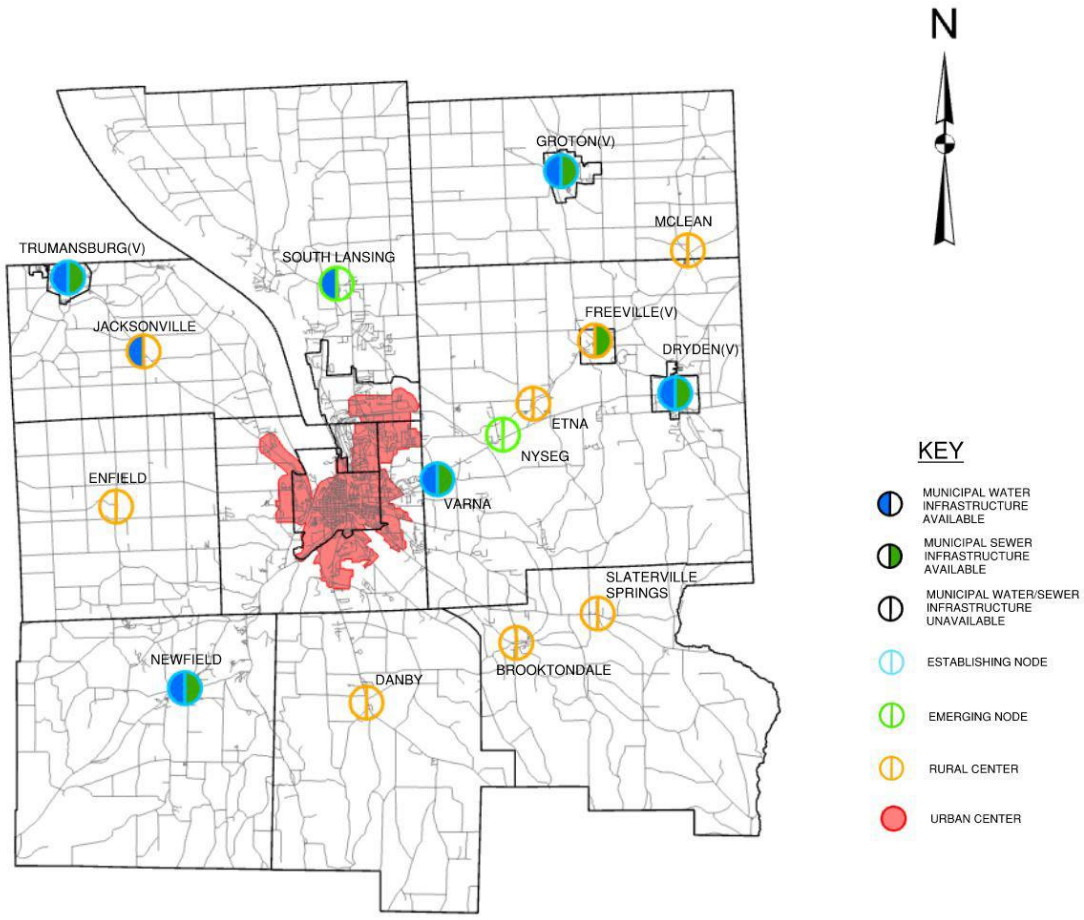
Facility	Permitted Treatment Capacity (MGD)	Maximum Month Flow* (MGD)	Estimated Surplus Capacity (MGD)	Potential Housing Units**
VCHWTP	2.000	1.600	0.400	1,250
Dryden (V)	0.600	0.590	0.010	50
Freeville (V)	0.125	0.045	0.080	250
Groton (V)	0.500	0.340	0.160	500
Newfield (T)	0.030	0.040	-	-
Trumansburg (V)	0.250	0.310	-	-
IAWWTF	13.100	7.925	5.175	15,900
			Total Potential Housing Units	17,950

* Maximum Month = Highest Monthly 30-Day Average

** 325 gallons per day/Housing Unit Rounded to the Nearest 50 Units

Focus on Capacity for New Housing in Development Focus Areas

As reported in the *Tompkins County 2020 Housing Snapshot*[5], for the period of 2016-2020 there was a total of 2,465 units of housing constructed in Tompkins County. Of the total, nearly 77%, or 1,898 units, were constructed in a DFA (Urban Center, Established Node, Emerging Node, and



Rural Center). Using data for each DFA provided by the TCDPS, approximately 95% of those housing units that were constructed in a DFA had access to both municipal water supply and sanitary sewer infrastructure.

The Urban Center and Established Nodes, each having both municipal water and sewer infrastructure, accounted for 1,681 and 121 of housing units, respectively. Emerging Nodes realized eighty-two units of housing, with eighty-one of those in South Lansing, and the Rural Centers collectively added fourteen units.

There are, however, challenges to accessing both municipal water supply and wastewater treatment capacities within the DFAs. As illustrated by the estimated surplus capacities in Tables 7 and 8, the potential for additional housing units in a municipality can be self-limited by one or the other utility. As evidenced by the findings of the *Housing Snapshot*, the Urban Center has realized the vast majority of new housing unit growth, which is consistent with both water and sewer infrastructure being readily available. Other economic and land use factors aside and a continuation of historic development trends, coupled with the current understanding of capacity limitations, would suggest the potential number of new housing units that can be served with the combination of water and sewer infrastructure within DFAs approximates 11,750.

Table 9 – Estimate of Potential Housing Units with Water/Sewer Service

Development Focus Area	Water Supply/Capacity (Expressed in Units of Housing)		Wastewater/Capacity (Expressed in Units of Housing)		Limiting Utility (Water or Sewer)	Potential Housing Units
Urban Center (incl Varna Established Node)	Ithaca (C)	4,750	IAWWTF	15,900	Water	11,200
	Bolton Point	6,450	VCHWTP	1,250		
	Combined	11,200	Combined	17,150		
Dryden Established Node	Dryden (V)	400	Dryden (V)	50	Sewer	50
Groton Established Node	Groton (V)	800	Groton (V)	500	Sewer	500
Newfield Established Node	WD #1-#2	0	SD #1	0	Both	0
Trumansburg Established Node	Trumansburg (V)	1,000	Trumansburg (V)	0	Sewer	0
				Total Potential Housing Units		11,750

Maintenance and improvements of existing facilities, capacity additions, and service extensions within DFAs are encouraged and support objectives outlined in the Tompkins County Comprehensive Plan, Tompkins County Housing Strategy, and IAED's Countywide Economic Development Strategy 2.0. Municipalities are encouraged to reference those documents when considering infrastructure extensions and service area expansions, especially if they extend beyond DFAs.

SECTION 6 - INTERMUNICIPAL/INTERAGENCY PLANNING

6.1 DROUGHT

The prolonged regional drought experienced in 2016 brought renewed attention to the importance of physical interconnections and coordinated emergency action plans between the County's three largest water purveyors: Bolton Point, the City of Ithaca, and Cornell University. A number of infrastructure, governance, and operational challenges were realized during the height of the drought that can proactively be evaluated in an interim between drought cycles.

The Tompkins County Resiliency and Recovery Plan (RRP) was initiated in 2019 by TCDPS and was being completed concurrently with this 2020 Update. One component of the RRP analyzed the redundancy of the countywide water systems to identify broad alternatives for creating a more resilient countywide drinking water supply. Given the populations served, analysis of the three largest water purveyors was emphasized. This analysis is presented in the Water Supply Drought Resilience Technical Memorandum (Memo) dated February 2022 and is attached to the 2020 Update as Appendix C. With respect to the three largest water purveyors, the opportunities presented in the Memo to strengthen drought resiliency address the need for new interagency water sharing agreements to support the planning and implementation of infrastructure improvements that expand system connectivity and increase supply capacity. The Memo does not include detailed descriptions of infrastructure expansion. However, the combined research and interviews conducted for the RRP and the 2020 Update did refine the understanding of physical improvements, together with changes in treatment plant operations, that collectively are needed for drought resiliency and supply redundancy.

6.2 PLANNING AND IMPLEMENTING THE INTERCONNECTIONS

As listed in Table 2, there are a number of areas within the City of Ithaca, Cornell University, and Bolton Point's member municipalities where distribution system interconnections currently support water service to discrete neighborhoods. The more significant interconnections that link the water treatment plants, from the resiliency perspective, are afforded by the Bolton Point transmission system comprised of the Oakcrest Pump Station, the East Hill Tank, and the 16 to 18-inch diameter main extending from Oakcrest Road in the Village of Lansing to a pumping station on Pearsall Place in the Town of Ithaca. Both the City of Ithaca and Cornell University water systems have connections to the large diameter Bolton Point transmission main immediately adjacent to their treatment plants. Cornell University also maintains a connection to the Bolton Point transmission main in the vicinity of North Campus on Pleasant Grove Road. These three primary interconnects are unidirectional, meaning that water can only be supplied out of the transmission main. A fourth interconnect exists between the Cornell University Hungerford Hill Tank and the Bolton Point East Hill Tank, both located proximate to each other on Hungerford Hill and with similar water overflow elevations. The pipe connecting the two tanks is reportedly 6-inch diameter, which is relatively small if high transfer flow rates between tanks are necessitated during an emergency.

While these interconnections have been utilized effectively in the past to support short-term water supply emergencies, it was not ascertained from the information collected that there is a technical understanding of the sustainable capacity of the current interconnections to endure a prolonged drought condition.

An engineering assessment of the Bolton Point transmission system, in the form of an extended period simulation hydraulic model, would be useful in quantifying surplus capacity inherent in the system as it is configured and operated today. Incremental increases in demand, in response to a drought condition or other prolonged emergency, can then be applied to inform impacts on the pumping, piping, and storage facilities as well as treatment plant operations. Once created, the hydraulic model can be updated as needed to reflect changes in consumption trends and service area growth.

In addition to the resiliency inherent in the interconnections, redundancy between the water systems can be significantly enhanced by constructing improvements to make the interconnections bi-directional. Bolton Point staff identified the following pump improvement projects that individually, or in combination, could support filling the Bolton Point East Hill Tank and facilitate back-feeding the transmission system to nearly all of the Bolton Point municipal member distribution grids:

- Install high-lift pumps at the existing City of Ithaca Water Plant on Water Street to pump treated water from the City's clearwells through the Bolton Point transmission main and into the East Hill Tank.
- Construct a high-flow pumping station between the Cornell University Hungerford Hill Tank and the Bolton Point East Hill Tank to supplement or replace the limited capacity of the existing 6-inch pipe interconnection.

6.3 IMPLICATIONS FOR TREATMENT PLANT OPERATIONS

With Cayuga Lake as the source of raw water, the Bolton Point Treatment Plant is perceived to be the most readily available backup supply for the City of Ithaca and Cornell University during drought emergencies. And while the Lake source is seemingly infinite, there are limits in plant production and operations that will be stressed as demands to augment supply to the other two purveyors increase. As shared during multiple interviews, Bolton Point staff noted the following production and operational challenges that would need to be overcome in order that the treatment plant could provide even greater drought resiliency:

- Production Hours and Filter Backwash Cycles: The treatment plant currently operates eighteen hours a day on weekdays and ten-twelve hours a day on weekends. During events when the other purveyors need to supplement their water supplies, Bolton Point would need to ramp up production to '24/7'. Relative to treatment processes, the limiting factor is the management of filter backwash water which is routinely generated twice daily. It is estimated that full-time production would increase the backwash cycles to as many as four times daily. Each cycle discharges 120,000 gallons of water into open air lagoons, located down gradient of the plant, for settling and evaporation. Given the steep topography of the site and limited land availability, alternative solutions to expanding the current footprint of the lagoons would have to be conceived, designed, and constructed.
- Plant Operators: According to Bolton Point staff, increasing production to '24/7' for periods of time in excess of two weeks would strain the availability of current licensed Plant Operators. Accessing on-demand operators for infrequent emergency events, such as drought, is an untenable staffing situation given the specific training required for the Plant.

- HABs Impact: As noted in the description of the SCLIWC facilities in Section 3, Cayuga Lake is under increasing threat of HABs. If cyanotoxins are ever detected in the raw water supply, the necessary responses in plant operations will reduce treated water production and, depending on the duration of a cyanotoxin event, may trigger water use restrictions within the Bolton Point system. Alternatively, improvements to the interconnections to establish bi-directional flow could provide temporary supply from one or both of the other purveyors.

SECTION 7 – REGULATORY AND CLIMATE CHANGE CONSIDERATIONS

There are several pending or proposed changes in regulatory requirements that will impact the County's public water systems and wastewater treatment facilities in coming years. In anticipation of these changes, the 2020 Update is raising awareness of the following:

- U.S. Environmental Protection Agency (EPA) Lead and Copper Rule Revision
- NYSDEC Draft Total Maximum Daily Load (TMDL) for Phosphorus in Cayuga Lake

7.1 EPA LEAD AND COPPER RULE REVISION

The publishing of the EPA Lead and Copper Rule Revision (LCRR) on December 16, 2021 will represent a significant change in drinking water regulations for public water systems in the County, as well as the nation. While the 2020 Update is not intended to provide technical guidance regarding the LCRR, the key requirements known at this time include: development of a lead service line (LSL) inventory; enhancing treatment to comply with a new concentration trigger level; sampling schools and childcare facilities; and improving public risk notification.

Regarding the LSL inventory, the EPA deadline for water systems to complete an initial inventory of all service line materials is October 16, 2024. Water system operators will need this time to compile their inventories to identify needed service line replacements as well as unknown services. As part of the LCRR, any 'lead status unknown' (LSU) services will require customer notification annually that they may have a lead service line. This may create unnecessary concern for the customer and erode consumer confidence in the quality of their drinking water.

Therefore, having the most complete inventory by the October 2024 compliance date can minimize the number of LSU services and resulting notifications. It is also important to confirm any lead service lines so the customer can be made aware and take precautions, if they so choose. Furthermore, systems with known LSLs will need to develop a replacement program depending on lead compliance sample concentrations.

Given this pending regulation, municipalities and water system operators are encouraged to fully understand the implications and requirements of the LCRR, promptly complete the LSL inventory, and explore options for funding their LSL replacement programs.

7.2 DRAFT TMDL IMPACTS ON WASTEWATER TREATMENT FACILITIES

On April 7, 2021, NYSDEC released the draft TMDL[6] for Phosphorus in Cayuga Lake. In brief, a TMDL determines the maximum amount of pollutant load, such as total phosphorous (TP), that a waterbody/segment can receive from point and non-point sources while continuing to meet water quality standards that support its best use. Relative to best uses, Cayuga Lake is divided by NYSDEC into four waterbody segments. The waterbody segment identified as the Southern End

is most proximate to the County's Urban Center and is considered impaired because "*it does not support its best uses of primary and secondary contact recreation and is threatened as a public water supply due to a phosphorus impairment*". As listed in the TMDL, among the sources of TP loads for the Southern Segment are four permitted municipal wastewater treatment facilities (IAWWTF, VCHWTP, Village of Dryden, and Village of Freeville). Within the Southern Segment, the TMDL is recommending SPDES permit modifications for IAWWTF and the Village of Freeville.

Public comments on the draft TMDL were received by NYSDEC through July 8, 2021. The TCDPS submitted comments[7] to NYSDEC which include, among other concerns, a focus on the potential impacts of the TMDL on local wastewater treatment facilities. As stated in the TDCPS comments, "*The draft TMDL, as written, may have unintended impacts on future land development within the watershed. We are concerned that the TMDL could limit growth for WWTF or make expansion cost-prohibitive. This may result in future development being directed into rural areas with no municipal sewer, thus increasing sprawl and the environmental impacts associated with sprawl".* With respect to WWTF impacts, the TCDPS recommended the following three improvements be made in the TMDL document:

1. The TMDL should spell out the impacts to current permits and future operations of WWTF, as well as the costs to operators and customers to implement the TMDL's recommendations. For example, in Tompkins County, new development in villages may be severely limited if the TMDL requires cost-prohibitive upgrades to the county's four smaller WWTF (Cayuga Heights, Dryden, Freeville, and Trumansburg).
2. The TMDL should clearly identify where future development would be limited based on the WWTF capacity. For example, the draft TMDL states that the Cayuga Heights WWTF total phosphorus load exceeds the permit limit but that corrective actions have been taken. However, those data were from 2013. While the draft TMDL acknowledges improvements have been made, it does not clarify the impact of those improvements. The TMDL should be updated to include the actual current total phosphorus load because it is impossible to determine from the information provided if the WWTF is close to the load limit or if there is capacity to expand.
3. The TMDL should provide a cost-benefit analysis of reducing phosphorus from point versus nonpoint sources. The value of point source WWTF to nodal development and reducing sprawl given the small contribution of phosphorus to the lake should be balanced with the other nonpoint contributions of phosphorus in the lake. Specifically, the Freeville WWTF only contributes 0.3% of the total phosphorus to the lake but it is the only contributor in Tompkins County identified for a phosphorus load reduction.

As the NYSDEC process to finalize a TMDL progresses, it will be vital that these recommendations, together with similar concerns and requests made by WWTF owners/operators in the Cayuga Lake Watershed, be fully satisfied.

7.3 CLIMATE CHANGE IMPACTS ON CRITICAL ASSETS

In addition to the focus on water supply drought resiliency in this 2020 Update and the County RRP, the TCDPS is developing an interactive map of critical asset resources located in floodplains, including water and sanitary sewer facilities, that could be at risk from flood events. This

component of the County RRP is available at https://tompkinscountyny.gov/planning/climate-adaptation.

SECTION 8 - PRIORITY FACILITY OBJECTIVES

8.1 DEFINING PRIORITIES AND OBJECTIVES

The development of the study scope for the 2020 Update recognized a need to expand the utility of the 2010 Study by incorporating forward-looking objectives that local governments may individually or collectively embrace to promote infrastructure planning that enhances facility resiliency and redundancy. The interview form used for the 2020 Update, together with the virtual interviews, prompted municipal officials and facility operators to share their information and perspectives for improvement projects that could derive resiliency and redundancy benefits. Responses provided for such project opportunities identified specific municipal improvements, in the case of rural communities, as well as inter-municipal improvements within the urban center. These needs are differentiated in the following lists of priority infrastructure. It is noted that these lists do not imply that action is pending or necessarily time critical. Rather, the lists reflect the current understanding of infrastructure challenges that, when addressed, will support greater systems resiliency and redundancy.

8.2 INFRASTRUCTURE NEEDS FOR WATER SYSTEM RESILIENCY AND REDUNDANCY

A. Within the rural communities not supplied by Bolton Point, the following improvements or investigations related to sources of supply will support resiliency and redundancy objectives:
   - Town of Danby, West Danby Water District – Undertake an engineering study to develop and permit a second well.
   - Town of Dryden, Yellow Barn Water District (SW7) – Initiate an engineering study to identify alternative sources of supply to replace or augment the current groundwater wells.
   - Town of Newfield Water Districts – Complete the permitting and construction of Pine Circle Well #4, and undertake maintenance of the pump in Well #2.

B. With respect to the County's Urban Center, the three largest water purveyors (Bolton Point, City of Ithaca, and Cornell University) would be encouraged to continue planning, design, and implementation of improvements to achieve the following objectives:
   - Complete the installation of pumping facilities at the City Water Plant and Cornell Hungerford Hill Tank to back-feed Bolton Point's transmission system and East Hill Tank.
   - Undertake an engineering assessment of the Bolton Point transmission system to quantify surplus capacity currently inherent in the system and to determine incremental increases in demand that trigger impacts on the pumping, piping, and storage facilities as well as treatment plant operations.
   - Initiate an engineering study to identify solutions for the management and disposal of filter back-wash water from the Bolton Point Treatment Plant during periods of continuous production.
   - Update interagency water sharing agreements to address longer-term emergency conditions, such as a prolonged drought.

8.3 WASTEWATER TREATMENT CAPACITY AND REDUNDANCY

A. There is a Countywide need to address I&I to recapture sewage treatment capacity. As reflected in the interview forms, nearly all municipalities with wastewater infrastructure have indicated I&I is prevalent in the collection systems and is reducing the inherent capacities of the sewer mains, pump stations, and wastewater treatment facilities. The interviews also revealed that I&I investigations are either in process or being considered. Each municipality will develop specific methods for reducing I&I through main repairs or replacements as well as timelines that are likely tied to funding availability. As represented in Table 9, there is an opportunity to broaden the potential for housing growth in several of the Established Nodes if sewage treatment capacity is not a limiting factor. To this end, a strategy to achieve the objective of recapturing sewage treatment capacity could include:
   - Encourage and support communities with wastewater facilities to utilize the NYSEFC Wastewater Infrastructure Engineering Planning Grant to help fund I&I investigations.

B. Relative to infrastructure projects that would enhance sewage treatment redundancy, this study found that, not unexpectedly, the geographical setting of treatment plants offers limited opportunities for interconnections and thus facility redundancy. One potential improvement project within the Urban Center that was originally studied in the early 2000's is known as the 'VCHWTP Remington Road by-pass to IAWWTF' (By-Pass). This By-Pass is similar in concept and function to the Kline Road diversion that exists between VCHWTP and IAWWTF. If implemented, the By-Pass would facilitate a gravity sewer connection from the Village's collection system south of NYS Route 13 to an IAWWTF interceptor sewer at Fall Creek. The By-Pass could be utilized during planned maintenance or emergency repairs at the VCHWTP.

8.4 REGULATORY AND CLIMATE CHANGE

A. Prior to October 16, 2024, water system operators should work to compile and complete an inventory of all service line materials to identify needed service line replacements as well as unknown services. This would be to comply with EPA Lead and Copper Rule Revision

B. Wastewater treatment facility operators should follow the DEC's work to finalize the TMDL for the southern end of Cayuga Lake, with particular focus on regulatory requirements and unintended consequences from regulation of wastewater treatment facilities.

C. Owners and operators of critical facilities located in the floodplain should consult the Critical Asset Resources in the Floodplain interactive map and consider implementing applicable solutions recommended in the accompanying Critical Facility Mitigation Fact Sheets. These Fact Sheets describe nine examples of potential upgrades facility owners may consider to mitigate the effects of flooding on critical facilities.

STUDY FINDINGS

The substantive findings of the 2020 Update are summarized in this section.

General

- Municipalities continue to proactively plan and undertake repairs and upgrades to existing treatment facilities and piping systems.

Capacity

- The Southern Cayuga Lake Intermunicipal Water Commission (Bolton Point) water treatment facility continues to have surplus capacity to meet the demands of the five municipal members and the Town of Ulysses. Average and maximum day production is still well below the permitted capacity and should remain so for the next ten years.
- The Ithaca Area Waste Water Treatment Facility (IAWWTF) has surplus wastewater treatment capacity as a whole with each of the three owners maintaining an allocation of that capacity. The ability of the three owners to buy and sell additional treatment capacity from each other assures that adequate capacity will remain available in this facility for the next ten years.
- The Village of Cayuga Heights Wastewater Treatment Plant (VCHWTP) has spare treatment capacity and retains the ability to utilize the Kline Road by-pass to divert occasional wet weather flow to the IAWWTF. Pursuing the Remington Road by-pass would facilitate planned or emergency repairs at the VCHWTP, or the NYS Route 13 tunnel crossing.
- Current hydraulic flow conditions experienced at the Village of Trumansburg Wastewater Treatment Plant suggest a minimal volume of capacity remains in this facility.
- The sewage disposal system serving the Hamlet of Newfield has exceeded the maximum month flow indicating there is no surplus treatment capacity, however, recent I&I investigations suggest there is an opportunity to effect repairs that will restore significant treatment capacity without expanding treatment facilities.
- The current surplus capacity in municipal water supply and treatment facilities throughout Tompkins County suggests that an equivalent of 13,400 additional units of housing can be served.
- Based on the existing utilization of wastewater treatment facilities throughout Tompkins County, there is treatment capacity available to support the equivalent of 17,950 units of new housing.
- Based on estimated surplus capacities in water supply and wastewater treatment facilities, without consideration of present facility ownership, the potential for new housing growth connected to both water and sewer service is closer to 11,750 units.

Development Focus Areas

- The Development Focus Areas with the greatest potential to access both water and sewer service in support of housing growth continue to be the Urban Center and Established Node in the Hamlet of Varna.
- Broadening the housing growth potential in additional Established Nodes will require improving access to municipal sewage treatment capacity. Recapturing existing capacity through I&I reduction in the collection systems will facilitate this access.

Infrastructure to Support Priority Facility Objectives

- Rural municipal water systems utilizing groundwater sources should have redundant wells of reliable water quality that will adequately supply the maximum day demand if the best producing well is out of service.
- Implementing the interconnection improvements identified in Section 6 for the County's three largest water purveyors (Bolton Point, City of Ithaca, and Cornell University) will create bi-directional supply redundancy in addition to enhancing resiliency during prolonged drought or other environmental emergencies.
- Investigating and correcting the sources of I&I in municipal wastewater collection systems is a Countywide objective that can support potential housing growth without necessitating treatment facility expansion.

Summary of Recommendations Included in the Tompkins County Resiliency and Recovery Plan's Water Supply Drought Resilience Technical Memorandum, February 2022

For ease of access and consideration of actions to be taken by water purveyors, the recommendations of the RRP are included below. Based on the available data, infrastructure, existing agreements, and water resources, Tompkins County has a shared need to address the water resiliency, but there is not a regional structure in place to coordinate the entire county. To begin to address the issue, this technical memorandum recommends the following:

A. Establish a formal regional water providers' consortium (drought planning team) representing the key stakeholders committed to addressing the water supply issues on a regional (or even just Countywide) basis. Convene the consortium regularly to continue to progress the issues, needs, and solutions. Suggested members of such a consortium would include:
   - Tompkins County Environmental Health Department
   - Tompkins County Department of Planning & Sustainability
   - SCLIWC
   - City of Ithaca
   - Cornell University
   - Rural center water providers
   - State agencies including the NYSDEC

   As appropriate, this consortium could initially address:
   - Develop a regional profile of current and future demand and availability.
   - Determine if there are surface and groundwater compatibility issues.
   - Support creation of updated interagency agreements between SCLIWC, the City of Ithaca, and Cornell University.
   - Address existing ordinances that currently prevent regionalization of the water system.
   - Research the legal ability to provide backup water to key locations outside of current service area boundaries. If legal, identify any unintended consequences of such provision, including potential negative impacts to development, land use and the environment to creating a more regionalized water system.
   - Determine if rural community stakeholders are interested in a regional redundant system and if there is interest outline necessary infrastructure needed to support this system.

- Come to consensus as to whether the climate change forecast alone justifies the capital investment to address a periodic event.
- Determine the cost sharing structure for capital investment, water rates, ownership, and operation and maintenance, etc.
- Determine if alternative, acute-drought solutions, such as trucking potable water to rural users, are adequate given the infrequency of severe drought events.
- Evaluate well depth and geotechnical conditions or an evaluation of deeper aquifer availability to determine if more resilient groundwater supplies are available in the region.
- Increase monitoring of groundwater in active supply wells to provide drought information to users and water districts.
- Identify funding mechanisms to conduct an engineered system study for an interconnected regional system specifying specific infrastructure improvement needs.
- Develop and prioritize a list of regional water infrastructure capital needs to provide water for participating stakeholders based on the 2020 Update.
- Implement a regional water conservation program.

B. To maximize current supplies and reduce demands, and in turn potentially reduce the capital investment for regionalization, the consortium could begin to address coordinated regional conservation through the following:
   - Define demand in terms of domestic, industrial, and agricultural uses. That breakdown will inform an approach to conservation.
   - Develop and implement a regional conservation program.
   - Draft and ratify an updated Intermunicipal Agreement in 2022 or 2023 to help support the coordinated transmission and compensation for longer term disruptions including drought that in particular allows for the potential of wheeling water through the SCLIWC, City of Ithaca, and Cornell University systems.
   - Explore key funding opportunities for infrastructure improvements to allow water to be supplied from the City of Ithaca to SCLIWC.
   - Develop a regional water resource portfolio and the availability of additional resources such as available capacity from Cayuga Lake, the region's most reliable source-of-supply
   - Analyze existing aquifer studies to determine more reliable groundwater resources, and as appropriate conduct further studies as appropriate.
   - Recommend that all water providers develop a water restriction protocol to implement during acute events when conservation is inadequate.
   - Recommend that all water providers meter and calculate production, demand, water loss, and projection of future needs.
   - Recommend that all water providers review existing interagency agreements, identify system-specific gaps and unaddressed needs, and update or create new agreements.

GLOSSARY OF TERMS

Activated Sludge: a process of wastewater treatment in which wastewater is aerated to remove biological contaminants.

Artesian Aquifer: an aquifer in which ground water in porous rock or soil is confined under significantly greater than atmospheric pressure by impermeable geological formations (also called a ***Confined Aquifer)***. An **Unconfined Aquifer** is one whose upper surface is a water table free to fluctuate.

Aquifer: a geological formation that contains sufficient saturated, permeable material to yield significant quantities of water to wells and springs.

Booster Pump: A pump that increases pressure in an area of the water distribution system with low pressure.

Clarification: The process of separating solids from the liquid during water treatment.

Coagulation: The clumping together of very fine particles into larger particles caused by the use of a coagulant. This clumping together makes it easier to separate the solids from the water by settling or filtering.

Cogeneration: A plant to generate electricity from the waste gas produced by a **Digester.**

Collection System: The network of pipes and pumping stations that collects wastewater and conveys it to a wastewater treatment plant.

Digester: A unit in a wastewater treatment plant for treatment of sludge to remove biological and bacterial contaminants prior to reuse or disposal.

Disinfection: The process designed to kill most microorganisms in water, including essentially all pathogenic (disease-causing) bacteria. There are several ways to disinfect with chlorine being most frequently used in water treatment.

Distribution Mains: The water pipes that transport the water from the storage tanks and supply the water to customers.

Equivalent Dwelling Unit (EDU): a unit of water or wastewater capacity that standardizes all uses (residential, office, retail, commercial, etc) to the level of demand created by one single-family housing unit.

Flocculation: The gathering together of fine particles in water by gentle mixing after the addition of coagulant chemicals, to form larger particles.

Force Main: A water pipe containing pumped flows from a wastewater or water pumping station.

Infiltration and Inflow: Flow into the sewerage system which is not from known sewer connections, i.e. from stormwater or groundwater.

Infrastructure: refers to water supply facilities (groundwater wells, infiltration galleries, reservoirs, and surface water intakes), water or wastewater treatment facilities, water transmission and distribution systems (pump stations, storage tanks, and pipe) and wastewater collection systems (septic tanks, pump stations, force mains, manholes and pipe).

Installed Production Capacity: for a Water Supply Treatment Facility, this is the amount of water that the available wells, pumps, or treatment equipment are able to pump and /or treat. This may equal, or be greater than or less than the **Permitted Production Capacity**.

Interceptor Sewer: A large diameter sewer pipe that collects (or intercepts) the flow from several other sewers.

MG/MGD: Million gallons/million gallons per day.

Microfiltration: Filtration using membranes with a pore size of around 0.2 μm.

Onsite sewage disposal system: an onsite wastewater treatment/disposal system is one which an individual home or business, or a cluster of homes, treats and disposes of its wastewater. It is also known as a "decentralized system" a "private system" and very commonly as a "septic system" because a typical household system consists of a house sewer, septic tank, distribution box and absorption field or other constructed method to discharge the treated wastewater into the ground. However, some systems may discharge into a stream or lake, and some may use aerobic systems. The system is typically owned and maintained by the land owner and serves only that property.

Outfall: The point of discharge from a wastewater system or treatment plant to the environment.

Permitted Production Capacity: for a Water Supply Treatment Facility, this is the amount of water that the regulatory authority has authorized may be withdrawn from the water source.

Permitted Treatment Capacity: for a Waste Water Treatment Facility, this is the amount of treated sewage that the regulatory authority has authorized may be discharged to the groundwater or a lake or a stream through a State Pollutant Discharge System Permit.

Development Focus Area: areas of relatively dense mixed-use development that can potentially accommodate new growth by using or building upon the resources that existing neighborhoods provide. The availability of existing infrastructure varies from area to area.

Precipitating: coming out of solution and returning to a solid form.

Present Average Day Demand: for a Water Supply Treatment Facility, this is the daily amount of water used, normally calculated over a calendar year. Typically the daily average is calculated each month by dividing the total water produced in that month by the number of days; then the Present Average Day Demand is calculated by dividing the sum of these twelve monthly averages

by twelve. The data is usually the amount of water produced so it includes all uses including non-metered uses such as fire fighting, water main flushing, and leaks.

Present Average Day Flow: for a Waste Water Treatment Facility, this is the daily amount of sewage processed, normally calculated over a calendar year. Typically the daily average is calculated each month by dividing the total water processed in that month by the number of days; then the Present Average Day Flow is calculated by dividing the sum of these twelve monthly averages by twelve.

Present Maximum Day Demand: for a Water Supply Treatment Facility, this is the maximum amount of water produced in any day, normally in the past calendar year. For most design purposes this is assumed to be twice the **Average Day Demand**. It is generally less than twice for large systems but may be greater for small systems due to the impact from fire fighting, flushing water mains, or manual control of pumps.

Present Maximum Month Flow: for a Waste Water Treatment Facility, this is the largest of the twelve monthly averages of sewage processed in the recent calendar year.

Present Surplus Capacity: for Water Supply Treatment Facility, this is the lesser of either the **Permitted Production Capacity** or the **Installed Production Capacity** minus the **Present Maximum Day Demand**. For a Waste Water Treatment Facility, this is the ***Permitted Treatment Capacity*** minus the ***Present Maximum Month Flow.***

Pressure Reducing Valve (PRV): A valve that reduces high water pressure, predominantly in low-lying areas.

Primary Treatment: The first major treatment process in a wastewater treatment plant, generally settling or clarification.

Private Water Supply: a private water supply or system is one which an individual home or business provides its drinking water. It typically consists of a drilled well with a pump and pressure tank and serves only the property on which it is located.

Secondary Treatment: The second major treatment process in a wastewater treatment plant which is generally to remove biological contaminants with or without further clarification.

Sequencing Batch Reactor (SBR): A process of treating wastewater biologically is by applying different levels of oxygenation to the wastewater in sequence.

Settling: See **Clarification**

Sewer: a pipe in which wastewater (sewage) flows.

Sewerage System: a whole system of sewer pipes including collection sewers (collectors) and interceptor sewers (interceptors).

Sodium Hypochlorite: A solid form of chlorine commonly used in water treatment.

Tertiary Treatment: The third major treatment process in a wastewater treatment plant. Generally involves filtration and / or disinfection.

Transmission Mains: The pipes that transport water between water treatment plants and storage tanks or between storage tanks prior to **Distribution** to customers.

Trickling Filter: *a bed of gravel* or pebble media through which wastewater percolates and microbial activity removes biological contaminants.

Ultrafiltration: pressure driven filtration of materials from water using a membrane pore size of approximately 0.03 to 0.1 μm.

Water Supply Treatment Facility: A facility containing a series of tanks, screens, filters and other processes by which pollutants are removed and/or organisms inactivated from water intended for drinking.

Waste Water Treatment Facility: A facility containing a series of tanks, screens, filters and other processes by which pollutants are removed from waste water before it is discharged to the environment (ground water, stream or lake).

REFERENCES

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4. The Southern Cayuga Lake Intermunicipal Water Commission. November 27, 2018. Water Emergency Plan.

5. Tompkins County Department of Planning & Sustainability. 2020. Tompkins County 2020 Housing Snapshot https://www2.tompkinscountyny.gov/planning/housing-choices#Strategy

6. New York State Department of Environmental Conservation. April 2021. Draft Total Maximum Daily Load (TMDL) for Phosphorus in Cayuga Lake. https://www.dec.ny.gov/docs/water_pdf/draftcayugatmdl(1).pdf

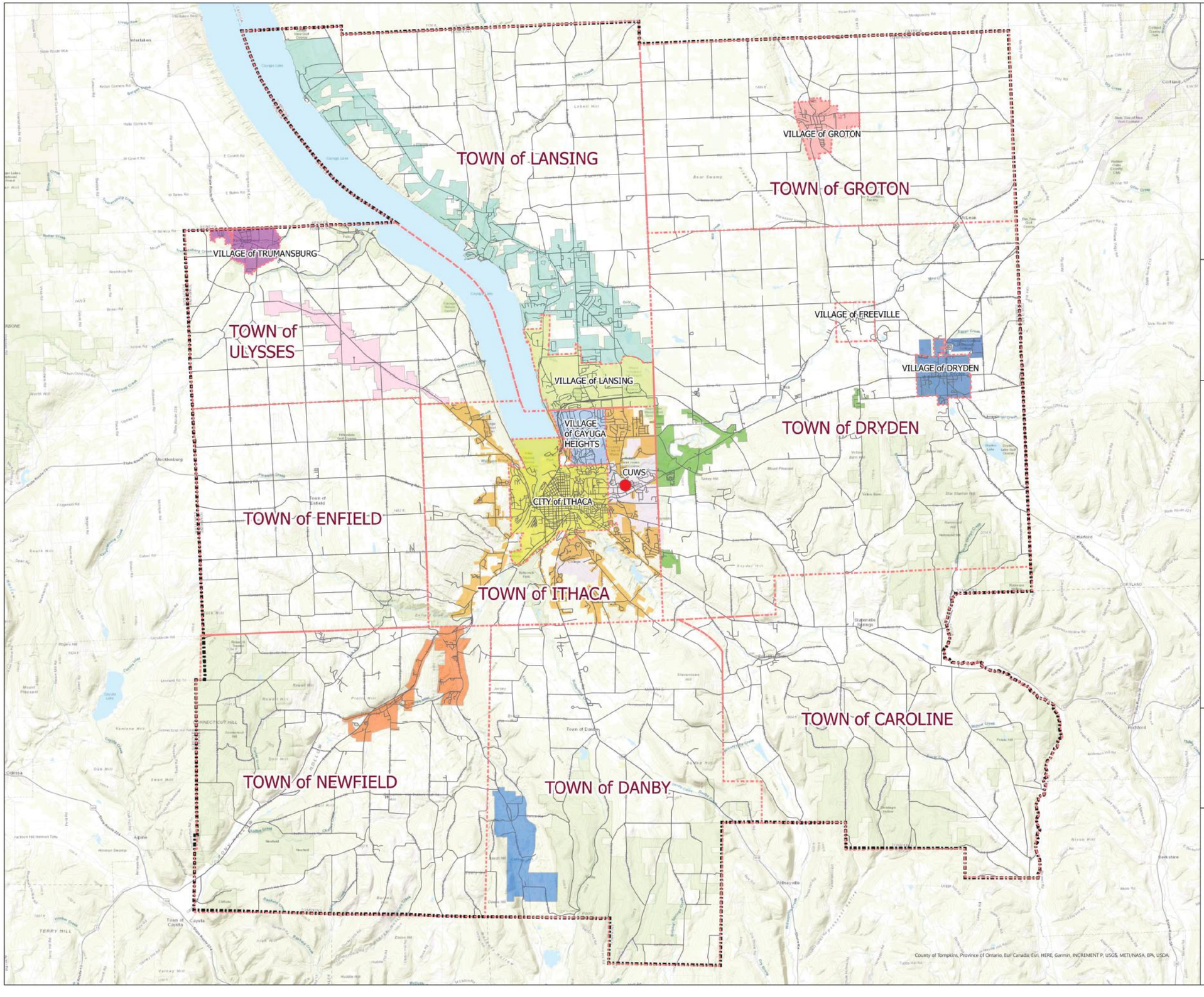
7. Tompkins County Department of Planning and Sustainability. Comments on draft TMDL. July 1, 2021. https://www.cayugalake.org/wp-content/uploads/TCDPS_TMDL_Comments_07-01-2021.pdf

APPENDICES

The following Appendices supplement the information contained in the Study.

- Appendix A1: Existing Water Service Areas Map
- Appendix A2: Existing Sewer Service Areas Map
- Appendix B1-B26: Municipal Infrastructure Interview Forms
- Appendix C: Tompkins County Resiliency and Recovery Plan, Water Supply Drought Resilience Technical Memorandum, February 2022

APPENDIX A1: MUNICIPAL WATER SERVICE AREAS MAP



GENERAL NOTES

- Base map was prepared by TG Miller, P.C. from publicly available mapping and with service area data provided by Tompkins County ITS/GIS Division and the Town of Ithaca
- Entities providing information to this map make no guarantee as to the accuracy or completeness of the data, nor that locations depicted represent true location. The Data are neither a legally recorded map or survey and are not intended to be used as one. They should be used for reference purposes only and only for the intended use.

N

MARCH 2022

Prj. Mgr: DAH

GIS Tech: PJK

KEY

- City of Ithaca Service Area
- Town of Ithaca Service Area
- Village of Cayuga Heights Service Area
- Village of Dryden Service Area
- Village of Groton Service Area
- Village of Lansing Service Area
- Village of Trumansburg Service Area
- Danby Water District
- Dryden Water Districts
- Lansing Water Districts
- Newfield Water Districts
- Ulysses Water Districts
- Cornell University Water System
- Road
- County Boundary
- Municipal Boundary

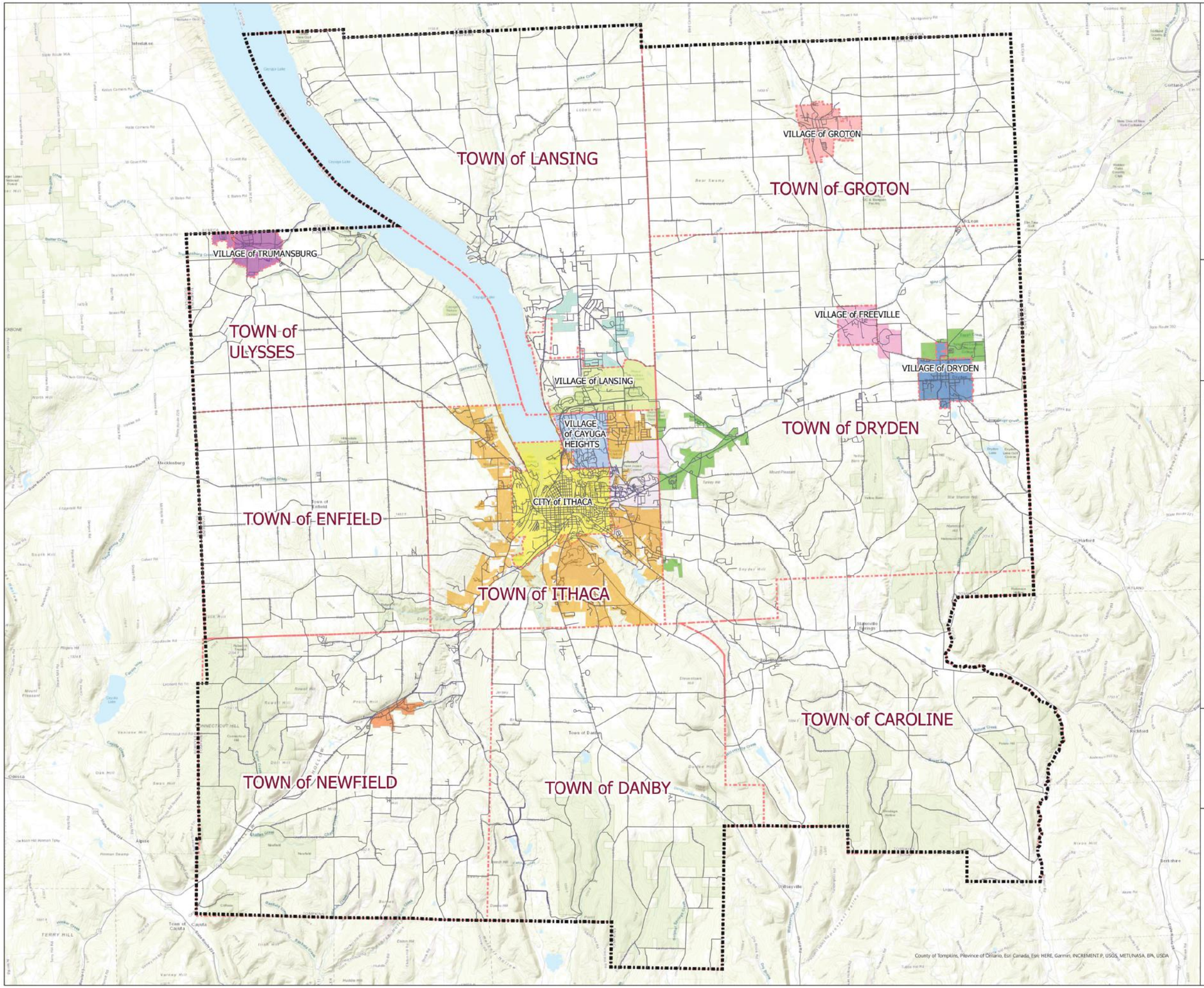
T.G. MILLER, P.C.

ENGINEERS AND SURVEYORS

MUNICIPAL WATER SERVICE AREAS

APPENDIX A1

APPENDIX A2: MUNICIPAL SEWER SERVICE AREAS MAP



GENERAL NOTES

- Base map was prepared by TG Miller, P.C. from publicly available mapping and with service area data provided by Tompkins County ITS/GIS Division and the Town of Ithaca
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N

MARCH 2022

Prj. Mgr: DAH

GIS Tech: PJK

KEY

- City of Ithaca Sewer Service Area
- Town of Ithaca Sewer Service Areas
- Village of Cayuga Heights Sewer Service Area
- Village of Dryden Sewer Service Area
- Village of Freeville Sewer Service Area
- Village of Groton Sewer Service Area
- Village of Lansing Sewer Area
- Village of Trumansburg Sewer Service Area
- Town of Dryden Sewer District
- Town of Lansing Sewer District
- Town of Newfield Sewer District
- Road
- Municipal Boundary
- County Boundary

T.G. MILLER, P.C.
ENGINEERS AND SURVEYORS

MUNICIPAL SEWER SERVICE AREAS

APPENDIX A2

APPENDIX B1-B26: MUNICIPAL INFRASTRUCTURE INTERVIEW FORMS

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: City of Ithaca

Contact: Nathaniel Carman, Chief Operator
Michael Thorne, Superintendent of Public Works
Erik Whitney, Assistant Superintendent DPW/Water and Sewer
Scott Gibson, Environmental Engineer
Roxy Johnston, Watershed Coordinator

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Interviewed by:
David Herrick, TG Miller
Kurt Anderson, IAED
Scott Doyle, Tompkins County

Date: October 5, 2020

Approximate Population Served by Treatment Works: 30,000
Approximate Number of Service Connections: 5,500
Average Day Production (last 12 months): 2.02 MGD (2020)
Maximum Day Production (last 12 months): 2.46 MGD (2020)

NYSDEC Withdrawal Permit #(s) and Permitted Capacity:

6112	2778	GPM	4.0	MGD	Notes:	Old permit (1972). Permitted withdrawal is plants capacity
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	

APPENDIX B1

General Description of Water Sources and Treatment Processes:

The source of supply for the City system is SixMile Creek. The sixty foot reservoir has a reported safe yield of at least 5.4 MGD. The existing water treatment plant located on Water Street has a capacity rating of 4.0 MGD. The current process starts with a pretreatment dosage of chlorine dioxide and sodium permanganate. Then goes through chemical coagulation, flocculation and sedimentation. This is followed by micro filtration and disinfection.

General Description of Distribution and Storage Systems:

Most of the water produced by the treatment plant is distributed by gravity from the two clearwell storage reservoirs at the plant site. The combined capacity of the clearwells is 1.43 MGD. The Elm street tank at the western limit of the City's gravity zone is a companion tank to the clearwells and has a storage capacity of 1.5 MG. As of the 2016 upgrades Elm street tank was outfitted with a pump station giving it the ability to pump water back into the gravity system and to the west hill system. The pump station located at the plant has 5 pumps that draw water directly out of the clearwells and discharge into higher tank zones. The Mitchell Street pumps fill the Cornell Street tank (1.0 MG) and Coddington Road tank (1.0 MG) The East Ithaca pumps fill the Maple Avenue tank (0.615 MG). The third pump station at Vinegar Hill pumps water from the gravity zone into the Oakwood Lane tank (0.75 MG) and the Cliff Park tank (0.15 MG). In total, there is a gross storage volume of over 6.4 MG in the city system.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

During periods of extended heat the reservoir water quality can change drastically, resulting in higher than normal levels of manganese, ammonia, and iron. The current pre-treatment process utilizes oxidants to bring these compounds out of solution so that they can be removed via flocculation/coagulation. This waste stream is then sent to the waste handling facility at Giles Street where we hold a SPDES discharge permit. The manganese and ammonia levels at the discharge are routinely outside of the SPDES permit levels. There is a planned dredging project for the reservoir that will help solve this issue.

Identified Limitations to Extending the Distribution System:

Looping of the distribution system on Floral Avenue would be beneficial. The extension of a reinforcing main from South Aurora Street to support the Chain Works redevelopment project will improve fire flow in the South Hill area. A redundant gravity main between Giles Street and downtown distribution grid would backup the existing transmission main constructed in the early 1900's. Lead and copper rules could affect about 600 services of unknown conditions, however, a budget to implement this work would require assistance from other funding sources.

Description of Near-Term and Long-Term Capital Improvements:

Planned construction of a new intake building that will provide better water quality monitoring of the reservoir. The same capital project will also provide some amount of dredging near where the intake building will be built. This will improve the overall raw water quality coming into the plant.

Resiliency and Recovery Plan (RRP):

Does the Water Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) No

If YES, describe briefly

If NO, select all that apply

- [x] A RRP or similar plans are being considered or are in the process of being developed.
- [ ] Interconnections to other WTF do not exist or are too remote.
- [x] Interconnections to other WTF could be possible with additional infrastructure and intermunicipal agreements.

Sewer Infrastructure

Municipality: City of Ithaca

Contact: Michael Thorne, Superintendent of Public Works
Scott Gibson, Environmental Engineer
Matthew Sledjeski

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607-272-1717 (Gibson)
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SGibson@cityofithaca.org
MSledjeski@cityofithaca.org

Interviewed by:
David Herrick, TG Miller
Kurt Anderson, IAED
Scott Doyle, Tompkins County

Date: October 5, 2020

Approximate Population Served by Municipal System: 30,000
Approximate Number of Service Connections: 5,450
Estimated Average Day Flow: 2.46 MGD

General Description of Collection and Transmission Systems:

There are approximately 80 miles of sanitary sewer mains within the City ranging in size from 8-inch collector pipes to 24-inch transmission mains. The service area has separate sanitary and storm water collection systems. Older pipe materials include clay tile, transite and cast/ductile iron. New main extensions or replacement projects utilize predominantly PVC gasketed-joint pipe.

Wastewater is conveyed to the Ithaca Area Wastewater Treatment Facility (IAWWTF) primarily through gravity mains. In addition, there is a small number of sewage lift stations with customary force main pipes at Stewart Park, Cass Park, Pier Road, Inlet Island, Giles Street and Southwest Park that discharge wastewater into gravity mains leading to the IAWWTF for treatment. All of the sewage collected in the Town of Ithaca and portions of the Town of Dryden utilize jointly owned transmission mains routed through the City to reach the IAWWTF.

Identified Deficiencies, Regulatory Compliance Problems, Complaints:

Sewer main improvement projects in the last several decades have focused on complete replacement of large diameter transmission or 'interceptor' pipes to increase conveyance capacity and eliminate surcharge or overflow conditions. Smaller diameter collector pipes are replaced in a similar manner versus 'spot' repairs. New residential and commercial development is also spurring replacement of collector pipes that are aged or of limited hydraulic capacity.

Older sewage lift stations such as Stewart Park, Pier Road and Inlet Island are expected to require upgrades in the near future. The current diameter of the force main serving the Giles Street pump station limits the ability to collect and discharge sludge generated at the Water Treatment Plant.

Identified Limitations to Extending the Collection System:

There are no known limitations to extending the collection system to serve additional sewer connections. The City is one of three municipal owners of the IAWWTF and retains roughly 2.7 MGD of excess treatment capacity in the facility. The City does not yet have an official Inflow and Infiltration (I&I) reduction program but is participating with the IAWWTF owners to upgrade the monitoring and data collection equipment in 14 flow meter stations located along the periphery of the City/Town boundary.

Identified Near and Long-Term Capital Improvements:

The Inlet Valley system under Six Mile Creek could include a pipe upgrade be improve pumping conditions into the 16-inch interceptor gravity main.
Replacement of pumps in the Inlet Island lift station will be implemented in the next year to restore normal service and eliminate the temporary mobile pump condition.
Replacement of the Giles Street lift station force main with new 6-inch pipe is being considered.
Modifications of the collector sewer at the former NYSDOT facility on Third Street Extension may be needed for re-development of that site.
Full replacement of the Pier Road lift station and gravity collector pipes will be completed by the City Harbor development within the next two years.

Any other projects to share?

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Village of Cayuga Heights

Contact: Brent Cross, Village Engineer/Public Works Superintendent
Michael Wiese, Director of DPW
Linda Woodard, Mayor

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607-257-1238 (Woodard)

Fax No: 607-257-4910 (Office)

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mwiese@cayuga-heights.ny.us
lwoodard@cayuga-heights.ny.us

Interviewed by:
Andrew Sciarabba, TG Miller
David Herrick, TG Miller
Kurt Anderson, TCAD
Scott Doyle, Tompkins County

Date: August 25, 2020

Approximate Population Served by Municipal System: 3,600+/-
Approximate Number of Service Connections: 1,000+/-
Current Average Day Consumption: Check SCLIWC

General Description of Water Distribution and Storage Facilities:

Village fully served w 6-8" DI water pipe. Larger pipe 12" for fire flow reinforcement on Park Way. No storage, all part of SCLIWC transmission system, Sheldon Road Tank (16" SCLIWC main from Burdick Hill Tanks) and Christopher Circle grids. Old Village mains could be 80-100 years old (cast iron).

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

SCLIWC t-main replacement expected to continue from Spruce Lane through CCC area. Could follow NCRI project.

Identified Limitations to Extending the Distribution System:

Fire flow improvements in Klinewoods and Midway (add fire hydrants and possibly pipe up-sizing).

Description of Near-Term and Long-Term Capital Improvements:

Pipe replacement in response to break frequency or above-grade street improvements. Village wide fire flow analysis may help understand areas where need more reinforcing (tuburculation). Check with Bolton Point for any ideas. Existing street R/W's are congested making pipe replacement difficult and expensive.

Sewer Infrastructure

Municipality: Village of Cayuga Heights

Contact: Brent Cross, Village Engineer/Public Works Superintendent
Michael Wiese, Director of DPW
Linda Woodard, Mayor
John McGrath, Yaws

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607-591-7939 (Wiese)
607-257-1238 (Woodard)
607-423-4129 (McGrath)

Interviewed by:
Andrew Sciarabba, TG Miller
David Herrick, TG Miller
Kurt Anderson, TCAD
Scott Doyle, Tompkins County

Fax No: 607-257-4910 (Office)

E-Mail: bcross@cayuga-heights.ny.us
mwiese@cayuga-heights.ny.us
lwoodard@cayuga-heights.ny.us
ectree3@aol.com

Date: August 25, 2020

Approximate Population Served by Treatment Works: TBD
Approximate Number of Service Connections: 2,500+/-

Rated Capacity per NYSDEC
SPDES Permit # NY0020958 :

Average Day Flow from
DMR (last 12 months): 1.30MGD

Maximum 30-day Flow from
DMR (last 12 months): 1.6MGD

General Description of Treatment Works Processes:

Headworks - mechanical screening and grit removal were replaced in 2020 as part of a 2 Phase improvements project. Primary treatment includes settling tanks and clarifier. Secondary treatment has a trickling filter, then a final clarifier before tertiary treatment with phosphorous and cloth filtration. Plant has a primary (heated) digester and secondary digester for sludge and a belt press for de-watering. Phase 2 improvements scheduled for 2021-2022 includes upgrading systems inside existing facility (alarms, electrical systems, pumps, digester covers, SCADA, waste gas burner).

An inter-municipal agreement is in place that allows flow 'displacement' between VCH and IAWWTF using existing Kline Road and future Remington Road mains. Some governance already exists...vetted by prior FEIS. (expand on 2003 IMA)

General Description of Collection and Transmission Systems:

Predominantly gravity-no municipal pump stations. Mostly 6-10" pipe, 12" under Rte 13. Is there a private pump station that pumps into the collection system?

Identified Treatment Works Deficiencies, Regulatory Compliance Problems, Complaints:

Annual (4 yr) DEC inspection in 2015 was the impetus to design and build Phase 1/2 improvements.

Identified Limitations to Extending the Collection System:

Pipe old enough to generate enough I&I to take action for finding sources. I&I from outside municipalities contributing to Village I&I.
Village is fully served and no need to extend service.
Local law in 2020 to inspect properties for inflow (sump pump). Triggered by house sale or other building permit. 1 source identified so far out of 30-40.

Identified Near and Long-Term Capital Improvements:

Find sources I&I. Master flow meters in VCH and outside users. Consistent with other municipal equipment and data. Real time reporting back to WWTP and to isolate sewer shed contribution of I&I. Peaking can be 5x avg day.
Capacity already owned can be recaptured and help with DEC approval of expanded sewer service areas...avoid DEC saying no.

Resiliency and Recovery Plan (RRP):

Does the Wastewater Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) No

If YES, describe briefly

Provide parallel transmission system between VCH to IAWWTF along Remington Road for emergency interconnection, diversion during plant maintenance and aggregate treatment capacity for 'outside' customers (add $$). Potential funding opportunity. This would build on prior transmission main upsizing completed by IAWWTF in vicinity of ICSD. Have emergency power. Primary treatment is provided during high flow/flood events. Add parallel pipe under Rte 13?

If NO, select all that apply

- ☐ A RRP, or similar plans are being considered or are in the process of being developed.
- ☐ Interconnections to other WWTF do not exist or are too remote.
- ☑ Interconnections to other WWTF could be possible with additional infrastructure and intermunicipal agreements.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Town of Danby, West Danby Water District

Contact: Tod Sukontarak, Water Superintendent
David West, Town Planner
Joel Gagnon, Supervisor
Anna Finley

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planner@townofdanbyny.org
jgagnon@townofdanbyny.org

Interviewed by: David Herrick, TG Miller

Date: July 20, 2021

Approximate Population Served by Treatment Works: 273
Approximate Number of Service Connections: 125+/-
Average Day Production (last 12 months): 17,000
Maximum Day Production (last 12 months): 34,000

NYSDEC Withdrawal Permit #(s) and Permitted Capacity:

WSA #5399	100	GPM		MGD	Notes:	Wellhead Protection agreement with West Danby Fire Department?
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	

General Description of Water Sources and Treatment Processes:

The West Danby Water District relies upon a single drilled groundwater well located at the west end of Sylvan Lane. The original State approval includes a maximum taking of 100 gpm from this source. The well is equipped with a 6,000 gph submersible pump with a 7.5 horsepower electric motor. The well water is treated with chlorine to control hydrogen sulfide levels and for disinfection. Treated water is pumped directly into the 90,000-gallon ground tank above Sylvan Lane and does not short cut to the distribution system. Remotely monitored water levels in the well casing continue to indicate there is negligible loss in the capacity of the well and aquifer recharge even during the 2016 drought.

The Sylvan Lane Pump Station structure is in relatively good condition. Roof repairs completed in 2019. Electrical system upgrades completed in May 2010 included a new panel and controls, a soft start switch for pump operation, pressure switch, upgraded wiring to the pump motor, upgraded wiring from the service to the pump control and installation of GFCI outlets.

Raw water is now collected ahead of chlorine injection for laboratory analysis and reporting.

General Description of Distribution and Storage Systems:

The primary distribution system is a combination of 8 and 6-inch AC pipe and 3-inch PVC pipe which adequately serves the domestic needs of the District. There are only three fire hydrants located in the West Danby hamlet. A capital improvement project in 2014 included replacing below-grade flushing assemblies with above-grade flushing hydrants and also complete replacement of old customer water meters with new, automated reading system meters.

The sole storage tank was completely replaced in 2014 and is glass-coated, bolted steel with a useable capacity of roughly 90,000 gallons. The storage volume is more than adequate for the domestic demand and also supports a fire flow of 500 gpm for a 2-hour duration. Static and residual pressures throughout the district are within an acceptable range.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

The single well deviates from current standards that require two sources of supply, preferably in different aquifers or different locations of an aquifer. It is not feasible to consider an alternative source at this time. Only 3 hydrants exist in the district and serve the central portion of the hamlet thereby limiting fire protection.

Identified Limitations to Extending the Distribution System:

Any sizable expansion of the District boundary and distribution system could trigger the need to develop a second well.

Description of Near-Term and Long-Term Capital Improvements:

Update billing software with ARS meter. Revisiting Water Rate Structure to reflect consumption versus unit.

Track unaccounted for water...about 20% above meter readings.

Resiliency and Recovery Plan (RRP):

Does the Water Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) N

If YES, describe briefly

Interconnection with generator at Fire Station to Well House.
Spare submersible on-hand.
Continue relationships with Danby Highway, WDFD and Newfield Water.

If NO, select all that apply

- ☐ A RRP or similar plans are being considered or are in the process of being developed.
- ☑ Interconnections to other WTF do not exist or are too remote.
- ☐ Interconnections to other WTF could be possible with additional infrastructure and intermunicipal agreements.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Town of Dryden

Contact: Rick Young, Town Highway/DPW Superintendent
Ray Burger, Director of Planning

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Interviewed by:
David Herrick, TG Miller
Dondi Harner, TG Miller

Date: 7/21/2021

Approximate Population Served by Municipal System: 2,200
Approximate Number of Service Connections: 440
Current Average Day Consumption: 196,000 gpd

General Description of Water Distribution and Storage Facilities:

The Town of Dryden has recently consolidated the number of water districts from 6 to 2. Yellow Barn Water District SW7 serves customers along Yellow Barn Road and Consolidated Water District SW8 serves customers within Varna, East of Varna, Sapsucker Woods Road and Snyder Hill Road. Yellow Barn Water District is supplied by four wells and a 53,000 gallon water storage tank. The SW7 distribution system consists of 1-1/2, 4 and 8-inch pipe. Varna and Sapsucker Woods Road area is supplied by the Apple Orchard PRV off the Bolton Point transmission main and 3MG East Hill water tank. In addition, this area is also serviced off of the Freese Road PRV from the 500,000 gallon Town of Ithaca Sapsucker Woods Road Tank through the Town of Ithaca's distribution system. This tank is supplied by a Town of Ithaca Pump Station. Customers east of Varna are supplied water from the two Town of Dryden NYSEG Tanks which have capacities of 200,000 and 400,000 gallons. The distribution system is a combination of 12 and 8-inch pipe and adequately serves the domestic and fire needs of this area. The NYSEG Tanks are filled through the Varna Pump Station located within Varna along Dryden Road. In addition, customers near Snyder Hill Road are supplied from the 500,000 gallon Town of Ithaca Hungerford Hill Tank through the Town of Ithaca distribution system. A booster pump station increases main pressure for domestic demands, but cannot provide fire flow. The distribution system on Snyder Hill Road consists of 8-inch pipe.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

Water main insulation over Freese Road Bridge needs to be replaced to protect from freezing and is planned to be addressed with the replacement of the Freese Road bridge. Reduced consumption from a few larger customers have impacted water quality within the NYSEG water tanks. Bolton Point has been monitoring water quality. Yellow Barn Water district wells have been problematic with sediment and it has been difficult to locate and find leaks on plastic mains without tracer wire. In addition, aging infrastructure has resulted in many emergency repairs on the system.

Identified Limitations to Extending the Distribution System:

The NYSEG storage tanks may have limited fire flow duration if future main extensions are added off the NYSEG tank pressure zone. Additional tanks may be required to provide fire protection per current standards. A previous completed feasibility study to extend water along Rte. 13 from the NYSEG pressure zone to the Village of Dryden was evaluated but determined to be cost prohibitive.

Description of Near-Term and Long-Term Capital Improvements:

Current projects that are being considered are to up size the aging 8" water main to 12" from the Apple Orchard PRV to Freese Road to provide increased fire flow and to accommodate future growth. The aging Apple Orchard PRV station is also planned to be replaced to improve fire flow and be converted to be the primary source of supply for the Consolidated Water District. A Feasibility study is currently underway to evaluate extending water service east along Rte. 13 within the NYSEG pressure grid.

Sewer Infrastructure

Municipality: Town of Dryden

Contact: Rick Young, Town Highway/DPW Superintendent
Ray Burger, Director of Planning

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Interviewed by:
David Herrick, TG Miller
Dondi Harner, TG Miller

Date: 7/21/2021

Approximate Population Served by Municipal System: 3,000
Approximate Number of Service Connections: 360
Estimated Average Day Flow: 185,000 GPD

General Description of Collection and Transmission Systems:

The Town of Dryden currently has 3 sewer Districts. Sewer District No. 1 serves Meadowlark Road, Cardinal Drive and properties on the east side of Sapsucker Woods Road and runs by gravity to the Town of Ithaca system. Flows then travel through the Town of Ithaca and Village of Cayuga Heights collection systems to the Village of Cayuga Heights Wastewater Treatment Plant. The collection system includes 8-inch ACP pipe. Cortland Road Sewer District serves the area of the Town north of the Village of Dryden including TC3, Dryden HS/MS and the commercial properties along North Road. Sewage flows by gravity to the Village of Dryden and is treated at the Village of Dryden Wastewater Treatment Plant. The collection system includes 8-inch PVC pipe. This district also has a small pump station, which serves part of Mott Road and pumps to the gravity near the intersection of North Road. Consolidated Sewer District (SS8) serves the Varna area and runs by gravity to the Varna Pump Station. This station pumps sewage to the joint Cornell/Dryden 16" transmission main on campus through a 8" cast iron force main. Flows then travel through the Cornell and City of Ithaca collection systems to the Ithaca Area Wastewater Treatment Plant. The collection system includes 8-inch and 10-inch ACP and PVC pipe. Agreements currently exist between the Town and Cornell for apportioning of capacity in the joint 16" transmission main. The district has one pump station on Freese Road and one on Lower Creek Road, which ultimately pump to the gravity main on Rte. 366. Also included in SS8 are the properties in the Peregrine Subdivision that runs by gravity to the Town of Ithaca system. The collection system includes 8-inch PVC pipe. The Vanguard property adjacent to Rte 13 is an out-of-district user. This property gravity feeds to its own pump station then sends sewage through a force main across Rte 13 to the Consolidated Sewer District.

Identified Deficiencies, Regulatory Compliance Problems, Complaints:

Preliminary Inflow and Infiltration study has been completed with higher I&I rates identified within the older portion of the Consolidated Sewer District system. Efforts are underway to identify and reduce I&I.

Identified Limitations to Extending the Collection System:

Any extensions that will exceed the pumping capacity of the Varna Pump Station will require upgrades to the station as well as possible up sizing of the Cornell and Dryden Transmission mains. These improvements will require entering into new agreements with Cornell. The City of Ithaca, Town of Ithaca, and Town of Dryden jointly own and operate the Ithaca Area Waste Water Treatment Facility (IAWWTF). An agreement between these parties recognizes the Town of Dryden having approximately 1.98% plant ownership, or 259,000 gpd of owned treatment capacity. Peak flow from the Town's districts has been estimated to be 171,000 gpd. Although currently within the owned capacity, future district expansion or large growth within the Consolidated Sewer District may trigger purchasing excess capacity from from one or both of the other municipalities.

Identified Near and Long-Term Capital Improvements:

Current planned projects consist of televising and evaluating options to repair, reline or replace the existing ACP pipe within the Consolidated Sewer District. In addition, gravity sewer pipe capacity is being evaluated with options to up size or construct a diversion along Rte. 366 to accommodate potential growth. The Varna Pump Station is being evaluated and potentially being up sized to accommodate future flow. In addition, the aging force main is planned to be replaced. Initial discussions with Cornell University and the Town have begun to renew the joint agreement for discharging sewage through Cornell's sewer collection system.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Village of Dryden

Phone No: 607-229-8580 (Sabin Jr.)
607-342-4737 (Bean)
607-844-8122 (Murphy)

Interviewed by:
N/A
Forms filled out by Village Staff

Contact: Paul Sabin Jr., Suprintendent of Public Works
Caleb Bean, Assistant Superintendent of Public Works
Mike Murphy, Mayor

Fax No: 607-844-8120 (Office)

E-Mail: dpwdryden@frontiernet.net

Date: 06/10/2021

Approximate Population Served by Treatment Works: 2,000
Approximate Number of Service Connections: 800
Average Day Production (last 12 months): 149,000 GPD - 2020
Maximum Day Production (last 12 months): 542,300 GPD - 2020

NYSDEC Withdrawal Permit #(s) and Permitted Capacity:

WSA #4744 (1)	80 GPM		MGD	Notes:	
WSA #4744 (2)	80 GPM		MGD	Notes:	
WSA #1875	120 GPM		MGD	Notes:	
WSA #12,321 (1)	600 GPM		MGD	Notes:	
WSA #12,321 (2)	250 GPM		MGD	Notes:	
	GPM		MGD	Notes:	

General Description of Water Sources and Treatment Processes:

Drilled wells at 3 sites with gas chlorination for disinfection and Aqua Pure 125 to sequester iron and manganese, to 2 tanks floating on system.
South Street well provides 30% of the water, Dryden Lake Park 50%, and Lake Road 20%. The Jay Street well has been abandoned.

General Description of Distribution and Storage Systems:

2 tanks: since 2018 the Lee Road reservoir and Ferguson Rd tank were replaced with concrete tanks, each having 0.5 MG water storage capacity.

Looping of East Main Street and Lee Road water mains has been completed.

Replacement of 4-inch mains on Rochester, Marsh, Union, and Montgomery Streets has been completed.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

Identified Limitations to Extending the Distribution System:

Description of Near-Term and Long-Term Capital Improvements:

Resiliency and Recovery Plan (RRP):

Does the Water Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) Yes

If YES, describe briefly

Water Emergency Plan

If NO, select all that apply

- ☐ A RRP or similar plans are being considered or are in the process of being developed.
- ☐ Interconnections to other WTF do not exist or are too remote.
- ☐ Interconnections to other WTF could be possible with additional infrastructure and intermunicipal agreements.

Sewer Infrastructure

Municipality: Village of Dryden

Phone No: 607-229-8580 (Sabin Jr.)
607-342-4737 (Bean)
607-844-8122 (Murphy)

Interviewed by:
N/A
Forms filled out by Village Staff

Contact: Paul Sabin Jr., Superintendent of Public Works
Caleb Bean, Assistant Superintendent of Public Works
Mike Murphy, Mayor

Fax No: 607-844-8120 (Office)

E-Mail: dpwdryden@frontiernet.net

Date: 06/10/2021

Approximate Population Served by Treatment Works: 2000
Approximate Number of Service Connections: 750

Rated Capacity per NYSDEC
SPDES Permit # NY0029190 : 0.6 MGD

Average Day Flow from
DMR (last 12 months): 0.148MGD

Maximum 30-day Flow from
DMR (last 12 months): 0.590 MGD

General Description of Treatment Works Processes:

New plant built in 2011 with a Sequencing Batch Reactor (SBR). The main driver behind the new plant installation was a new Phosphorous limit of 1.0 mg/L. The new plant includes Stern Bac to chemically precipitate Phosphorous in addition to biological Phosphorous removal from the SBR process.

General Description of Collection and Transmission Systems:

The system has 1 pumping station that serves 6 dwellings and 2 pumping stations that serve Poet's Landing (15 buildings that house 120 apartments). The remainder of the system is gravity fed.

Identified Treatment Works Deficiencies, Regulatory Compliance Problems, Complaints:

The new plant meets the requirements of current SPDES permit.

Identified Limitations to Extending the Collection System:

A Town of Dryden Sewer District discharges to the Village system.

Identified Near and Long-Term Capital Improvements:

Complete an I&I study. A grant application to correct the I&I has been applied for.

Resiliency and Recovery Plan (RRP):

Does the Wastewater Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) Yes

If YES, describe briefly

See attached.

If NO, select all that apply

- ☐ A RRP, or similar plans are being considered or are in the process of being developed.
- ☐ Interconnections to other WWTF do not exist or are too remote.
- ☐ Interconnections to other WWTF could be possible with additional infrastructure and intermunicipal agreements.

Sewer Infrastructure

Municipality: Village of Freeville

Contact: Pat Brennan, Highway Superintendent, DPW Director
David Fogel, Mayor

Phone No: 607-745-8110 (Brennan)
607-844-8301 (Office)

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E-Mail: dmf10421@gmail.com

Interviewed by:
N/A
Forms filled out by Village Staff

Date: 05/12/2021

Approximate Population Served by Treatment Works: 750
Approximate Number of Service Connections: 300

Rated Capacity per NYSDEC
SPDES Permit # _____ : 0.125 MGD

Average Day Flow from
DMR (last 12 months): 0.04 MGD

Maximum 30-day Flow from
DMR (last 12 months): 0.045 MGD

General Description of Treatment Works Processes:

Plant is 2 lagoons, one primary lagoon and then a secondary lagoon divided into two by a weir across the center of the tank. All lagoons are aerated by 3 x 7.5 HP blowers only one of which generally operates. Following treatment in the lagoons the effluent is chlorinated with sodium hypochlorite and then discharged to the outfall (shared with the Village of Dryden) to Fall Creek about 2 ½ miles away.

General Description of Collection and Transmission Systems:

System contains 11 pumping stations the main one is on Johnson Rd. This station contains 2 x submersible sewage pumps and delivers the flow from the Village of Freeville. All sewage from the William George Agency for Children's Services flows by gravity to the plant.

Identified Treatment Works Deficiencies, Regulatory Compliance Problems, Complaints:

Identified Limitations to Extending the Collection System:

None known, but service outside the Village would require the creation of a Town sewer district.

Identified Near and Long-Term Capital Improvements:

Resiliency and Recovery Plan (RRP):

Does the Wastewater Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) No

If YES, describe briefly

If NO, select all that apply

- ☐ A RRP, or similar plans are being considered or are in the process of being developed.
- ☑ Interconnections to other WWTF do not exist or are too remote.
- ☐ Interconnections to other WWTF could be possible with additional infrastructure and intermunicipal agreements.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Village of Groton

Contact: Chris Neville, Mayor
Terrance Walpole, Trustee/Sewer and Water Commissioner
Chad Shurtleff, DPW Supervisor
Alvin Howell, WWTP Operator
Lee Shurtleff
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Nancy Niswender, Clerk

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villageadmin@grotonny.org

Interviewed by:
Andrew Sciarabba, TG Miller
David Herrick, TG Miller
Kurt Anderson, TCAD

Date: 8/28/2020

Approximate Population Served by Treatment Works: 2,363
Approximate Number of Service Connections: 768
Average Day Production (last 12 months): 308,000 GPD - 2019
Maximum Day Production (last 12 months): TBD

NYSDEC Withdrawal Permit #(s) and Permitted Capacity:

WSA #7010	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:

General Description of Water Sources and Treatment Processes:

Two sources - ground water wells and infiltration galleries. Two 12" Ground water wells, developed in 1982 are in use. Gas chlorination treatment - 250 gpm each. Pilot well (100 gpm) was not needed. 2 wells in use are set up on 6 month rotation but can run simultaneously. Pumps replaced about every 10 years. 130,000 gpd out of wells and 108,000 out of infiltration galleries. Groundwater has high Iron which is sequestered. Ground water under direct influence of surface water infiltration galleries with micro-filtration and disinfection with gas chlorine. Higher in nitrates but doesn't need treatment.

General Description of Distribution and Storage Systems:

The storage system includes 2 tanks. A 500,000 gallon glass-lined Aquastore tank built in 1994 feeds the lower pressure zone of the Village. Water is pumped to a 200,000 gallon pre-cast post-tensioned concrete tank built in 1988 that feeds the higher pressure zones. Fire flow capacity in tanks is sufficient. Water mains are 4" and 6" cast iron.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

Many miles of 4" and 6" cast iron water mains with flow restrictions (tuberculation) - Complaints of red or yellow water. Main breaks have been infrequent at 1 per year. Customer pressure 60 psi or more...no low pressure zones.

Identified Limitations to Extending the Distribution System:

Village limits, availability of enough customers, funding.Two commercial locations along east side of Village?? may have potential.

Description of Near-Term and Long-Term Capital Improvements:

Village has a 5-year main replacement plan with a concentration on replacing 4" water mains in the residential areas (Park Street, Pleasant Street, South Parkway, Kennedy Lane and Jones Avenue). South Main Street South end??? The 5-year plan will be coordinated with street maintenance projects. Long term plan includes construction of an additional storage tank on Spring Street for fire flow improvement.

Resiliency and Recovery Plan (RRP):

Does the Water Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) Yes

If YES, describe briefly

County Template - Emergency Response Plan
2 backup generators currently. Have enough storage for 12 hours of use before needing backup.

If NO, select all that apply

- ☐ A RRP or similar plans are being considered or are in the process of being developed.
- ☐ Interconnections to other WTF do not exist or are too remote.
- ☐ Interconnections to other WTF could be possible with additional infrastructure and intermunicipal agreements.

Sewer Infrastructure

Municipality: Village of Groton

Contact: Alvin Howell, WWTP Operator
Chad Shurtleff, DPW Supervisor
Terrance Walpole, Trustee/Sewer and Water Commissioner
Chris Neville, Mayor
Nancy Niswender, Clerk

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607-898-3345 (DPW)
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E-Mail: customerservice@grotonny.org
clerk@grotonny.org

Interviewed by:

Date: 08/26/2020

Approximate Population Served by Treatment Works: 2470
Approximate Number of Service Connections: 715

Rated Capacity per NYSDEC
SPDES Permit # NY0025585 : .5 MGD?

Average Day Flow from
DMR (last 12 months): .29 MGD

Maximum 30-day Flow from
DMR (last 12 months): .34 MGD

General Description of Treatment Works Processes:

In 2010 the Village built a new Sequencing Batch Reactor (SBR) plant. The headworks has a bar screen to remove grit and a settling tank for silt. Primary treatment is provided in a 2-tank system designed to provide mixing, aeration and decanting to reduce BOD, & TSS. The plant has been handling all flows hydraulically even after heavy rains and thaws. The plant has a backup generator.

General Description of Collection and Transmission Systems:

All mains are gravity sewers with manholes, no pumps. Village maintains service connections and main lines to sewer plant.

Identified Treatment Works Deficiencies, Regulatory Compliance Problems, Complaints:

Village experiences up to 500,000 GPD flows from Inflow/infiltration (I&I). Hired out firm to scope lines to find sources of I&I. Preliminary scoping observed tuberculation and root penetration. No DEC deficiencies.

Identified Limitations to Extending the Collection System:

None

Identified Near and Long-Term Capital Improvements:

Considering headworks improvements to eliminate hand raking of bar grates, sewer trunk line replacements, and covering of equalization tank.

Resiliency and Recovery Plan (RRP):

Does the Wastewater Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) No

If YES, describe briefly

If NO, select all that apply

- [x] A RRP, or similar plans are being considered or are in the process of being developed.
- [ ] Interconnections to other WWTF do not exist or are too remote.
- [ ] Interconnections to other WWTF could be possible with additional infrastructure and intermunicipal agreements.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Town of Ithaca

Contact: Joe Slater, Director of Public Works
Dan Thaete, Director of Engineering

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607-273-1656 x225 (Thaete)

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Interviewed by:
Andrew Sciarabba, TG Miller
David Herrick, TG Miller

Date: 1-28-21

Approximate Population Served by Municipal System:
Approximate Number of Service Connections: 3200
Current Average Day Consumption:

General Description of Water Distribution and Storage Facilities:

The Town of Ithaca is a Town-wide water benefit area however not all lands in the Town presently have access to municipal water. The majority of Town customers are supplied potable water from the SCLIWC (Bolton Point) water system. Cornell University has it's own supply, but also utilizes SCLIWC water as a customer of the Town of Ithaca. Some Town customers are served off the City of Ithaca water system. Lake shore properties along Taughannock Boulevard, and several properties on Trumansburg Road near the City boundary are supplied potable water from the City of Ithaca. In 2017 the Town of Ithaca upgraded the existing Oakwood Lane pump station by incorporating a PRV and a meter into the station. Approximately 102 City of Ithaca customers receive water from the Oakwood Pump station. These customers previously received water from the unmetered Brookfield PRV station. Approximately 40 Town of Ithaca customers are supplied potable water from Cornell University. There are 12 Town owned water storage tanks with a combined volume over 5.35 MG. The 16-inch and 18-inch diameter transmission mains owned and operated by Bolton Point stretch from the Burdick Hill Storage Tank in the Town of Lansing to the Pearsall Place PRV station on South Hill. Town owned transmission mains (12" and 16") extend from South Hill through the Inlet Valley to West Hill which link the Town's storage tanks and distribution systems in those areas to the Bolton Point supply.

Water Infrastructure

General Description of Water Distribution and Storage Facilities (Continued):

The Town of Ulysses water system is supplied Bolton Point water through the Town of Ithaca infrastructure to the Woolf Lane pump station take off point. The Town of Ulysses storage tank on Van Dorns Corners Road provide domestic and fire water storage for Town of Ithaca customers in the vicinity of Trumansburg Road and Iradell Road. An aeration system was added in 2020 to help reduce THM's to lower levels. The Town of Ulysses is a customer of the Town of Ithaca. Approximatey 3.5 to4 MG per quarter is supplied to the Town of Ulysses. Ithaca College is connected to the Town's Danby Road tank zone and pumps Bolton Point water to it's independently owned and operated 0.5 MG storage tank and campus distribution system. The Danby Road (0.5 MG) ground tank was replaced in 2013. On East Hill, the Town's Hungerford Hill tank zone supplies water to the Town of Dryden Snyder Hill Water District. A new tank in the East Hill system was built in 2018 as a sister tank to the Pine Tree Road tank. The Pine Tree Road/Ellis Hollow Road tank zones currently serve a majority of the customers located on East Hill, including Cornell University properties along Pine Tree Road and the East Hill Plaza. In the Northeast area, the portion of the Cornell Business and Technology Park in the Village of Lansing and south of NYS Route 13 is connected to the Town's Sapsucker Woods tank zone. The 0.5 MG ground tank was replaced in 2015 with a 0.39 MG elevated tank. The elevated tank raised pressures in this tank zone which is also the supplemental supply for the Town of Dryden Water District No.1 (Varna area). In 2015 a PRV station was added on Freese Rd to regulate pressures to the Varna area. A majority of Dryden /Varna service area is fed via the Apple Orchard PRV connected to Bolton Point transmission main located at the intersection of NYS RT 366 and Palm Rd.

The Christopher Circle ground tank (0.5 MG) was replaced in 2014 with a 0.5 MG ground tank and the Christopher Lane Pump Station was upgraded in 2015. The 0.2 MG Northview ground tank was replaced with a 0.5 MG tank in 2012. The town has installed approximately 51,250 lf of water mains since 2010. A majority of the water main installations has been replacement of existing water mains. The Town spends approximately $2M/year on water system improvements.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

The Town has not identified any water quality issues. Deficiencies exist in the Ulysses water system related to THM's.
Some Town of Ithaca tanks do not meet the Town of Ithaca 3-day storage requirement due to only 2-3' of fluctuation in domestic water operating levels.

The Town is considering adding backup generators to all pump stations.

Various areas within the town do not meet Town of Ithaca fire flow requirements. Various tanks within the town do not provide adequate storage capacity to meet Town of Ithaca storage requirements. These deficiencies are outlined in the GHD water study reports prepared for the Town of Ithaca.

Identified Limitations to Extending the Distribution System:

In 2012 the Town replaced the mains on South Hill with a 8-inch pipe creating a looped system through the Longview Development. Also, in the South Hill area, there are low static and residual pressures in the Southwoods Subdivision on East King Road which is served by the Troy Road tank zone. Available fire flow within the development is limited. The Town is presently evaluating what system improvements to implement to enhance fire protection.

The Pine Tree Road tank zone includes a length of 6-inch diameter pipe between Snyder Hill Road and Ellis Hollow Road that limits the available fire flow to the commercial and high density residential properties surrounding the East Hill Plaza. In 2017 the Town installed the Ellis Hollow tank on Hungerford Hill Road as a sister tank to the Pine Tree tank to accommodate capacity and fire flow issues.

The Distribution main on East Shore drive is old 6-inch cast iron pipe and was replaced in 2011 with a 12” ductile iron pipe and a PRV station on Remington road eliminating the fire flow issues and eliminating the need for City of Ithaca water feeding this portion of the Town.

Description of Near-Term and Long-Term Capital Improvements:

The Town is considering the following improvement projects over the next 2-3 years:

Water main work on Cliff Street/Trumansburg Road/Hopkins Street, Troy Road, Wildflower lane, installing new watermain and a PRV on East King Road connecting to the existing water main on Troy Road to rectify the Southwoods Development pressure and fire flow issues and existing fire flow issues on Coddington Road South Hill water system improvements to support the New Neighborhood Code. A water quality study of the West Hill tank zone is scheduled to start in 2023.
A pressure boosting station in the Ridgecrest tank zone to allow for more fluctuation of the tank and utilization of the storage volume.

Sewer Infrastructure

Municipality: Town of Ithaca

Contact: Joe Slater, Director of Public Works
Dan Thaete, Director of Engineering

Phone No: 607-273-1656 x226 (Slater)
607-273-1656 x225 (Thaete)

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Interviewed by:
Andrew Sciarabba, TG Miller
David Herrick, TG Miller

Date: 1-28-21

Approximate Population Served by Municipal System: 8000
Approximate Number of Service Connections: 3219
Estimated Average Day Flow: 1.8 MGD

General Description of Collection and Transmission Systems:

The Town of Ithaca is a Town-wide sewer benefit area however not all lands in the Town presently have access to municipal sewer. Collection system includes approximately 68 miles of 6"-15" gravity sewer, 14,000 ft of 3"-8" force main, 1,720 manholes, and 9 pump stations. Average day flows are approximately 2.3 million gallons per day. There are six distinct geographic service areas: The West Hill collection system serves properties on and adjacent to Trumansburg Road, Mecklenburg Road, West Haven Road and Elm Street. The sewer mains along these highway corridors connect to jointly owned interceptor pipes in the City. The three interceptors converge near the Buffalo Street bridge at the Flood Relief Channel. A combination of gravity and low pressure (siphon) piping convey flow over and under the Channel, respectively. Lake front parcels along Taughannock Boulevard from the City boundary to the Ulysses (T) border are also served by a Town sewer main. The Taughannock Boulevard main connects to a jointly owned interceptor pipe and pump station in Cass Park. A force main from the pump station extends beneath the Cayuga Inlet to Pier Road. The Inlet Valley system extends from a jointly owned interceptor on Floral Avenue and serves parcels along Five Mile Drive, Elmira Road, NYS Route 327 and the surrounding area. A siphon beneath the Flood Relief Channel discharges to a pump station in the Cherry Street industrial park. Sewer mains throughout the South Hill neighborhoods converge at jointly owned interceptors in the City on Aurora Street, Hudson Street and Crescent Place. The Danby Road corridor serves the majority of the Ithaca Colleges facilities, the South Hill Business Campus and the commercial uses in the vicinity of the West

Sewer Infrastructure

General Description of Collection and Transmission Systems (Continued):

King Road intersection. The collection system along Coddington Road serves a limited number of residential customers between City boundary and West Northview Road.Therm and residential neighborhoods in the vicinity of Pennsylvania Avenue, Northview Road, Troy Road and East King Road (Southwoods and Deer Run developments) connect to the interceptor at Crescent Place. The East Hill system includes extensions of jointly owned interceptors on the East State Street/Slaterville Road from the City boundary to Burns Road and on Mitchell Street from the City boundary to Summerhill Lane. Colllection pipes serving residential and institutional uses on Pine Tree Road, Honness Lane, Snyder Hill Road and Eastern Heights neighborhood connect to Slaterville Road interceptor. Commercial and high density residential properties surrounding the East Hill Plaza discharge to the Mitchell Street interceptor. The Northeast system basically includes the Town's sewer infrastructure in the vicinity of the Warren and Hanshaw Road corridors north of Cornell University Campus. Sewage from residential and insitutional properties is ultimately discharge into the Village of Cayuga Heights collection system and treated at the Village of Cayuga Heights Wastewaster Treatment Plant. The Lake Street system includes gravity collection mains along Lake Street and throughout the Renwick Heights neighborhood which extend from a jointly owned interceptor at the Ithaca High School. The East Shore Drive properties, including a few City parcels adjacent to Stewart Park, drain to a jointly owned pump station which lifts sewage to the Lake Street main. Jointly owned infrastructure: The Town of Dryden is a Town of Ithaca customer. The Town of Dryden does not own any percentage of the interceptors that conveys sewage to the plant.

Identified Deficiencies, Regulatory Compliance Problems, Complaints:

The Town has identified inflow and infiltration (I&I) in the collection system and is currently spending approximately $300,000 per year on rehabilitations to address I&I issues.

Identified Limitations to Extending the Collection System:

There are occasional wet weather capacity problems with the jointly owned interceptor mains that serve the West Hill and East Hill collection systems. The existing siphon under the Flood Control Channel at Buffalo Street, which serves the Town's and City's collection systems on Trumansburg Road and Elm Street, is flow limited when high rates of infiltration and inflow surcharge the interceptor pipes on Inlet Island.

On East Hill, segments of jointly owned interceptors within the City on East State Street and below Valentine Place can be flow limited when high rates of inflow and infiltration exceed pipe capacities. Utilizing the City of Ithaca water and sewer crews, an inter-municipal project was done in 2018 up-sizing the East State Street Interceptor with a 15" PVC pipe.

Development drives need for sewer extensions.

Various sections in each collection system are at or near capacity. Further investigation is needed prior to any extensions or increases in flow.

Identified Near and Long-Term Capital Improvements:

Past projects include interceptor main replacements with the City of Ithaca. Over the past 5 years mains on Renzitti Place, Hector Street and State Street have been rep laced.

An interceptor main replacement on Thurston Avenue is scheduled to be completed in 2021 or 2022.

The Town will continue its annual investments in I&I projects.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Town of Lansing

Contact: Charles Purcell, Highway Superintendent
Ed LaVigne, Supervisor
C.J. Randall, Director of Planning
Mike Moseley, Deputy Highway Superintendent

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Interviewed by:
David Herrick, TG Miller
Dondi Harner, TG Miller

Date: June 2, 2021

Approximate Population Served by Municipal System: 3670
Approximate Number of Service Connections: 1433
Current Average Day Consumption:

General Description of Water Distribution and Storage Facilities:

The contiguous Town distribution system includes 5 water storage tanks that feed more than 11 individual pressure zones. Two additional isolated extensions from adjacent neighboring municipalities (Town of Ithaca and Village of Lansing) exist along E. Shore Drive. There is one booster station system on Emmons Road that serves a limited number of residential connections where gravity distribution is presently not available at higher ground elevations. The Town has previously combined individual districts to form a single benefit area known as the Consolidated Water District. Subsequently, there have been 3 extensions of the CWD on Lansing Station Road, Drake Road and Peruville Road. Village Circle Tank and Bean Hill Tank – The combined storage volume of these two companion tanks is 1.35 MG. Both tanks are supplied by the Burdick Hill Pump Station which has a direct connection to the SCLIWC transmission system. Pumping capacity in the Burdick Hill station was significantly increased in 2017 to meet the growing water demands in the CWD. The distribution piping is at least 8 inch diameter throughout that portion of the South Lansing area served by these tanks. The pipe network is fairly well looped between Cherry Road, North Triphammer Road, Peruville Road and Warren Road. Wilson Road Tank – Supplied by the Village Circle/Bean Hill grid, the 0.2 MG tank provides service to the Lansing Central School District and surrounding residential neighborhoods in Ludlowville and Myers Park. Emmons Road Tank – Supplied by the Pine Grove Pump Station in Ludlowville, this 0.25 MG tank provides volume and pressure for lands between Ludlowville Road and Milliken Station Road along the Ridge Road (NYS Route 34) corridor. Bone Plain Road Tank - Placed in service in 2016. Supplied by the Village Circle Pump station, this 0.26 MG tank is physically located in the Town of Dryden and provides a higher pressure zone for the CWD distribution system on Farrell Road, Village Circle and Bean Hill neighborhoods.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

The level of trihalomethanes (THM), or disinfection byproducts, continue to be monitored in the Emmons Road tank pressure zone as water consumption in this zone was reduced following closure of the AES power plant. In 2014 an aeration system was installed in the Emmons Road tank to 'strip' THMs to maintain acceptable levels at the north end of the distribution system on Milliken Station Road.

Soil conditions in specific locations have lead to increased corrosion failures and premature replacement of ductile iron pipe.

Identified Limitations to Extending the Distribution System:

There are no known limitations to extending the distribution system within the CWD other than affordability in neighborhoods of limited density. Planning for extensions to lakeshore neighborhoods, who rely on lake water or marginal groundwater wells, is complicated by the financial hardship created by the Norfolk Southern construction requirements mandated within the railroad rights-of-way. In respect of the Town's Comprehensive Plan, Agricultural District lands and boundaries need to be carefully considered as requests for additional water service extensions are presented to the Town.

Description of Near-Term and Long-Term Capital Improvements:

Construction of water mains in CWD, Extension #5 (Peruville Road) is currently underway. The Town recently formed CWD, Extension #3 to extend roughly 20,000 feet of 8-inch distribution mains in the vicinity of Conlon, Buck and Wilson Roads to serve residential properties with marginal groundwater sources.

Looping of the distribution system between the Village Circle tank grid in South Lansing and the Wilson Road tank grid is a possible long-term goal to improve system redundancy during water main breaks.

Additional main extensions within the Town Center development area will be needed to support planned residential and/or commercial growth. These extensions are likely to be completed in conjunction with new development projects.

Infilling unserved, less dense properties bordering or surrounded by existing CWD will improve looping and customer base.

Sewer Infrastructure

Municipality: Town of Lansing

Contact: Charles Purcell, Highway Superintendent
Ed LaVigne, Supervisor
C.J. Randall, Director of Planning
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crandall@lansingtown.com

Interviewed by:
David Herrick, TG Miller
Dondi Harner, TG Miller

Date: June 2, 2021

Approximate Population Served by Municipal System: 650+/-
Approximate Number of Service Connections: 131+ 2019
Estimated Average Day Flow: 0.05+/- MGD

General Description of Collection and Transmission Systems:

The Town presently has sewer collection systems serving the Cherry Road Sewer District (CRSD) and Warren Road Sewer District (WRSD). The CRSD serves primarily residential subdivisions on Horizon Drive and the Borg-Warner plant on Warren Road. The WRSD collection system was constructed in 2010 to serve institutional, commercial and multi-family properties along Cherry Road, Warren Road, Dutch Mill Road, Oakwood Drive and Farrell Road. Both the CRSD and WRSD are connected with 8-inch mains to the Village of Lansing collection system on Bush Lane.

The WRSD includes two municipal sewage lift stations, one on Farrell Road and the second on Oakwood Drive. A sewage flow monitoring station is located near Bush Lane which collects daily flow data for all of the WRSD and a portion of the CRSD. All of the municipal gravity sewer collection pipes are 8-inch PVC.

Recently formed Sewer District No. 1 was established to facilitate potential residential growth in the south end of the Town, however, there has been no physical construction of infrastructure.

Identified Deficiencies, Regulatory Compliance Problems, Complaints:

Voltage drops in the NYSEG electric distribution system have created alarm conditions for the Farrell Road pump station. There are no other known deficiencies in the system.

Identified Limitations to Extending the Collection System:

There is presently no sewer system in the Village of Lansing west of N. Triphammer Road and north of Oakcrest Road that the Town can utilize for conveyance of sewage to the Village of Cayuga Heights Treatment Plant. However, the Village of Lansing is developing a plan to extend sanitary sewer service along E. Shore Drive (NYS Route 34) which is expected to extend to the Village/Town boundary just south of Waterwagon Road. This extension will facilitate planned growth in the Town's newly formed Sewer District No. 1. The extension of collection mains in Sewer District No. 1 to serve new customers will be completed entirely by the private sector in conjunction with approved development projects.

Available treatment capacity in the VCHWTP will ultimately limit the number of new sewer connections in the future.

Identified Near and Long-Term Capital Improvements:

Replacement of 4-inch diameter force main pipe in the Woodland Park Subdivision (p/o Warren Road Sewer District) may be needed due to pipe break history.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Village of Lansing

Contact: John Courtney, Superintendent of Public Works
Ronny Hardaway, Mayor

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Fax No: 607-257-3230 (Office)

E-Mail: dpw@vlansing.org
ronny.hardaway@gmail.com>

Interviewed by:
David Herrick, TG Miller
Dondi Harner, TG Miller

Date: 7/15/2021

Approximate Population Served by Municipal System: 3,500
Approximate Number of Service Connections: 683
Current Average Day Consumption: 600,000 GPD

General Description of Water Distribution and Storage Facilities:

The Village is served by gravity from 4 tank pressure zones and several smaller areas within these zones are served by pressure reducing stations. The Village Circle Tank is a 1,000,000 gallon tank owned by the Town of Lansing. This tank serves the area east of Warren Road north of NYS Route 13 with 8, 10 and 12-inch cast or ductile iron pipe. The Sapsucker Woods Tank is a 500,000 gallon tank owned by the Town of Ithaca. This tank serves the area east of Warren Road south of NYS Route 13 with 8 and 12-inch cast or ductile iron pipe. The Airport Ground Tank is a 500,000 gallon tank owned by the Village of Lansing. This tank serves the area east of North Triphammer Road to Warren Road and the Shops at Ithaca Mall with 8 and 12-inch cast or ductile iron pipe. There are two tanks at the east end of Burdick Hill Road totaling 2.4 MG that are owned by the SCLIWC that are used to serve the balance of the Village. Half of this area is fed by gravity and half by a PRV station with 8-inch cast or ductile iron pipe. This area of the Village used to be served by the Oakcrest Tank which was removed from service in 2010 and the Village shared in the cost of constructing the SCLIWC Burdick Hill 'sister tank' in 2013 as a replacement. In 2014 the Village sponsored the construction of a new 18" transmission/distribution main under NYS Rte.13 to replace an aging 8" Village distribution main. The new 18" main functions primarily as the Village distribution main but is interconnected with the SCLIWC transmission system and provides redundancy for the existing 18" SCLIWC main under NYS Rte.13.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

There are no known limitations with the existing system. However the Village has been experiencing problems with numerous main breaks in the piping along Warren Road and Brown Road. There are also a couple of areas that would benefited by looping of existing pipes. About half of the North Triphammer piping was replaced when the road was reconstructed and the Village is looking into replacing the remainder. The Village system is vulnerable to the larger diameter private system within the Village. Many of these system are aging and have experienced multiple breaks leading to system wide impacts.

Identified Limitations to Extending the Distribution System:

No areas have been identified as having capacity issues but not all properties within the Village are currently being serviced by public water.

Description of Near-Term and Long-Term Capital Improvements:

Near term water main replacements include Warren Road from Bomax Drive to Dart Drive and Brown Road from Warren Road to the Airport Ground Tank. Minor maintenance items have been identified for the Airport Ground Tank during a recent inspection and repairs are planned to be completed within the next year.

Sewer Infrastructure

Municipality: Village of Lansing

Contact: John Courtney, Superintendent of Public Works
Ronny Hardaway, Mayor

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Interviewed by:
David Herrick, TG Miller
Dondi Harner, TG Miller

Date: 7/15/2021

Approximate Population Served by Municipal System: 3,500 Est
Approximate Number of Service Connections: 683
Estimated Average Day Flow: 600,000 GPD

General Description of Collection and Transmission Systems:

A portion of the Village of Lansing has sewer service, which can generally be described as the south east 2/3's of the village and all of the area of the Village south of Route 13. The Village sanitary sewer system south of NYS Route 13 is an extension of the mains in the Village of Cayuga Heights. There are two connections to the VCH system; the corner of Uptown Road and Burleigh Drive and the intersection of Berkshire and Highgate Roads both which have a sewer flow meter. Sewers that were installed prior to the formation of the Village in 1974 are mainly 8-inch ACP and are generally located north of Route 13 in the vicinity of N. Triphammer Road, Graham Road, Dart Drive and Warren Road along with the sewers west of Warren Road and south of Route 13. More recent re-construction and extensions within this area have been with 8-inch PVC pipe. The remainder of the sewered portion of the Village along Cedar Lane, Beckett Way, Oakcrest Road and Bush Lane consists of 8 to15-inch ABS Truss pipe installed in 1982. The 15-inch interceptor pipe connects to the inlet side of the VCHWTP. The Town of Lansing further extends this system north from two connections on Bush Lane for Warren Road Sewer Distirct and Cherry Road Sewer District users. Extensions of the 1982 sewer system within the Village are generally PVC pipe.

Identified Deficiencies, Regulatory Compliance Problems, Complaints:

Flow monitoring studies have been completed identifying Inflow and Infiltration in the system. I&I is being tracked and efforts are underway to find and reduce I&I.

Grease build up has been a concern in some of the commercial districts which have caused sewer main back ups that require regular cleaning. Alternative routing and enforcement of grease trap maintenance are being evaluated.

Repair sag in 15" transmission main and repair two sanitary wood bridge crossings along the railroad corridor.

Identified Limitations to Extending the Collection System:

No sections have been identified as having capacity issues.

Identified Near and Long-Term Capital Improvements:

Expansion of sewer service into the northwest portion of the Village is currently underway. The proposed system improvements will connect to an existing 12" Village sewer main on Cedar Lane near the intersection with Cayuga Heights Road. All sewage from the expanded area as well as from the recently formed Town of Lansing Sewer District 1 will be conveyed to the existing Village collection system at this location. The system will extend service to customers along Cayuga Heights Road, Twin Glens Road and a portion of East Shore Drive.

Remote flow metering is currently being installed at three connection points to the Village of Cayuga Heights system which will allow for real-time flow monitoring and rainfall measurement to better track I&I and system capacity.

On-going evaluation of the sewer system that have been identified to have higher I&I rates in order to identify repair or replacement techniques and then perform the necessary repairs.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Town of Newfield

Contact: Kevin Berggren, Highway Superintendent
Sean Redman, Water and Sewer Manager

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607-327-1751 (Redman)

Fax No: 607-564-7329 (Office)

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highway@newfieldny.org

Interviewed by:
David Herrick, TG Miller
Dondi Harner, TG Miller

Date: May 5, 2021

Approximate Population Served by Treatment Works: 2,000+/-
Approximate Number of Service Connections: 436+/-
Average Day Production (last 12 months): 156,000+/- 2019
Maximum Day Production (last 12 months): 333,000+/- 2019

NYSDEC Withdrawal Permit #(s) and Permitted Capacity:

WSA #5525	200	GPM		MGD	Notes:	Pine Circle Wells 1-3
WSA #10711	200	GPM		MGD	Notes:	Armstrong Well
Pending	200	GPM	330,000	MGD	Notes:	Pine Circle Well 4
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	

General Description of Water Sources and Treatment Processes:

The source of supply for the Town's water districts is the West Branch Cayuga Inlet and Fish Kill Valleys Aquifer (aka Newfield Aquifer). There are two well sites, identified as Pine Circle and Armstrong. The largest producing well is Pine Circle well #2 with a current production rate of 190 gpm. The current combined pumping capacity of the Pine Circle wells #2 and #3 and the Armstrong well is 350 gpm. Groundwater quality and level have remained consistent over the last 35 years, however, the aesthetic quality of the Armstrong water is less desirable and is used less frequently. Sodium hypochlorite is injected for disinfection and to maintain appropriate residual levels in the distribution system. Polyphosphate (Aqua-Pure) is a sequestering agent being injected at the Pine Circle Wells for controlling iron and manganese.

General Description of Distribution and Storage Systems:

The Town of Newfield currently has 3 water benefit districts. Water District No. 1 serves the Main Street area of the Town and is fed off the 183,600 gallon Trumbull Corners Tank and the 158,000 gallon 'companion' Van Kirk Road Tank. The distribution system includes roughly 41,200 feet of 6, 8 and 10-inch pipe comprised of asbestos cement and PVC. Water District No. 2 serves the Inlet Valley Area on NYS Rte 34 & 96. Water District No. 2 maintains two storage tanks. The Main Street Tank is a 150,000 gallon transfer tank to fill the 300,000 gallon Shelter Valley Tank which provides the distribution storage and pressure within Water District No. 2. The distribution system includes about 27,000 feet of 10 and 8-inch PVC or HDPE pipe. The "Frandsen Water District" is an extension of Water District No. 1 and includes 144 affordable-housing units and an existing residence along NYS Rte 13 just north of the intersection of South Main Street and Rte 13. The Frandsen District is served by the combined Trumbull Corners and Van Kirk Tank grid.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

Pine Circle Wells #1 and #2 have been in operation since 1967 and while they are still in operation, the pumps have become lodged in the well casings and removing them for proper maintenance has not been possible. The loss of these pumps due to a mechanical failure would be detrimental to the source capacity for the water districts.
Some customers in Water District No. 1, specifically along Main Street, have realized diminished water pressure which was found to be caused by mineral deposits accumulating in the services lines and reducing the effective diameter of the services.
There have not been NYSDOH violations reported in the last ten years.

Identified Limitations to Extending the Distribution System:

Piping in Water District No. 1 is comprised of aging asbestos cement pipe which has likely reached the end of useful life. Segments of the Water District No. 1 system may need replacement in the next several years. Duplicating the groundwater source currently provided by Pine Circle Wells #1 and #2 will be an important factor when considering any possibility of extending the municipal distribution system to any new customers.

Description of Near-Term and Long-Term Capital Improvements:

A groundwater source study was completed in September 2020 which identified and recommended additional sources of supply within the adjacent aquifers. A new well was recently drilled in the vicinity of Pine Circle (known as #4) with a reported sustainable yield of 200 gpm. Permitting of Pine Circle Well #4 is in process. Once in service, the Town will attempt to pull the pump from Pine Circle Well #2.

Depending on funding availability, possible pipe replacement in Water District No. 1 could be initiated in the next several years with a goal to replace all asbestos cement pipe by year 2032. A priority segment would be Main Street south of the Trumbull Corners intersection.

Stream flooding in 2016 entered the Pine Circle Pump House suggesting there may be a need to raise grades around the Pump House to divert flood waters.

Resiliency and Recovery Plan (RRP):

Does the Water Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) N

If YES, describe briefly

The Pine Circle Pump House does have a permanent emergency generator and the Town has a portable generator that can be used at the Armstrong Well site during a power emergency.

If NO, select all that apply

- ☐ A RRP or similar plans are being considered or are in the process of being developed.
- ☑ Interconnections to other WTF do not exist or are too remote.
- ☐ Interconnections to other WTF could be possible with additional infrastructure and intermunicipal agreements.

Sewer Infrastructure

Municipality: Town of Newfield

Contact: Kevin Berggren, Highway Superintendent
Sean Redman, Water and Sewer Manager

Phone No: 607-564-3616 (Berggren)
607-327-1751 (Redman)

Fax No: 607-564-7329 (Office)

E-Mail: watersewer@newfieldny.org
highway@newfieldny.org

Interviewed by:
David Herrick, TG Miller
Dondi Harner, TG Miller

Date: May 5, 2021

Approximate Population Served by Treatment Works: Unknown
Approximate Number of Service Connections: 170 +/-

Rated Capacity per NYSDEC
SPDES Permit # NY0110752 : 0.03 MGD

Average Day Flow from
DMR (last 12 months): 0.028 MGD

Maximum 30-day Flow from
DMR (last 12 months): 0.04 MGD

General Description of Treatment Works Processes:

The treatment works at Taber consists of two 5,700 gallon settling tanks which discharge into another 5,700 gallon tank. There are two 7.5 HP pumps that transfer the effluent to four absorption fields for distribution. The distribution between the fields is controlled by ball valves. It is automatically controlled based on the pump start time and alternates between the fields. The pumps are Flygt 3127.180. The well empties in about 4.5 minutes and if the pumps fail the effluent will overflow and flow by gravity into the fields. There is space available on site to add an additional 2-4 absorption fields, however, the Town has been informed by NYSDEC that this space needs to be reserved as replacement area for the current system loading.

General Description of Collection and Transmission Systems:

The sanitary sewer system collects effluent discharged from privately owned septic tanks. The gravity mains and manhole covers continue to be checked and replaced where necessary to minimize inflow and infiltration (I&I). The flow rates have not reduced significantly and increases are noted during dry wet weather periods. Individual gravity collection grids drain to a total of five pump stations which lift the effluent to the Taber Road treatment works. New level sensors have recently been installed in the pump stations. In the last year, pumps have been replaced in Station #2 (Depot Road) and Station #3 (Trumbulls Corners/Main Street). All of the sewer system was installed in 1984.

Identified Treatment Works Deficiencies, Regulatory Compliance Problems, Complaints:

Since the average day flow to the treatment works is at or above 95% of the permitted capacity, the Town is not currently allowing new service connections for infill development within the sewer service area.

Identified Limitations to Extending the Collection System:

Expanding the collection system beyond the current service area is not anticipated and would be limited by the permitted capacity of the treatment works.

Identified Near and Long-Term Capital Improvements:

The installation of a flow monitoring station at the inlet to the treatment works on Taber Road is being considered. A flow meter at this location would provide more accurate measurement of average day flow versus calculating such flows based on run times of the pumps in the various pump stations.

There are a number of private septic tanks that should be replaced to reduce sources of I&I, however, the cost of replacement for some landowners may be prohibitive.

The Town is in the process of conducting an I&I investigation and is expected to prepare a flow management plan in July 2021 to present to NYSDEC.

Resiliency and Recovery Plan (RRP):

Does the Wastewater Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) No

If YES, describe briefly

The Town does have stationary emergency generators for Pump Stations #1 and #2 and a spare pump in inventory for all five pump stations.

If NO, select all that apply

- ☐ A RRP, or similar plans are being considered or are in the process of being developed.
- ☑ Interconnections to other WWTF do not exist or are too remote.
- ☐ Interconnections to other WWTF could be possible with additional infrastructure and intermunicipal agreements.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Village of Trumansburg

Contact: Rordan Hart, Mayor
Debora Watkins, Deputy Mayor
Tammy Morse, Village Clerk
Matt McKenna, Engineer-MRB Group
Bill Davis, Engineer-MRB Group

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Interviewed by:
Andrew Sciarabba, TG Miller
David Herrick, TG Miller
Kurt Anderson, TCAD
Scott Doyle, Tompkins County

Date: August 19, 2020

Approximate Population Served by Treatment Works: 2,300
Approximate Number of Service Connections: 838
Average Day Production (last 12 months): 184,422 GPD - 2019
Maximum Day Production (last 12 months): 360 gpm (2010-2014)

NYSDEC Withdrawal Permit #(s) and Permitted Capacity:

WSA #5327	500	GPM		MGD	Notes:	Frontenac Well (Well #1)
	60	GPM		MGD	Notes:	Taughannock Falls State Park (Well #2 - NYS Parks)
WSA #11951	300 and 500	GPM		MGD	Notes:	Taughannock Falls State Park North Point Wells #3 and #4 (Village)
WSA #741		GPM		MGD	Notes:	Hoffmire Well - Indian Fort Road (Emergency Use Only)
		GPM		MGD	Notes:	
		GPM		MGD	Notes:	

General Description of Water Sources and Treatment Processes:

(1) Village Well #1 located along Frontenac Road near Camp Barton is active and permitted for 500 gpm. Well recently flushed and new pump installed during 2015 W & Water System Improvement Project. Sodium Hypochlorite introduced at well head. (2) Well #2 was the existing New York State Parks well for Taughannock Falls State Park. This well was left existing to remain and has a pumping capacity of 60 gpm and was left in service. (3) Two new wells were drilled at Taughannock Falls State Park by the Village for a redundant supply. Well #3 is located at North Point, to the west of Taughannock Creek and is permitted for 300 gpm. Well #4 is located to the east of Taughannock Creek and is permitted for 500 gpm. These two (2) wells are interconnected prior to sodium hypochlorite being introduced for treatment. (4) Existing emergency Hoffmire Well located along Indian Fort Road was left in place for emergency use only. This well has not been operated in several years and has poor water quality. Village is approved for 720,000 gpd from permitted wells.

General Description of Distribution and Storage Systems:

(1) Well #1 pumps to a 150,000-gallon ground storage tank at the corner of Route 89 and Frontenac Road. Three (3) pumps convey water from 150,000-gallon storage tank to the elevated 500,000-gallon storage tank at corner of Route 227 and Halsey street in the Village of Trumansburg. Elevated tank was constructed in 2004. (2) Well #2, #3 and #4 pump to a 200,000 gallon ground storage tank off Taughannock Park Road that was formerly owned and operated by the NYS Parks. Ownership of the tank and piping was transferred to the Village as part of 2015 Well and Water System Booster Pump Station. Water from the 200,00 gallon storage tank is then conveyed to the elevated 500,000 gallon storage tank in the Village by a triplex booster pump station (2 duty/1 standby).

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

New wells solved Tompkins County Health Department second source concerns from 2010 study. Miscellaneous improvements were made in the vicinity of Well #1 to solve lack of disinfectant contact time. Water system has approximately 12 miles of old, small diameter mains (6-8"). Would be expensive to replace at one time. More cost effective to fix repairs and up-size as needed.

Identified Limitations to Extending the Distribution System:

No flow or pressure problems noted. System has excess capacity to serve future demands (within and outside Village).

Description of Near-Term and Long-Term Capital Improvements:

The 2006-2007 Main Street project replaced some mains. A loop installed in the south side of the Village in 2013/2014 improved pressures around the Fairgrounds. No capital improvements are planned for the next 10 years. Past discussions were held to consider serving the Town of Ulysses WD#3 currently supplied by the Town of Ithaca. Current agreement between Ithaca/Ulysses prohibits such a connection. Surrounding areas impacted by high TTHM's may benefit from the Village's groundwater source and extra capacity via inter-municipal interconnections. Possible future interconnection for redundancy? Town of Covert has expressed an interest in water from Village system. Waterloo or Bolton Point sources may be potentials for a backup to the Village system.

Resiliency and Recovery Plan (RRP):

Does the Water Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) No

If YES, describe briefly

If NO, select all that apply

- [x] A RRP or similar plans are being considered or are in the process of being developed.
- [ ] Interconnections to other WTF do not exist or are too remote.
- [x] Interconnections to other WTF could be possible with additional infrastructure and intermunicipal agreements.

Sewer Infrastructure

Municipality: Village of Trumansburg

Phone No: 607-387-6501 (Village Office)

Interviewed by:
Andrew Sciarabba, TG Miller
David Herrick, TG Miller
Kurt Anderson, TCAD
Scott Doyle, Tompkins County

Contact: Rordan Hart, Mayor
Debora Watkins, Deputy Mayor
Tammy Morse, Village Clerk
Matt McKenna, Engineer-MRB Group
Bill Davis, Engineer-MRB Group

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mmckenna@mrbgroup.com
bdavis@mrbgroup.com

Date: August 19, 2020

Approximate Population Served by Treatment Works: 1800
Approximate Number of Service Connections: _____

Rated Capacity per NYSDEC
SPDES Permit # NY0024902 : 0.25 MGD

Average Day Flow from
DMR (last 12 months): 0.21 (2019)

Maximum 30-day Flow from
DMR (last 12 months): 0.31 (2019)

General Description of Treatment Works Processes:

Upgrades to the Treatment Plant started in 2015 and closed on long-term funding in 2019. The upgrades did not increase the permitted capacity of the plant but vastly improved the effluent water quality discharged to Trumansburg Creek and ultimately Cayuga Lake. Influent to the plant is through a 15" gravity main. Influent passes through a mechanical screen, to a vortex grit chamber with classifier, then to two (2) aeration tanks for biological treatment. The flow is then lifted by two (2) screw pumps to two (2) peripheral feed secondary clarifiers. Treated water from the secondary clarifiers is conveyed by gravity to two (2) mechanical disc filters then is disinfected via an open channel UV disinfection system. Flow runs through a post-aeration tank and followed by the effluent WWTP Parshall flume flow meter before being discharged to Trumansburg Creek. Sludge removed from the secondary clarifiers is treated in aerobic digesters prior to dewatering by a belt press which is operated around once a month. The dewatered sludge is removed from the facility and disposed of by land application in Seneca County.

General Description of Collection and Transmission Systems:

Flow to the plant is by gravity and the majority of the collection system is small diameter piping (6" to 12"). There are two pumping stations in the network, one on South St and one on Prospect St, these pump into the gravity network. Record drawings from original construction of the collection system indicate approximately 53,400 LF of sewer main and approximately 215 manholes.

Identified Treatment Works Deficiencies, Regulatory Compliance Problems, Complaints:

The permitted plant capacity is 0.25 MGD and the WWTP was designed for a hydraulic peak flow of 1.0 MGD. Inflow and Infiltration (I&I) was present prior to the 2015 upgrades but improvements to the WWTP were initial priority. Due to flow exceedances resulting from I&I, the NYSDEC and Village are proactively working to identify and mitigate sources of I&I impacting the collection system and ultimately the WWTP. An increase in the permitted hydraulic capacity may be entertained by NYSDEC with a reduction in I&I as the WWTP was designed for a Maximum Month design parameters. The Village is revising the 1966 Sewer ordinance to bring it in line with current NYSDEC Model Sewer use Law and USEPA Model Pretreatment Ordinance. Camden Group is the current WWTP operator. The Village does not currently have a back-up operator if Camden were unable to operate the plant. Consider inter-municipal agreements with other plant operators for backup.

Identified Limitations to Extending the Collection System:

There are portions of the Village that have no sewer service and would need either low pressure sewer mains or pump stations installed to serve these properties. The Village is not currently looking to expand their customer base to users outside of the Village.

Identified Near and Long-Term Capital Improvements:

The Village is in the process of completing I&I studies to determine the I&I sources. Age of infrastructure and location of infrastructure may be impacted by an underground aquifer as a possible source amongst other suspected sources. Collection system improvements (manhole rehab/sewer relining) to mitigate I&I may be required in next 5 years. The (2) pump stations at South and Prospect Streets may need upgrades in the next 5 years.

Resiliency and Recovery Plan (RRP):

Does the Wastewater Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) No

If YES, describe briefly

If NO, select all that apply

- ☑ A RRP, or similar plans are being considered or are in the process of being developed.
- ☐ Interconnections to other WWTF do not exist or are too remote.
- ☐ Interconnections to other WWTF could be possible with additional infrastructure and intermunicipal agreements.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Town of Ulysses

Contact: Chris Stevenson, Highway Department/Water District Operator
Nancy Zahler, Supervisor
Carissa Parlato, Town Clerk
Michael Boggs, Town Board Mbr, Water Liaison

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607-387-5767 (Parlato)
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Interviewed by:
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Forms filled out by Town Staff - Modifed by TGM to fit fields.

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Clerk@ulysses.ny.us
Boggs@ulysses.ny.us

Date: April 15, 2021

Approximate Population Served by Municipal System: 1600
Approximate Number of Service Connections: 264 user connex
Current Average Day Consumption: 27,250 WD3

General Description of Water Distribution and Storage Facilities:

The Town of Ulysses currently has 4 water Districts. Water District No. 1 serves the Cayuga Addiction Recovery Services facility on Rte 227. This facility is fed off the 0.5 MG Village of Trumansburg Tank. The facility is served by a 4-inch lateral off an 8-inch main. Avg Daily Consumption WD1= 2378 gpd. Water District No. 2 serves the Sure Save grocery store on NYS Rte 96. This facility is fed off the 0.5 MG Village of Trumansburg Tank. Avg Daily Consumption for WD2 = 84gpd. District No. 3 serves properties along NYS Rte 96 in the Hamlet of Jacksonville, Cold Springs Road, Swamp College Road, Jacksonville Road, Perry City Road and Van Dorn Corners Road. This district is fed off the 0.2 MG Town of Ulysses Tank located on the corner of Iradell and Van Dorn Corners Roads. The distribution system includes a 12-inch pipe and was intended to adequately serve the domestic and fire needs of the district. Water is supplied to the District through the Wolf Lane pump station located in the Town of Ithaca. The water supplier is the SCLIWC. The agreement with the Town allows Ulysses to draw up to 159,000 gpd. Avg Water Consumption WD3 = 27,500 gpd. Water District No. 4 serves three properties on Dubois Road just north of the Town of Ulysses/Ithaca border. This district is fed off the 0.5 MG Town of Ithaca T-Burg Road Tank. The agreement with the Town allows Ulysses to draw up to 3,000 gpd. Avg Water Consumption for WD4= 239 gpd

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

TTHM violations exist at the Hydrant 60 sampling point on Jacksonville Road which is a dead end 1/4 mile spur. To address the TTHM issue with the Health Department, the Town jointly funded an aerator in the Town of Ithaca tank in the hope that TTHMs would be reduced. In the Fall of 2020, the Town used a WIIA grant to install an aerator, mixer system in our Van Dorn Corners tank. The aerator sprayer system has to be turned off in both tanks during the winter to avoid icing on the interior which could damage the roofs. The Ulysses aerator is currently going through performance testing to secure the manufacturer's guarantee of 50% TTHM reduction in the tank. The key measure will be summer 2021 when TTHMs are usually highest and aerator will be fully operational. The reductions are not guaranteed for hydrant 60. WD3 has continued to have periodic exceedances of the 80ppb of TTHMs, requiring notice to users and continued reporting to the Health Department. The hope is that with the aerator fully operational, our running quarterly average TTHMs will drop below 80 ppb so we can provide safer water and be released from TCHD monitoring. We have higher than average water loss due to excessive flushing to keep chlorine residuals up on our Cold Springs Road Spur.

Identified Limitations to Extending the Distribution System:

Future extensions from the Town of Ithaca system could require updates to the Town of Ithaca infrastructure. Still true? Possibly yes.

The current WD3 has demand among residents who live on roads served by Town lines; however, our original Map Plan and Report do not allow us to extend the lines to serve those nearby. In one case where a line ended on Swamp College Rd, a household with a dry well was able to hook up to the existing line through an out of district user agreement; however, another user on Cold Spring road would have needed an extension of the line that crossed under the road and while the owner would have paid for the extension, they would not agree to future maintenance as an out of district user and we couldn't just extend the district without a new MP&R.

The other logical extensions for WD3 are to connect with the Village of Trumansburg's district lines that extend into the Town of Ulysses; however, the current agreement between the Towns of Ithaca and Ulysses requires Ulysses to buy water exclusively from Ithaca for 30 years. Unless renegotiated, this agreement would preclude expansion through a connection with Tburg.

Description of Near-Term and Long-Term Capital Improvements:

Near-term: Install remaining AMR meter heads, install a chlorinator and CL monitor in the Jacksonville Hamlet area to keep CL levels up in the Cold Springs Road Spur, install a smaller HDPE service line on Jacksonville Road to increase turn-over time on this spur or loop it to Cold Springs to increase throughput, install a dedicated tank fill line up Iradell Road (we could potentially pick up a few customers on the way), install a custody transfer meter at the Ithaca-Ulysses Town line. WD1 serving Cayuga Addiction Recovery Services (CARS) has two additional out of district users and will be adding a new women's unit (new water demand is guaranteed in a Town/Village agreement). Development of a capital plan for WD3 to repair and replace the current lines once the current debt is retired in 2024. Long-term: Install an extension from Cold Springs Rd terminus to South St or Waterburg Rd for a District 1 connection and consolidate the districts, Future water districts: Use part of the American Rescue Plan funding to explore creating additional water districts in areas of the town where we'd like to facilitate residential and/or business development. New district along Falls Road where Village of Trumansburg ran a transmission line to connect to their system along Cemetery Road. 2018-petitioned for a district however, the creation failed by one vote. Grassroots owns land on Falls Rd and would like water. The Town will be re-visiting this district in 2021.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Municipality: Southern Cayuga Lake Intermunicipal Water Commission

Contact: Steve Riddle, General Manager
Jack Rueckheim, Chairperson
Glenn Ratajczak, Production Manager
Gregg Weatherby, Distribution Manager

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gregg@boltonpoint.org

Interviewed by:
David Herrick, TG Miller
Andrew Sciarabba, TG Miller
Kurt Anderson, IAED
Scott Doyle, Tompkins County

Date: December 3, 2020

Approximate Population Served by Treatment Works: 30,000
Approximate Number of Service Connections: 7,175
Average Day Production (last 12 months): 2.597 MGD - 2020
Maximum Day Production (last 12 months): _____

NYSDEC Withdrawal Permit #(s) and Permitted Capacity:

6115	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:
	:		GPM		MGD	Notes:

APPENDIX B24

General Description of Water Sources and Treatment Processes:

Treatment capacity is 6.0 MGD by permit, but the plant can produce 6.75 MGD based on a filtration rate limit. Additional production does not need to be considered for long-term as average day production is similar to 1990 rates and plant is only running for 18 hrs/day on weekdays and 10 hrs/day on weekends. Connection to other neighboring communities could change this. Operating above a threshold production for 6-mo period would trigger planning for upgrades (included in Agreement of Municipal Cooperation).

General Description of Distribution and Storage Systems:

2 Burdick Hill Tanks replaced in 2013-2014, expanded to total of 2.4MG.
Sheldon Road Tank owned by SCLIWC but only serves Village of Cayuga Heights customers.
E. Hill Tank 3MG can back feed all customers other than Lansing (T). Is interconnected with Cornell University Hungerford Hill tank.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

HABS will impair ability to serve municipalities during drought. Have not had issue yet at intake pipe.
Transmission capacity and backwash investment for 'emergencies' creates water quality and operational problems for SCLIWC.
Currently backwash twice a day. Land available for additional filter backwashing is limited. Possible sanitary sewer connection by Village of Lansing may provide relief.
Duplicate T-main will require more maintenance in long-term.
Water mixing has been a concerned from chemistry perspective (mostly concerned about lead) when systems share sources of supply.
Lead and copper rule changes may be a future concern.
PFOS and PFOA 1,4 Dioxan could be issue for City and CU stream sources...not a concern for SCLIWC.
SCLIWC working with member municipalities to address water quality issues related to long storage times.
Flooding does not cause problems as raw water pump station is well above lake level and intake falls between Salmon Creek and Cayuga Inlet - both sources of high turbidity during rain events. Culvert blockages that create bank/main wash-outs are the only flooding threat.

Identified Limitations to Extending the Distribution System:

T-main route is 'tight' along road corridors which limits parallel pipe opportunities.
Gravity pipe between Hungerford Hill and East Hill tanks is small diameter. Funding for a new pump station is in place but logistical issues holding up project.
Not strong interest from municipalities in 'swapping' customer base where distribution systems could allow.
Extra plant capacity would be quickly taken up if other municipalities wanted to connect (eg Town of Newfield, Village of Dryden).

Description of Near-Term and Long-Term Capital Improvements:

Oakcrest Road pump station adding 3rd pump with natural gas.
Possible hi-lift pump out of City WTP into E. Hill Tank.
Member municipalities are encouraged to share infrastructure where useful and look for ways to improve redundancy...invisible 'boundaries'.
Get improvements in the other systems to expand their capacity in order to serve SCLIWC.
Retired t-mains that paralleled with newer pipe could possibly be re-lined to serve in emergency situations. Big $$
Redundant creek crossings at Fall Creek and Cascadilla Creek are in planning. A similar crossing of Six Mile Creek is under construction.

Resiliency and Recovery Plan (RRP):

Does the Water Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) Yes

If YES, describe briefly

Harmful Algae Blooms (HABs) have been seen at shore but not at intake. A HAB reaction plan was put in place 3 years ago. A system slow-down due to HABs would supply current customers but may require 'use restrictions'. SCLIWC has redundancy in t-mains and raw water piping where 24-hour shutdown would be a problem.
Also has added additional pumps at the raw water and Oakcrest pump stations.
Working with primary water suppliers (City of Ithaca and Cornell) and TCHD on monthly basis.
Funding from IAED or County may be best spent to improve supply capacities of City and Cornell systems to reduce reliance on SCLIWC and allow for supply to SCLIWC. Possible pilot project for lining a section of old parallel mains. Triphammer by Kendal is an opportunity.

If NO, select all that apply

- ☐ A RRP or similar plans are being considered or are in the process of being developed.
- ☐ Interconnections to other WTF do not exist or are too remote.
- ☐ Interconnections to other WTF could be possible with additional infrastructure and intermunicipal agreements.

2020 Water and Sewer Evaluation Update

Water Infrastructure

Phone No: 607-255-3381 (Office)

Interviewed by:

Municipality: Cornell University

Contact: Chris Bordlemay Padilla, Water and Wastewater Manager
Josh LaPenna, Utilities Production Director
Mark Vallely, Lead Plant Operator/Technician/Sr. Mechanic

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mtv3@cornell.edu
water@cornell.edu

Date:

Approximate Population Served by Treatment Works: 31,000
Approximate Number of Service Connections: 259
Average Day Production (last 12 months): 1.166 MGD- 2019
Maximum Day Production (last 12 months): 2.7 MGD - 2019

NYSDEC Withdrawal Permit #(s) and Permitted Capacity:

	:		GPM	5.45	MGD	Notes:	Permit #: 7-5030-00008/00007 Production design capacity 3.6 MGD
	:		GPM		MGD	Notes:	
	:		GPM		MGD	Notes:	
	:		GPM		MGD	Notes:	
	:		GPM		MGD	Notes:	
	:		GPM		MGD	Notes:	

General Description of Water Sources and Treatment Processes:

Fall Creek (surface water source) with conventional water treatment plant (rapid mix coagulation, slow mix flocculation, slow velocity sedimentation, decant water to dual media filtration to clear well, sodium hypochlorite disinfection); corrosion inhibitor applied for Lead and Copper control; Interconnection with Bolton Point at WFP, North Campus PRV Station, and storage tank site. Plant built 1927-28.

General Description of Distribution and Storage Systems:

Ductile iron and HDPE transmission and distribution system, pumping station, 2 PRV stations, 2 storage tanks (1.0 MG, 1.5 MG)
Zone 1 tank to lower pressure zone then pump up to Hungerford Hill tank for Zones 2-3. Can supply Bpt through Hungerford Hill tank.
120+/- miles of distribution pipe.

Identified Facility Deficiencies, Regulatory Compliance Problems, Complaints:

No regulatory compliance problems; occasional complaint regarding stirred sediment in the distribution system due to fire flow testing;

Identified Limitations to Extending the Distribution System:

Limitations to distribution system are geographic (serving campus) and/or hydraulic
5 yr program to replace CI pipe with more HDPE.

Description of Near-Term and Long-Term Capital Improvements:

Plant modifications and repairs to concrete components, sluice gates. Distribution system improvements (minor). Instrumentation and Controls replacement (PLC and SCADA); Intake building replacement;

Resiliency and Recovery Plan (RRP):

Does the Water Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) Yes

If YES, describe briefly

We have an extensive Emergency Response Plan, updated as needed but typically yearly. We also conduct a Vulnerability Assessment (Homeland Security) every 5 years, which now includes a Cybersecurity Vulnerability Assessment.
Oakcrest pump station to E. Hill Tank has been discussed w SCLIWC; redundancy at creek crossings (sensitive to CU Natural Areas). Cost sharing got up to $20M.

If NO, select all that apply

- ☐ A RRP or similar plans are being considered or are in the process of being developed.
- ☐ Interconnections to other WTF do not exist or are too remote.
- ☐ Interconnections to other WTF could be possible with additional infrastructure and intermunicipal agreements.

Sewer Infrastructure

Municipality: Ithaca Area WWTF - Ithaca(C), Ithaca(T), Dryden(T)

Contact: Carl Kilgore, Chief Operator, IAWWTF
Scott Gibson, City of Ithaca
Joe Slater, Town of Ithaca

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607-273-1656 (Slater)

Fax No: 607-273-8433 (Kilgore)

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sgibson@cityofithaca.org
jslater@town.ithaca.ny.us

Interviewed by:
Andrew Sciarabba, TG Miller
David Herrick, TG Miller
Kurt Anderson, TCAD
Scott Doyle, Tompkins County

Date: 9/3/2020

Approximate Population Served by Treatment Works: 45,000+/-
Approximate Number of Service Connections: 3,400+/-

Rated Capacity per NYSDEC
SPDES Permit # NY0026638 : 13.1 MGD

Average Day Flow from
DMR (last 12 months): 6.069 MGD

Maximum 30-day Flow from
DMR (last 12 months): 7.925 MGD

General Description of Treatment Works Processes:

Changes/additions since 2010 include new digester mixers and a co-generation system, new bar screens, new septage screening and an aeration system. Improvements underway include grit removal upgrades, effluent water reuse, a new vacuum truck dumping pad, new tank rails and troughs, and 2 generators to run entire plant. Plant receives 4 million plus gallons septage per year.

General Description of Collection and Transmission Systems:

IAWWTF has no collection system but is working with municipalities on joint interceptor upgrades including the Thurston Ave upgrade (next 1-2 yrs). State Street upgrades were completed in 2018 and Renzetti Place was replaced in 2017. IAWWTF has an I&I study in progress including metering. Ithaca (T) has been allocating funds for I&I reduction since 2018 using trenchless technologies for repairs.

Identified Treatment Works Deficiencies, Regulatory Compliance Problems, Complaints:

Changes/additions: Permit expired 5/31/20, renewal applied for 7/17/2019, have not seen renewal physically or online but should be good thru 2025. Digester mixing, heating and cogen project complete. New bar screens in place, 6mm screening. Grit removal prior to primary in progress. Trucked waste facility upgraded. New vac truck dump pad in place, may use for septage dumping when grit system complete. New aeration system installed. Lab/staff room on hold. Actiflo splitter non issue (already exists). Tank repairs in progress, will be ongoing. Structural concrete repairs, trough replacement, rail replacement in progress. Getting 2 new emergency generators to replace single, aging, undersized generator. Evaluating boiler needs - (2) 33 year old boilers are approaching end of useful life, (2) newer high efficiency boilers are unreliable and maintenance intensive. (2) 10,000 gallon chemical feed tanks failed inspection (cracking/delaminating). Digester piping in need of replacement due to build up of internal corrosion/deposits and potential for flow restrictions. Gas flair in need of replacement/upgrade.

Identified Limitations to Extending the Collection System:

Identified Near and Long-Term Capital Improvements:

As discussed above, plus: ongoing tank/concrete repairs; boiler replacement; Chemical tank replacement; solids handling/sludge drying equipment; mechanical thickening; new dewatering equipment to replace 20 year old built press that has no replacement equipment support; flare replacement; trucked waste facility upgrades to include new screening equipment, evaluation for food waste acceptance and other high strength waste, evaluate configuration for better mixing and processing. Street and parking improvements are also planned.

Resiliency and Recovery Plan (RRP):

Does the Wastewater Treatment Facility have a RRP or other Disaster Preparedness Plan? (Y/N) No

If YES, describe briefly

If NO, select all that apply

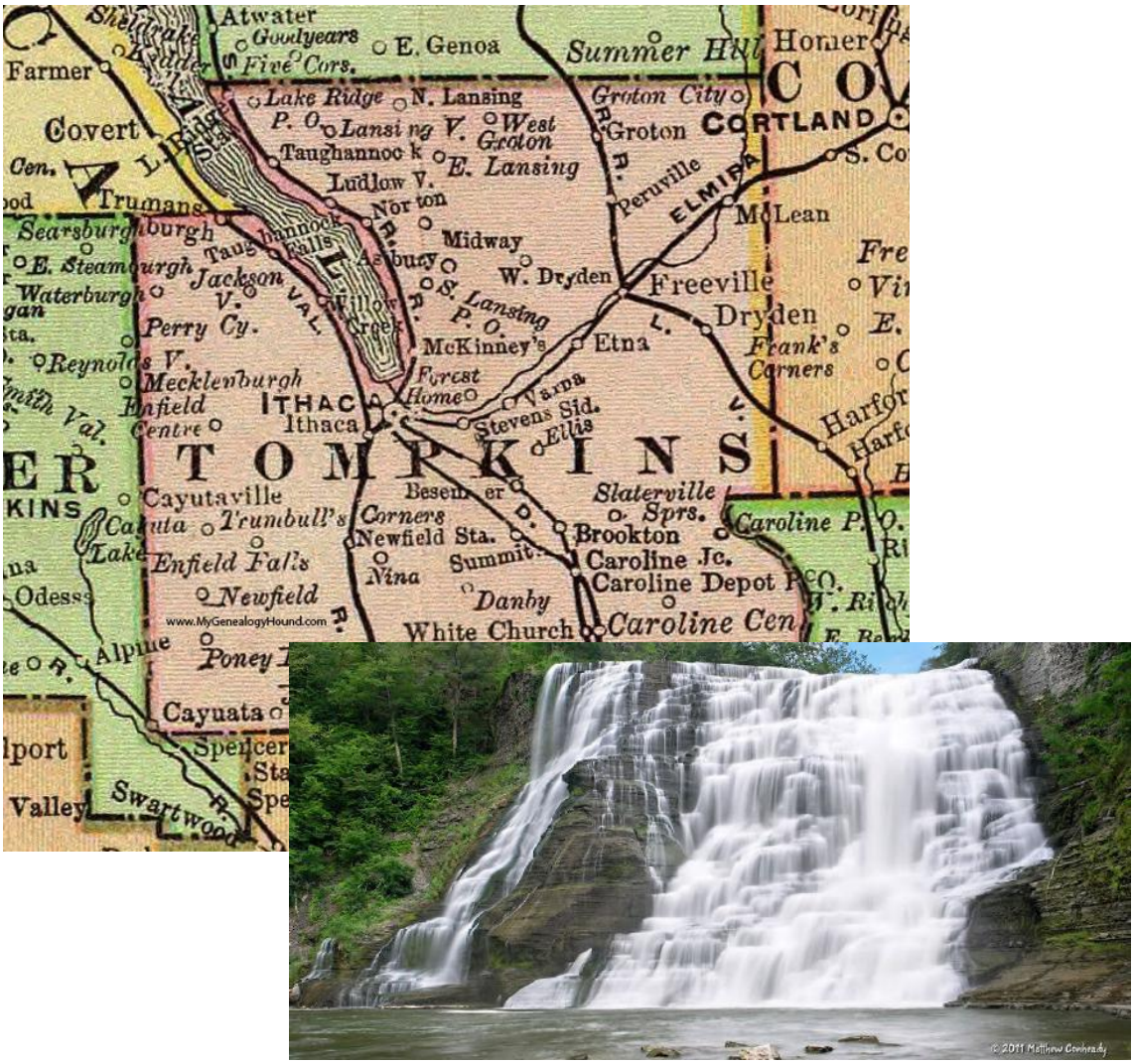
- ☐ A RRP, or similar plans are being considered or are in the process of being developed.
- ☑ Interconnections to other WWTF do not exist or are too remote.
- ☐ Interconnections to other WWTF could be possible with additional infrastructure and intermunicipal agreements.

APPENDIX C: TOMPKINS COUNTY RESILIENCY AND RECOVERY PLAN, WATER SUPPLY DROUGHT RESILIENCE TECHNICAL MEMORANDUM, FEBRUARY 2022

Tompkins County

Resiliency and Recovery Plan

Water Supply Drought Resilience Technical Memorandum



TETRA TECH

February 2022

Water Supply Drought Resilience Technical Memorandum

February 2022

PREPARED FOR

Tompkins County Department of Planning and Sustainability
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OVERVIEW

1.1 BACKGROUND

The *Tompkins County Hazard Mitigation Plan: 2013 Update* identified water supply as a vulnerable sector in need of further analysis. There are 16 municipalities in Tompkins County, ranging from rural towns and villages to the City of Ithaca. In general, the region is one of the less drought-prone areas in the state, but the frequency of abnormally dry to moderate droughts has increased since drought conditions began to be more closely monitored in 2000 and *ClimAID: The Integrated Assessment for Effective Climate Change Adaptation Strategies in New York Stat*e highlights the expected increase in drought events due to climate change. In 2016, Tompkins County experienced an extreme drought, bringing to light concerns with each of the county's three largest water purveyors—the City of Ithaca, Cornell University, and Southern Cayuga Lake Intermunicipal Water Commission (SCLIWC)—as well as with private groundwater wells. The 2016 extreme drought exposed potential vulnerabilities in countywide water resiliency.

The 2016 drought resulted in low stream flow to the City of Ithaca's reservoir between June and September. Reductions in available flow also occurred in Fall Creek, the water supply for Cornell University, and temporary water tanks were supplied to certain university customers for irrigation purposes, with water trucked from Cayuga Lake. Streams and shallow wells throughout the rural areas of the county dried-up over this period. SCLIWC, which draws its water from Cayuga Lake through its Bolton Point Water Treatment Plant, augmented water supplies to the City of Ithaca and Cornell during that period. While emergency distribution helped the City of Ithaca and standby distribution allowed Cornell University to respond to the crisis, each purveyor acknowledged that the drought exposed a variety of governance and infrastructure issues that need to be addressed in a coordinated planning effort.

The 2016 drought showed that governance and infrastructure improvements need to be addressed by the three large purveyors to reliably provide water in the areas that they serve. Additionally, any of the towns and villages in the rural areas relying on shallow wells are at risk due to droughts and the absence of a diversified source-of-supply.

1.2 OBJECTIVE

The objective of this technical memorandum is to analyze the redundancy of the countywide water systems and identify broad alternatives for creating a more resilient countywide drinking water supply. It provides the following:

- A preliminary identification of gaps regarding interconnection of the existing purveyors and clarification of the importance of interagency agreements.

- Identification of best practices to improve governance and to include recommendations to build drought resiliency in rural areas.
- Recommendations to address water resiliency on a more shared regional basis.

2. Study Area and Regional Agency Profiles

The majority of the population of Tompkins County is served by one of three water purveyors: City of Ithaca, Cornell University, or SCLIWC. These purveyors' interconnectivity is essential to the region's drinking water resiliency that relies on surface water. Creating greater connectivity between the purveyors can further increase available supply. The following sections describe the major purveyors and rural centers that represent the study area.

2.1 CITY OF ITHACA

The City of Ithaca is located in the center of Tompkins County at the south end of Cayuga Lake. The City of Ithaca Water Treatment Plant (rebuilt in 2016) draws water from Six Mile Creek at the 60' Dam Reservoir. Future demand is not currently tracked by the City, nor is it projected. The City Water Treatment Plant has a capacity of 55 million gallons per day (mgd) and a current average day production of 2.5 mgd. It currently serves 30,000 customers, including residents of the City of Ithaca and Town of Ithaca customers along Taughannock Boulevard including lakeshore properties along East Shore Drive and Taughannock Boulevard. The City also provides water to the Renwick Heights neighborhood.

Water availability has not historically been an issue in the City. However, there are potential issues that may affect the city's water reliability. Dredging and other maintenance tasks for the 60-foot dam at the reservoir are required for safety and to maintain or add capacity to the reservoir. Actions related to this are included in the City of Ithaca's Annex to the *Tompkins County Hazard Mitigation Plan: 2021 Updat*e and remain a significant cost concern to the City. During the drought in 2016, water was not released by the dam. Past monitoring data from the City shows that the reservoir is adequate to maintain supply for roughly 30 days beyond the point where water is no longer flowing over the dam.

The City of Ithaca water treatment plant recently underwent renovations as a part of its rebuild in 2016 to improve settling and filtration processes, providing more consistent water quality, and the distribution system was upgraded to increase distribution capacity to the Town of Ithaca.

2.2 SOUTHERN CAYUGA LAKE INTERMUNICIPAL WATER COMMISSION (SCLIWC)

The SCLIWC is a partnership of five municipalities receiving water through the Bolton Point Water Treatment Plant, drawing from Cayuga Lake. The Bolton Point Water Treatment Plant was built in 1976 and has a capacity of 6 mgd, a current average day demand of 2.6 mgd, and a maximum-day demand of 4.2 mgd. Water availability is typically not an issue. Supply is only constrained by the infrastructure and staffing available and any potential new agreements with existing and new members.

The water intake is approximately 3 miles north of Stewart Park, on the eastern side of Cayuga Lake, at a depth of 65 feet. During 2016, the Bolton Point system did not experience any restriction on its water supply. Short-term emergency interties[1] do exist between SCLIWC and the City of Ithaca and Cornell University during emergencies and planned maintenance periods. These interties were used to wheel water during the 2016 drought. The wheeling of water refers to the movement of water from one system to another through an intermediary system requiring interagency agreements.

2.3 CORNELL UNIVERSITY

Cornell University, located in northwest Ithaca, maintains the Cornell Water Filtration Plant. The filtration plant was built in 1928 and draws surface water from Fall Creek. The Fall Creek watershed has typically provided an abundant surface supply to a variety of users. The Cornell Water Filtration Plan utilizes just surface water. However, in 2016, flow in Fall Creek fell to below 10 cubic feet per second (cfs) (In the 96 years that the USGS has been monitoring flows in Fall Creek and the average low of 20cfs typically occurs in August; the average high (430 cfs) typically occurs in April; In some years the high reaches 4000 cfs) which severely constrained the Cornell Filtration Plant capacity and resulted in the need for temporary tanks on campus for water supply, among other measures.

The filtration plant has a capacity of 3.6 mgd and a current average day demand of 1.2 mgd. It serves a population of 33,000 on campus and in neighboring Cornell Heights area in the City of Ithaca and the Forest Home portion of the Town of Ithaca on the south side of Fall Creek. Because of the constrained service area, the majority of demand attributed to the campus, and conservation measures, demand has remained essentially flat despite campus population growth over the years.

2.4 RURAL TOMPKINS COUNTY

Water supply in rural Tompkins County is a mixture of private wells, local water districts, and, in part, the SCLIWC water district system. While water demand is currently met in normal years, the 2016 drought showed that water supply resiliency can be a concern during times of water stress due to reliance on single sources of supply and the isolated nature of the water districts. Supply to rural areas is limited by pumping and distribution infrastructure as some rural areas use a mix of private wells associated with small water districts and municipal wells. Figure 1 shows the water suppliers of Tompkins County.

Water demand for the urban and rural areas is shown in Table 1 which outlines the region's water supply infrastructure and frame it in the context of the region's layout and topography. Each of the main purveyors and outlying municipalities are compared, with rural areas separated into a separate subcategory. The distance from the terminal end of the SCLIWC system to the center of the respective rural center is listed to indicate how much effort would be needed to bring a transmission line to the area. In other words, the table indicates the quantity of water needed, the distance to the user, the elevation needed to pump, and the current demand, to provide an estimate of the distance required for water to the rural communities. Should connection to any of these areas be explored, Elevation from proposed receiving areas to the SCLIWC facility also puts into context what kind of pumping infrastructure would necessary.

[1] Physical connections between adjacent systems that can be used to share water in one or both directions depending on the agreed-upon operational parameters.

Table 1. Main Regional Water Purveyors, Demand, and Capacity

Purveyor Facility	Distance from SCLIWC system or existing intertie[2]	Elevation @ terminal end of transmission line (ft)[3]	Water demand (MGD)[4]	Treatment or Supply Capacity MGD	Water Source[5]
SCLIWC (Bolton Point)			4.23	6	Surface water (Cayuga Lake)
Ithaca (Town of)	--	368	--	--	Surface (Bolton Point), Individual & Public Well Water System
Cayuga Heights	--	300	--	--	Surface water
Lansing	--	1090	--	--	Surface Individual & Public Well Water System
Lansing	--	328	--	--	Surface water
Dryden	--	700	--	--	Surface water, Individual & Public Well Water System
City of Ithaca	Intertie with SCLIWC	-196	4.47	6	Surface Water (Six-Mile Creek)
Cornell University	Intertie with SCLIWC	240240	1.55	3.6	Cornell WFP (Fall Creek)
Sub-Total			***10.5***	***15.6***	
Town of Danby	4.4	932	0.03	0.14	Individual Private Wells & Public Well Water System
Village of Groton	5.13	1300	0.73	0.7	Individual Private Wells & Public Well Water System
Town of Newfield	4.75	1000	0.26	0.3	Individual Private Wells & Public Well Water System
Village of Trumansburg	1.2	365	0.40	0.72	Public Well Water System
Village of Dryden	6.5	489	0.32	0.6	Individual Private Wells & Public Well Water System
Village of Freeville	4.68	443	0.04	0.125	Individual Private Wells
Town of Caroline[6]	4.5	1044	0.33	--	Individual Private Wells
Town of Enfield[4]	3	512	0.34	--	Individual Private Wells
Town of Groton[4]	5.5	1090	0.58	0.7	Individual Private Wells
Town of Ulysses	Intertie with SCLIWC	381	0.49	0.2	Surface Water, Individual & Public Well Water System
Sub-Total			***3.58***	***3.48***	
Total			**14.1**	**15.6**	

[2] Distance from existing system or intertie to the center of the community

[3] Elevation of the system transmission point to the center of town to indicate the magnitude of pumping needed

[4] Designated estimated demand based on 100 gallons/capita/day average use

[5] The supply capacity sources, in some cases private wells only or a combination of known public and private well capacity

[6] Estimated demand based on 100 gallons/capita/day average use

Water demand and capacity reflecting local needs are shown along with the existing respective facility water source. Many rural areas rely on private wells, with the resulting demand difficult to fully capture. For some rural areas, demand was estimated based on local population. A total of available water demand of Tompkins County and available capacity from the three primary purveyors' capabilities is shown on the Total line in Table 1. This reflects the entire region's water demand and compares it with the capacity of the three major purveyors, reflecting a current county-wide surplus of 1.5 mgd.

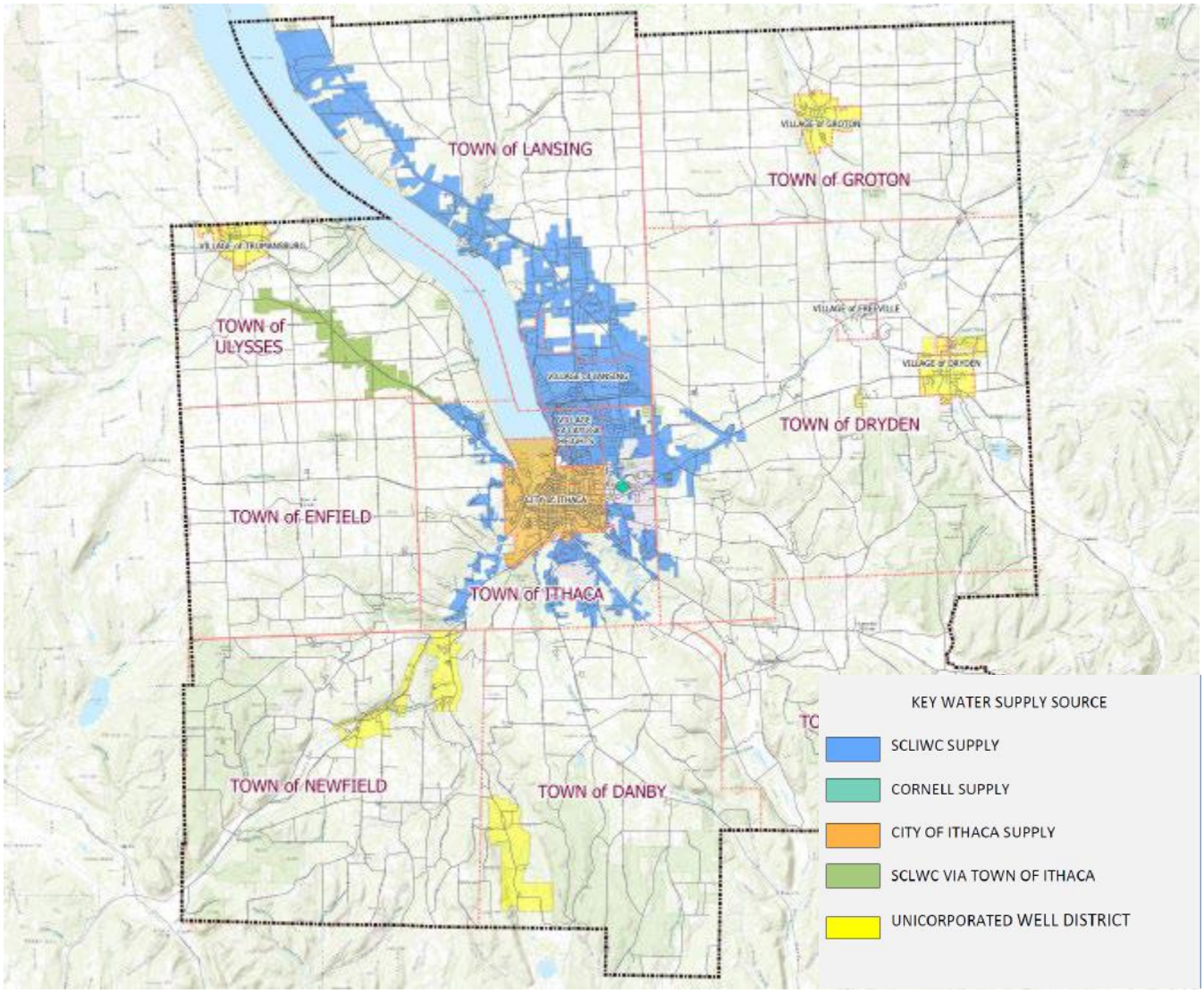


Figure 1. Tompkins County Municipal Water Suppliers

Source: T.G. Miller, David Herrick, IAED Water and Sewer Evaluation Update, December 2021

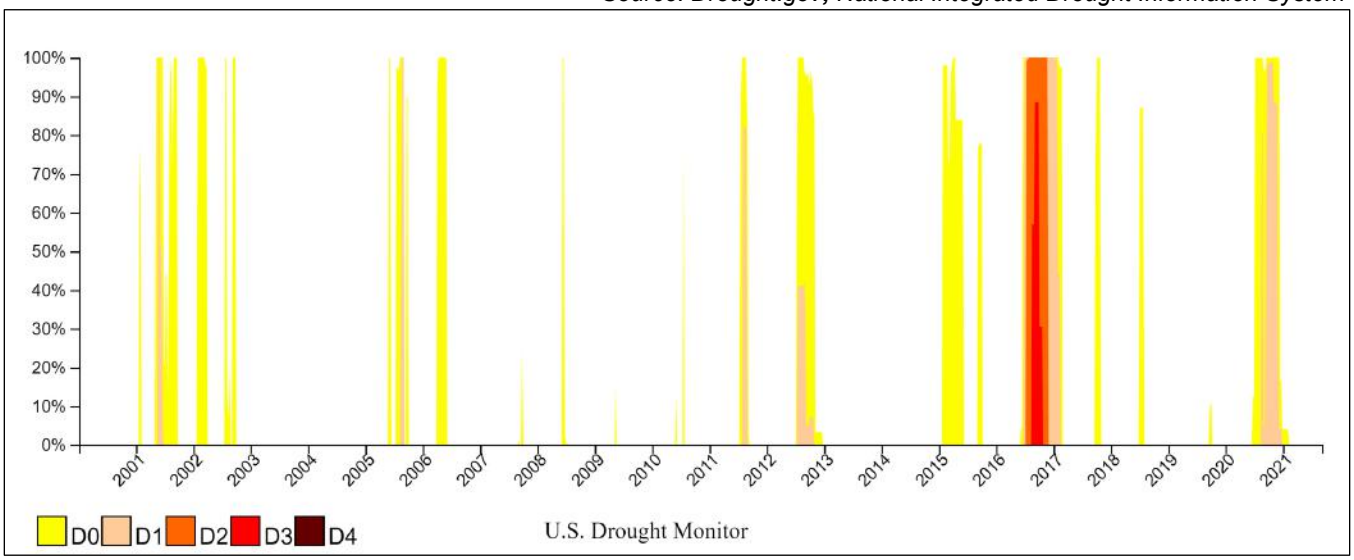
DROUGHT CONDITIONS

Droughts in Tompkins County historically occur with greatest effect between May and October. Abnormally dry periods are often observed, but severe or extreme droughts have not been typical. In general, New York State represents one of the historically more drought-resistant regions in the United States, however potential longer dry periods and drought concerns are suggested in the *ClimAID: The Integrated Assessment for Effective Climate Change Adaptation Strategies in New York Stat*e report. Tompkins County, similarly, is in a drought resistant region of New York positioned on the edge of Finger Lakes. Long sustained droughts are less prevalent, and groundwater levels are more stable, with quicker rates of recharge in Tompkins County than in other counties around New York State, due in part to the proximity of the Great Lakes. However, water quality issues should be considered in the event future drought conditions may create a reliance on Cayuga Lake, which may be increasingly affected by hazardous algal blooms due to climate issues.

3.1 HISTORICAL DROUGHT EVENTS

The U.S. Drought Monitor is a national map service that has tracked drought data since 2000. The Drought Monitor synthesizes drought data from local and national services (the Palmer Drought Severity Index (PDSI) and the State Drought Index, for example) to track and project drought periods. While the drought condition record is not long (going back only to 2000), what is available indicates a recent history of dry periods, as shown in Figure 2..

Source: Drought.gov; National Integrated Drought Information System



D0, D1, D2, D3, and D4 represent abnormally dry, moderate, severe, extreme, and exceptional droughts, respectively.

Figure 2. Historical Drought Severity—Percent of Tompkins County Experiencing Drought Level

The period of 2010 to 2021 reflects an increase in abnormally dry to severe and even extreme droughts. Figure 2 highlights the 2016 summertime drought as the most severe drought since the U.S. Drought metric began tracking

data in 2000. Indications are that water purveyors can expect to encounter more frequent future moderate to extreme droughts associated with climate change.

The U.S. Drought Monitor data can be put into greater context when one reviews the longer-term Palmer Drought Severity Index (PDSI). The PDSI has decades worth of data that estimates the moisture of a soil and related agricultural impacts. As shown in Figure 3, this data, shown as dry periods (yellow-red) and wet periods (green-blue), reflects that for the most of the past 50 years, wet periods have dominated. However, droughts are still a common occurrence, and should a sustained severe drought occur similar to the mid-1960s (the deep red portion shown in Figure 3), the water resiliency concerns in Tompkins County would be exposed. The 1960s period of drought was longer and of higher intensity than that experienced in 2016.

3.2 PREDICTED ENVIRONMENTAL AND WATER SUPPLY CONDITIONS

According to the National Oceanic and Atmospheric Administration (NOAA), Tompkins County falls in moderately to extremely wet climate categories, depending on location. NOAA classifies the local region as W1 to W3 for long term drought forecasts, as shown in Figure 4. This forecast synthesizes 6-month, 1-year, and 5-year precipitation data sets as a predictive tool to estimate future regional rainfall totals. The model has time limitations and only predicts gross yearly rainfall based on past history; it does not take into account wet and dry seasons in a localized climate.

Surface water in the next 1- to 5-year range is predicted to be abundant; however, rainfall is predicted to occur in fewer events with greater intensity. While winters are projected to be wetter, summer and fall are projected to see rainfall amounts decrease by 5 to 10 percent by 2050 (NYSERDA, 2014). The reduction in frequency and increase in intensity of rainfall may impact groundwater recharge in rural Tompkins County. The monitoring of groundwater levels will be important in the future to determine how changing rainfall patterns will impact aquifers. Even though precipitation is projected to remain high, the PDSI provides an indication of long-term drought. PDSI trends are projected to reflect the overall status of soil moisture to become drier, as shown in Figure 5. Both historic and projected data are shown with the historic PDSI data going back to 1950 shown for context (up to +6 very wet and down to -6 very dry), and a projected 5-year PDSI map of New York as prepared by the Cornell Cooperative Extension.

Source: Drought.gov; U.S. Drought Monitor

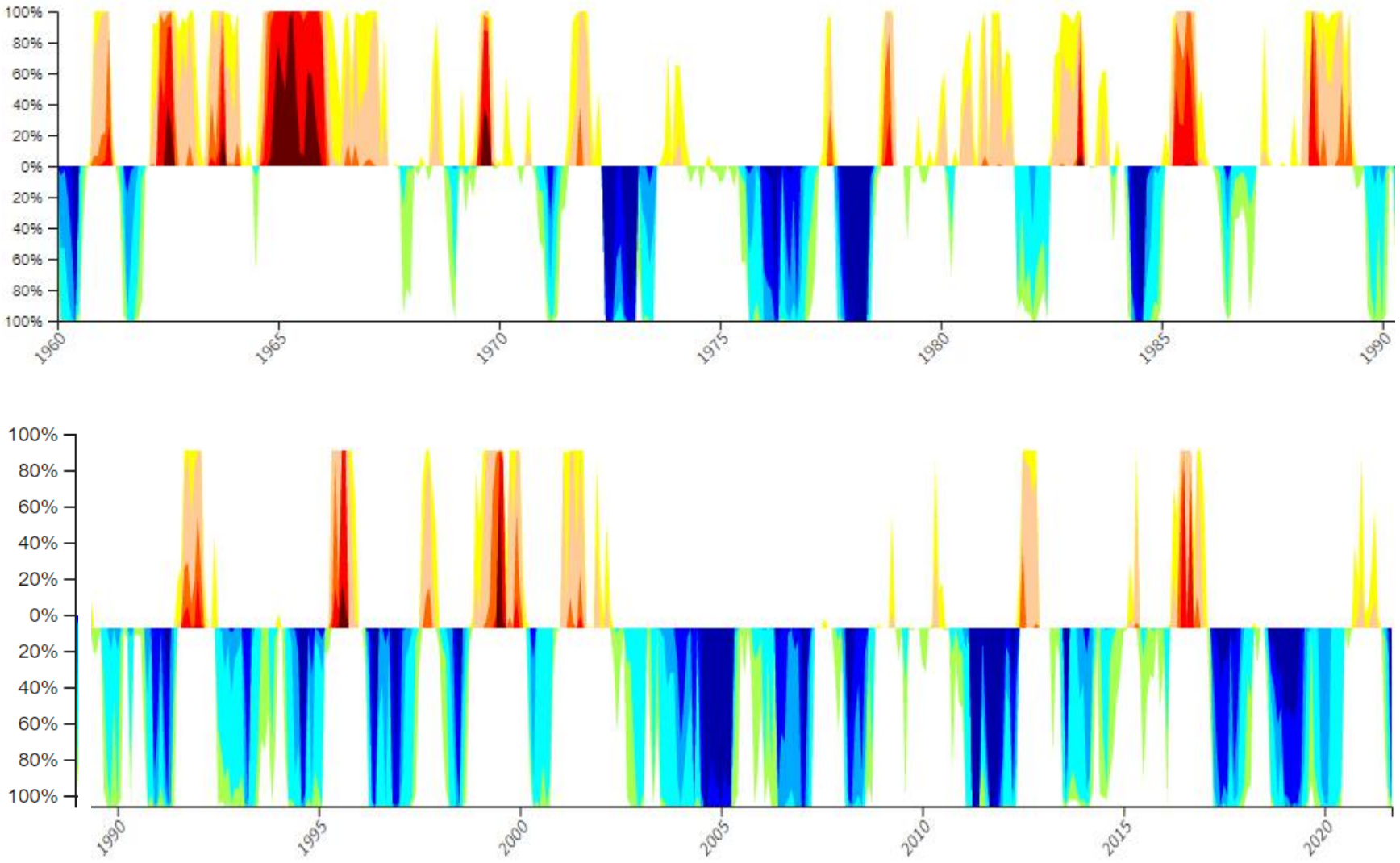
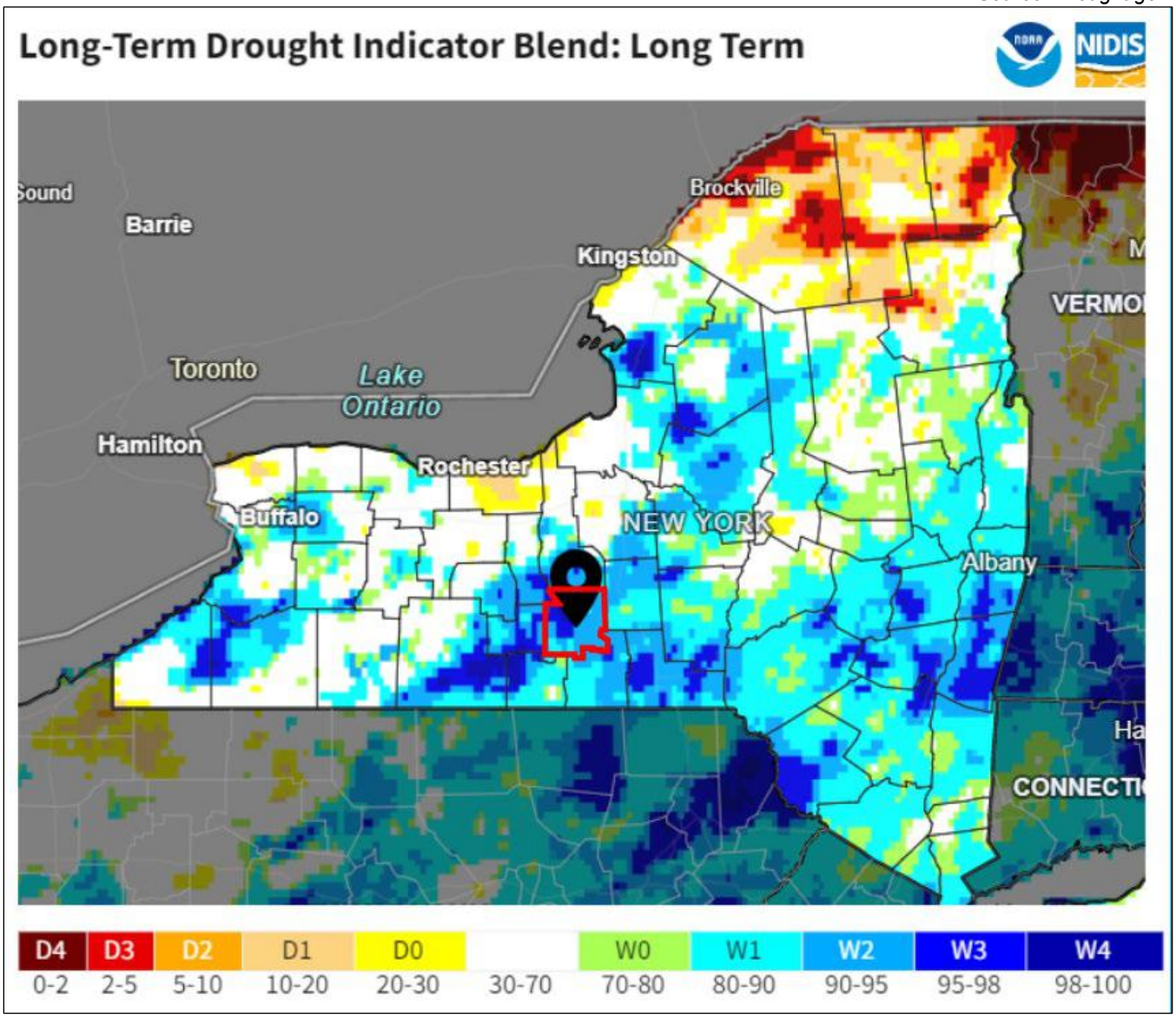


Figure 3. Past Precipitation—Percent of Tompkins County Experiencing Dry or Wet Period, 1950 – Present

(Blue/Green represents periods of time of high precipitation; red/yellow represents periods lacking precipitation)

Source: Drought.gov



Tompkins County Outlined in Red

Figure 4. Long-Term Precipitation 5-Year Forecast by NOAA Based on Total Rainfall

Source: Cornell Cooperative Extension

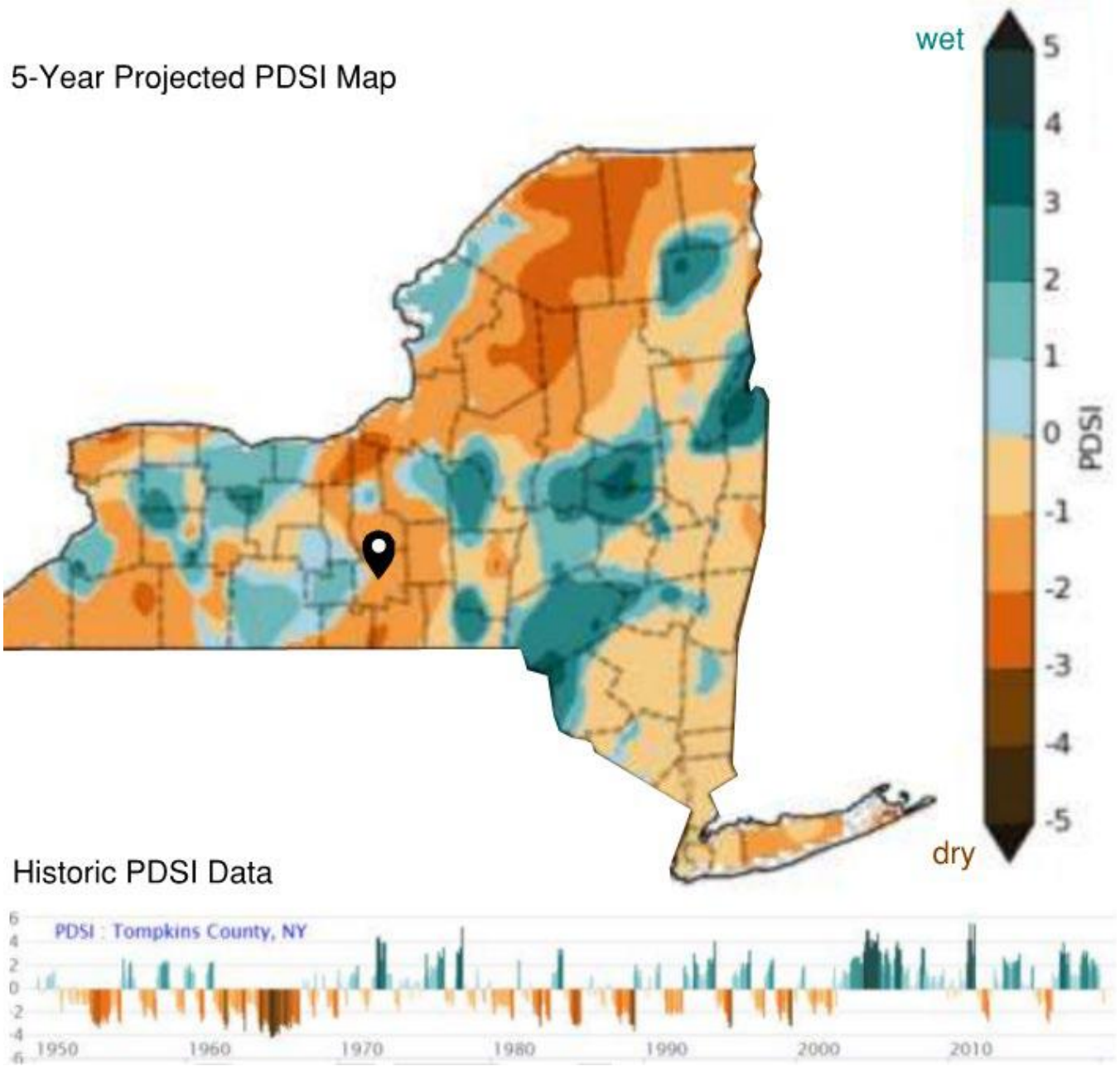


Figure 5. PDSI Data 5-Year Projection and Historical PDSI Data Since 1950

(PDSI Data 5-year Projection on Map; Historical PDSI Data Since 1950 on chart)

4. REGIONAL WATER SUPPLY INFRASTRUCTURE

Customers in Tompkins County receive their potable water by a combination of groundwater and surface water in both private and public municipal systems, depending on location. Some rural areas depend on direct pumping of groundwater from wells for water and are not incorporated into municipal service areas. These are often low population areas of the County, making districts and connections to existing water infrastructure difficult.

The county's three major water purveyors have some excess production capacity but are not physically connected via any distribution network to rural towns and villages for additional supply water.

4.1 GENERAL WATER QUALITY ISSUES

The wheeling of water depends on the availability of physical infrastructure to distribute, pump, and store the water. Compatibility of the water chemistry of different sources in terms of source water and treated water must also be considered. SCLIWC, the City of Ithaca, and Cornell University all use surface water sources that typically have compatible characteristics.

Beyond the raw water characteristics are seasonal changes to water chemistry that may occur. Water quality at Bolton Point and the City of Ithaca can be impacted by the occurrence of cyanobacteria harmful algal blooms (HABs). The source waters experience naturally occurring blooms significant enough to require treatment modifications. Per NYDEC, between 6/29/2021 and 10/7/2021, there have been 117 reports of HABs in Cayuga Lake in portions of Seneca, Seneca, and Tompkins counties. The issue of HABs occurrence has been proactively addressed within the plant to provide the necessary treatment as needed and the City of Ithaca will have a response tool in place in 2022. While the water is treated to be a safe potable water source, the acceptability of the water by the Cornell University and City of Ithaca systems should be confirmed before any investment in infrastructure.

One of the issues that arises in considering the wheeling of water by purveyors from the urban area to rural areas is that the rural areas predominantly use groundwater, which can have different chemical characteristics and can lead to a variety of issues when mixed with the purveyor non-groundwater sources. A thorough evaluation of mixing potential between the county's surface water sources and rural groundwater sources should also be analyzed. Incompatible water may dictate moving to a solely surface water source for some communities.

4.2 BOLTON POINT WATER TREATMENT PLANT AT VILLAGE OF LANSING

The Bolton Point Treatment Plant is the largest treatment plant in the county. Water capacity is limited only by what the plant can produce which is largely limited by staffing. Historically, there has not been a need for withdraws from Cayuga Lake beyond the permitted 6 mgd, nor have there been any limits placed on withdrawals.

The plant typically operates 18 hours per day on weekdays and 12 hours per day on weekends but is capable of 24/7 operation.

In addition to interties, pumping improvements would be needed in the City of Ithaca system, and likely Cornell University, to move water from the SCLIWC system to those systems. From there, water could be moved to other parts of the county. An engineered system study of options outlined in the *Ithaca Area Economic Development (IAED) Water and Sewer Evaluation Update, December 2021*would be helpful in getting a sense of precise improvement needs.

4.3 CITY OF ITHACA WATER TREATMENT PLANT

The City of Ithaca Water Treatment Plant draws water from Six Mile Creek. The City does not actively track or project water demand; however, current observed average day demand is 2.5 mgd. The treatment plant has a production capacity of 4 mgd. The plant was recently updated and rebuilt in 2016 to provide room for expansion of treatment up to 6 mgd and to include granular activated carbon. The City of Ithaca's raw water is high in manganese and sodium. While there are no regulatory issues, the high manganese has led to past customer complaints. In 2016 the system did receive brown water complaints largely tied to high manganese issues.

Available supply is not currently an issue; however, dredging projects for the dam and reservoir are an ongoing concern to maintain the storage capacity. While formal monitoring is not yet in place, staff report that water overtops the dam structure in typical years. However, it was noted that water did not overtop during the 2016 drought.

Currently, there is not an intertie from the City of Ithaca to the SCLIWC systems. An intertie is defined as a physical connection, typically paired with a use agreement, to allow for water to be supplied from one system to another to meet daily demand or specified for emergency use.

Currently, there is an existing one-way intertie from Cornell University system to the City of Ithaca. Cornell's system can provide water to the City during emergencies, maintenance evolutions, or projects, but that intertie cannot provide water to in the other direction due to hydraulic constraints the prevent adequate service pressure and fire flow.

Potentially, the City could help supply SCLIWC and Cornell with redundancy and some infrastructure improvements. An engineered system study of options referenced in the *IAED Water and Sewer Evaluation Update, December 2021*would be helpful in getting a sense of precise improvement needs.

4.4 CORNELL WATER FILTRATION PLANT

The Cornell Water Filtration Plant serves the campus of Cornell University as well as small parts of the City and Town of Ithaca. The Cornell Water Treatment Plant draws water from Fall Creek and historically has had reliable water supply. During the 2016 drought, temporary water tanks filled by water trucked from Cayuga Lake were supplied to certain customers on campus requiring irrigation, highlighting the lack of redundancy and existing infrastructure.

The Cornell University system has limited intertie capabilities with the SCLIWC system. These capabilities were added following the 2016 drought.

Cornell's system provides some redundancy to the City of Ithaca's system, as well as SCLIWC. An engineered system study of options outlined in the *IAED Water and Sewer Evaluation Update, December 2021*would be helpful in getting a sense of precise improvement needs.

4.5 RURAL AREAS

Rural areas that lie outside of the 3 large water purveyor service areas make up the majority of Tompkins County. Figure 6 outlines the infrastructure from Bolton Point to the outlying districts and indicates locations of regional storage tanks. The rural areas of the county rely primarily on groundwater for the source-of-supply. Current New York State standards require redundant source-of supply to meet demand and for that capacity be calculated assuming that the best producing well out of service or unavailable. A sample of available well data concerning location are shown in Figure 7 and quantified in Figure 8. Figure 9 is a summary of drilled well depths, with each point representing a well depth range of 10 feet. Please note: these figures represents only limited data from the New York State Department of Environmental Conservation's Well Water Program which collects well data from 2000-2021 and should be considered illustrative rather than an exhaustive well inventory.

While some of these noted wells are very deep, the median well depth is somewhere between 140 and 150 feet. The shallowest quartile of well depths is roughly 82 feet, with the shallowest at 23 feet deep.

To provide redundant water supply to wells the most reliable way to do that is to supply water to key rural locations from one of the major water purveyors. While the SCLIWC is best equipped in terms of capacity, source availability, and proximity, substantial capital investment would be required to provide a redundant water supply from SCLIWC to key rural locations. This would provide true redundancy by providing water from a unique secondary source. However, creating a regional redundant water supply requires addressing a number of potential issues. Questions that need to be addressed on a regional level include:

- How much water is available to meet demand?
- Are there surface and groundwater compatibility issues?
- Will local and state ordinances allow for regionalization of the water system outside of the current boundaries?
- Are there other unintended development impacts to an added build out of water systems?
- How does demand breakdown between domestic and agricultural uses? That breakdown will inform an approach to conservation.
- Are enough rural communities interested to make a regional redundant system financially feasible?
- Is the cost of capital investment justified by stakeholders to address only a periodic event?
- Operationally, switching to a regional surface water source as the primary supply and groundwater as a secondary source is preferred. I s that acceptable to all stakeholders?
- Are rate increases that would be required for regionalization of the water supply be acceptable?
- Does the climate change forecast alone justify the investment?
- Since Cayuga Lake use is not restricted by water right limitations does aquifer recharge make sense and does the geology make it an option?
- With the apparent infrequency of severe drought events and capacity in the Bolton WTP, is trucking potable water to rural users a suitable alternative to an acute crisis over capital investment? What needs to be in place to allow for a smooth roll-out of such a system in a crisis?

Table 1, found on page 5, shows categories to consider in order to understand the region's water supply infrastructure and frame it in the context of the region's layout and topography. Each of the main purveyors and outlying municipalities are compared, with rural centers separated into a separate subcategory. The distance from the terminal end of the SCLIWC system to the center of the respective facility is listed to indicate how much effort would be needed to bring a transmission line to the area. Should connection to any of these areas be explored, Elevation from the SCLIWC facility to the facility center also puts into context what kind of pumping infrastructure would necessary.

Water demand and capacity reflecting local needs are shown along with the existing respective facility water source. Many rural areas rely on private wells, with the resulting demand difficult to fully capture. For some rural areas, demand was estimated based on local population. A total of available water demand of Tompkins County and available capacity from the three primary purveyors' capabilities is shown on the Grand Total line in Table 1. This reflects the entire region's water demand and compares it with the capacity of the three major purveyors, reflecting a current county-wide surplus of 1.5 mgd.

Source: 2021 Bolton Point GIS

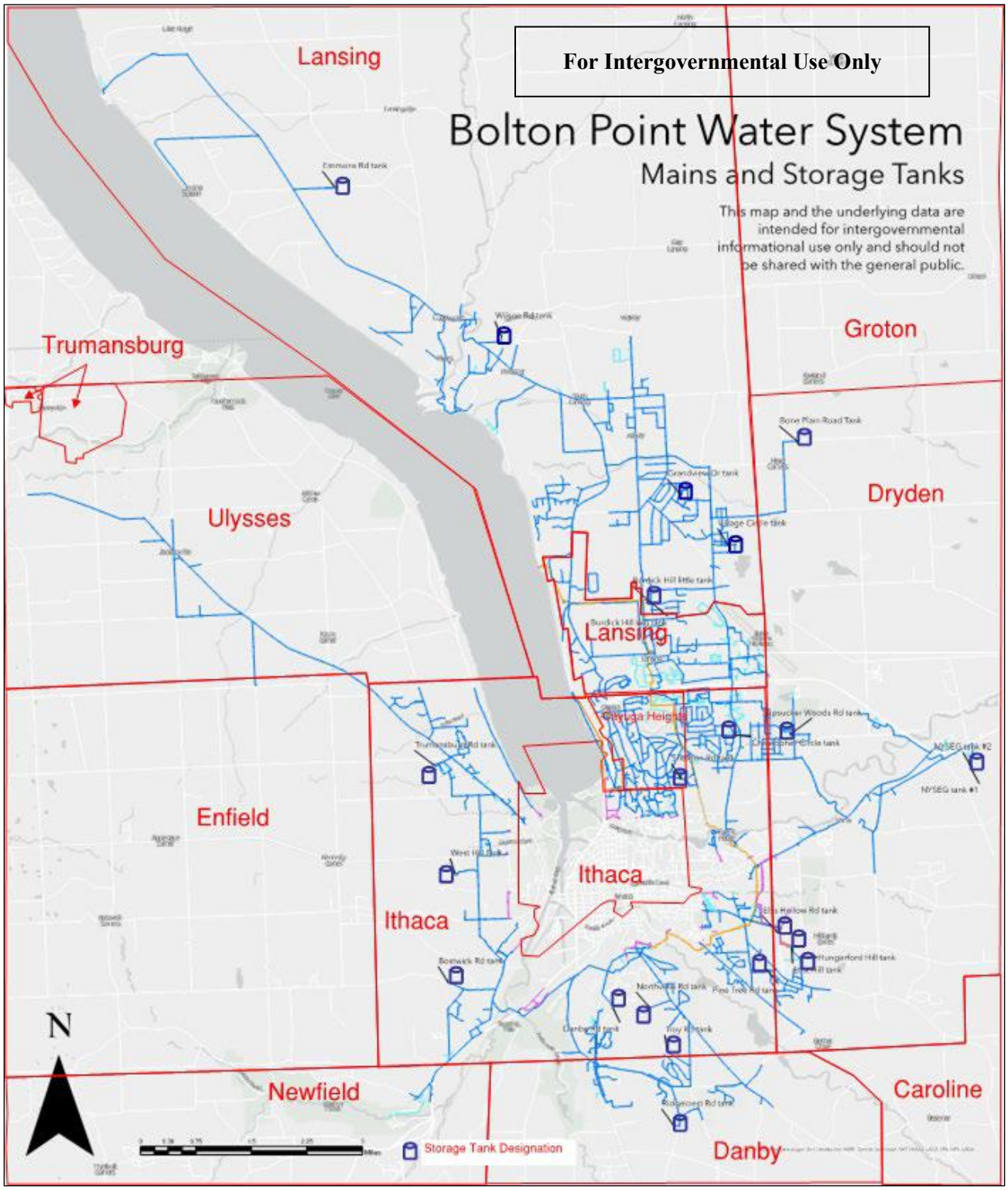


Figure 6. Bolton Point Transmission Line and Location of Storage Tanks

Source: 2021 Tompkins CountyGIS

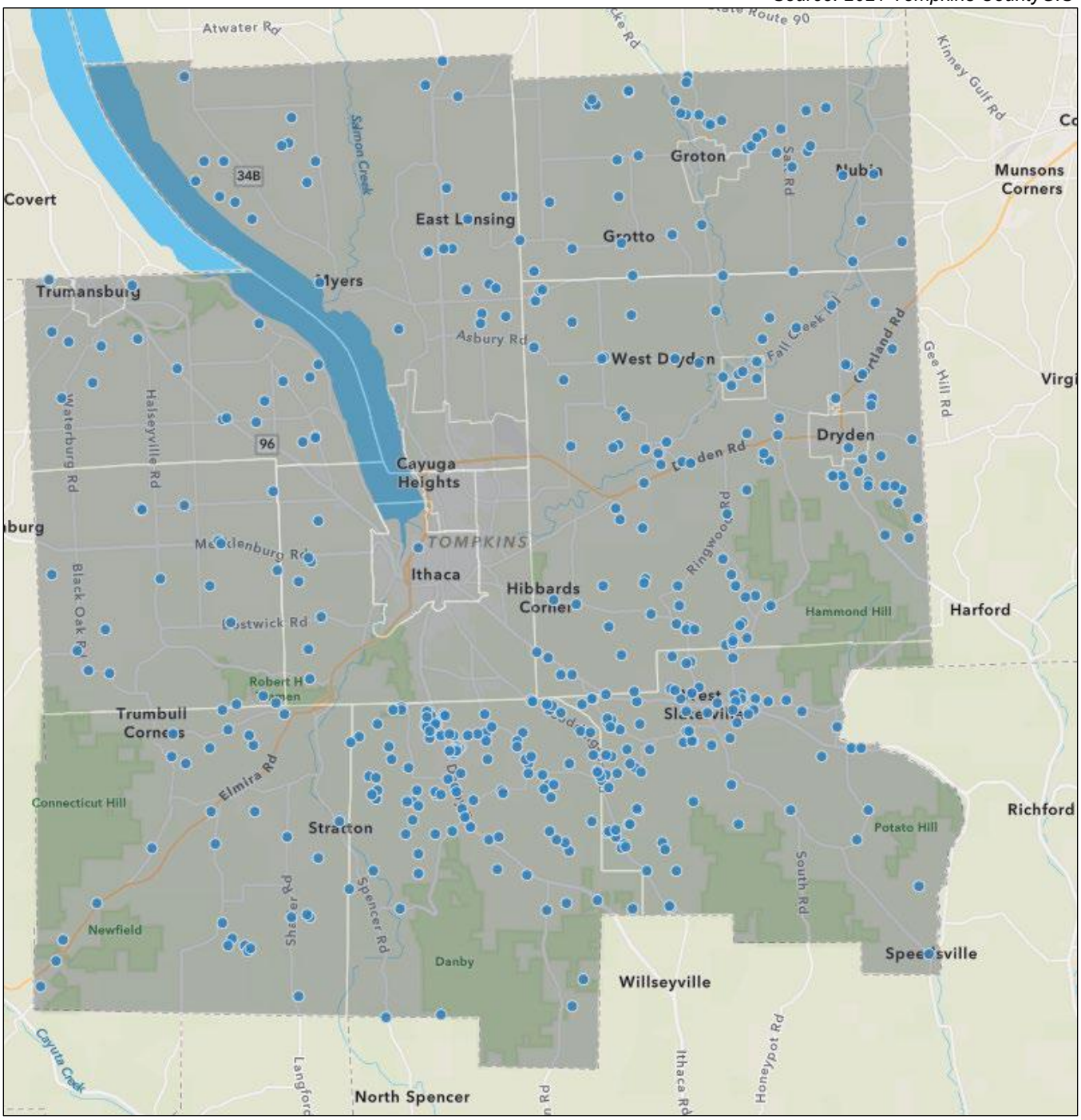


Figure 7. Water Well Program Data (NYSDEC) for Representative Private Well Locations in Tompkins County*

**Note: Not Exhaustive List of Private Data in Tompkins County, wells shown are those documented by NYSDEC from 2000-2021*

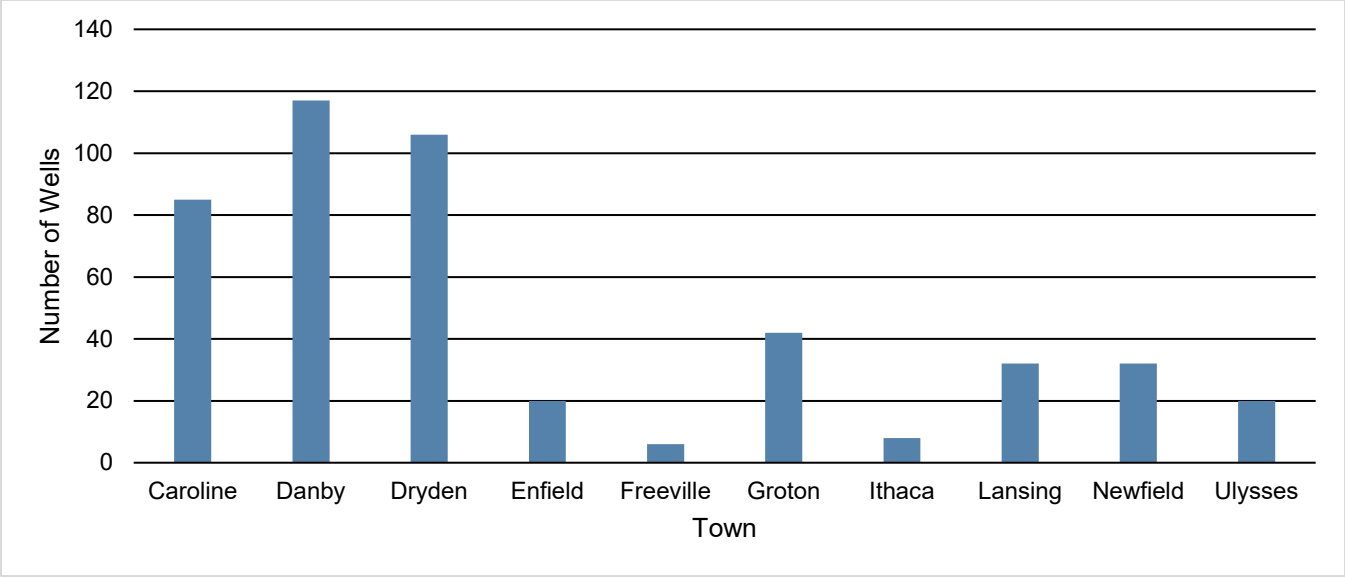


Figure 8. Representative Number of Private Wells per Town in Tompkins County Based on NYSDEC Water Well Program Data**

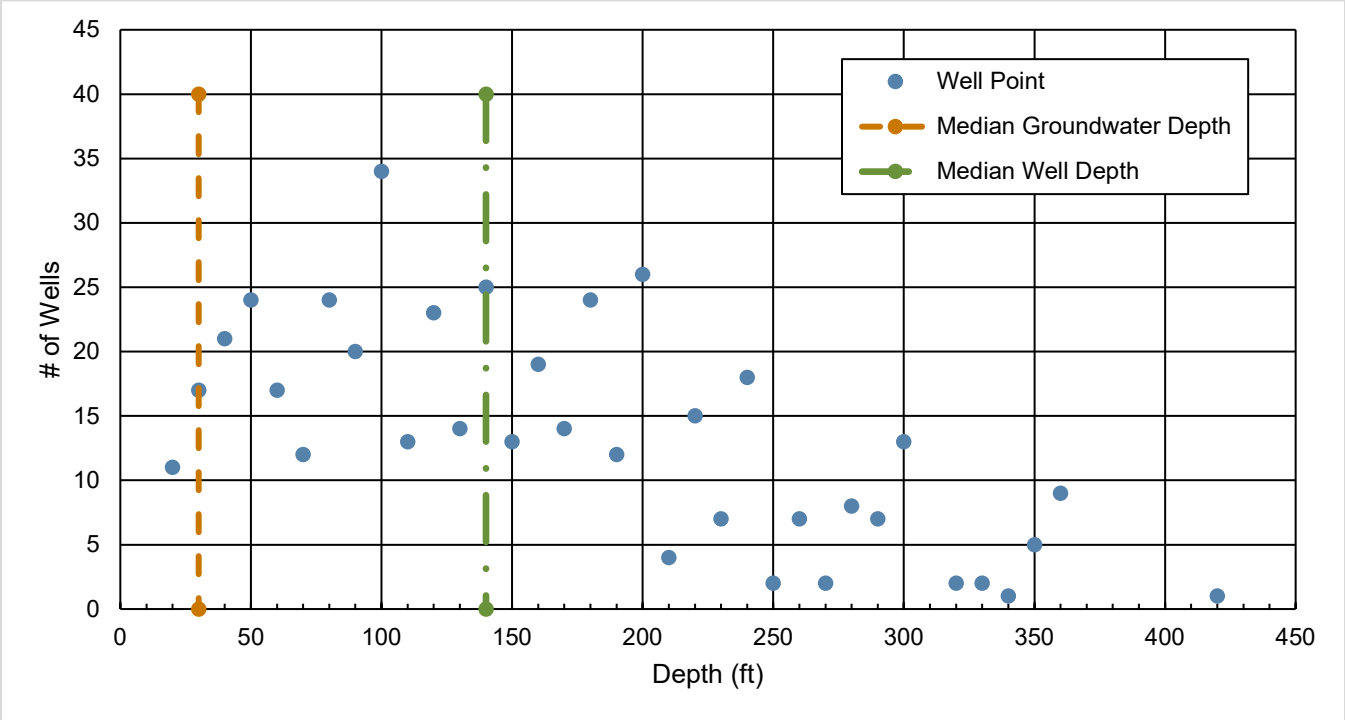


Figure 9. Representative Groundwater and Drilled Well Depths in Tompkins County Based on NYSDEC Water Well Program Data**

***Note: Not Exhaustive List of Private Well Data in Tompkins County, (2000-2021)*

5. EXISTING INTERAGENCY WATER SHARING AGREEMENTS

Currently, 9 of 12 municipalities that receive municipal water participate in inter-municipality service agreements. These agreements allow for redundancy in systems and increase water supply reliability and security. Currently 90 percent of water supplied from municipal systems is distributed between municipalities that operate under intermunicipal agreements, highlighting their prevalence and importance in the region.

As the largest water provider in the region, SCLIWC maintains interagency water sharing agreements that address the management of water use and with five municipalities, Cornell University, and the City of Ithaca. This agreement was finalized in 1986 and does not reflect current water quality and quantity concerns. Other agreements exist between the Towns of Ithaca and Ulysses; and the Town of Ulysses and Village of Trumansburg.

Intertie agreements are local and agency specific. Based on the findings of this technical memorandum it would be anticipated that as agencies negotiate the updating of existing agreements, and development of new agreements they could address issues of:

- Water quality
- Supply during HAB events
- Nature of the intertie (i.e., unidirectional, bi-directional, emergency use only, demand dependent)
- Intertie ownership and operation and maintenance responsibilities
- Duration of service
- Metering
- Pricing of supplied water
- Addressing the wheeling of water rather than operation for consumption

5.1 TOWNS OF ITHACA AND ULYSSES AGREEMENT

The SCLIWC has an existing transmission main stretching along the west side of Cayuga Lake which ends at the Pearsall Place Control Valve Building as shown in Figure 6.This enables the Town of Ulysses to receive water from the Town of Ithaca with the source from Bolton Point. The Town of Ulysses is not a member of the SCLIWC but has an agreement with the Town of Ithaca to provide water. This water supply serves Water District No. 3 in Ulysses and charges the 12-inch water main from the Woolf Pump Station in the Town of Ithaca. The agreement is for 159,000 gallons per day. A similar agreement also allows Water District No. 4 in Ulysses to draw 3,000 gallons per day to fill a 500,000-gallon Town of Ithaca Trumansburg Road tank.

5.2 TOWN OF ULYSSES AND VILLAGE OF TRUMANSBURG AGREEMENT

Water sharing agreements between the Town of Ulysses and Village of Trumansburg go both ways. The Village supplies two small Ulysses water districts with well water from the village's two existing wells. The Town of Ulysses has an agreement to receive Trumansburg well water to supply Ulysses Water District No. 2 via a 500,000-gallon tank. None of the current supply to Trumansburg comes from Bolton Point and all of it is well water, either from Ulysses or from the village's two main wells.

5.3 CORNELL UNIVERSITY, CITY OF ITHACA AND SCLIWC AGREEMENT

Sharing agreements exist between the trio of main purveyors for emergency allocations and all three purveyors have expressed interest in expanding those agreements. Since the 2016 drought, these agreements have been reviewed and ways to strengthen them were considered in the *Water Disruption 2016 After-Action Report* from Cornell University. While all three purveyors have indicated that expanded, updated agreements would be worth pursuing, none of the agreements have been modified at this time .

Existing agreements primarily address short-duration needs where water would be supplied from the Bolton Point Water Treatment Plant. These would include water deliveries to the City of Ithaca and Cornell University.

The longest disruption of service for which an agreement has been utilized was the recent rebuild of the City of Ithaca Water Treatment Plant, which lasted 354 days.

There are also agreements between Cornell University and the City of Ithaca. These agreements are quite limited in extent and cover limited areas in each other's jurisdiction.

There are currently no existing agreements between the SCLIWC, Cornell University, and Ithaca to send surplus water via pump station or other means to the Bolton Plant from either the City or Cornell systems for further distribution around the County. For example, distribution from Bolton Point to Ulysses and Trumansburg through aforementioned agreements or to supply any SCLIWC members during times of drought. This primary weakness in existing agreements is also reflected in the inability of water to be wheeled between either City of Ithaca or Cornell University Purveyors and the SCLIWC distribution network. Updated agreements between purveyors could increase daily production rates and boost regional supply capabilities.

In addition to written agreements, infrastructure connectivity has been considered. The SCLIWC Bolton Point transmission line has mains from the Bolton Point Water Treatment Plant to the Cornell Water Treatment Plant and into parts of the City of Ithaca. Additional infrastructure connectivity would likely still be needed for water wheeling purposes.

6. Opportunities and Needs to Address Regional Drought Resiliency

Opportunities exist to strengthen regional resiliency to droughts. These can be achieved through more robust water conservation measures, construction of infrastructure to facilitate the wheeling of water, and updating/negotiating interagency emergency water sharing agreements. These actions will extend the resources that are available and provide agreement on the decision making, manner, quantity, and conditions under which water assistance can be requested and provided. The inter-agency agreements are of particular importance, as all three major water purveyors indicated supply and availability of water is not the primary concern, but rather supply redundancy. If additional resources are needed in the rural areas and the extension of infrastructure is not possible another consideration is the drilling of deeper, potentially more resilient wells.

6.1 LEGAL AGREEMENT NEEDS

The City of Ithaca and Cornell University would benefit from new water sharing agreements since their supplies depend on surface water from streams (Six-Mile Creek and Fall Creek), which can experience low flows during dry periods.

Interagency agreements between SCLIWC and the City of Ithaca and SCLIWC and Cornell University may also help the Bolton Point and City of Ithaca Water Treatment Plants hedge against any disruptions in its system from the emerging HABs containments on Cayuga Lake. While the likelihood of drought impacting a water system is much higher than HABs, agreements and associated improvements that increase redundancy would still provide benefits to all county water users.

Being able to wheel water around the east, west, and south portions of the lake would increase resiliency for all parties. Sharing agreements between the appropriate agencies can help establish fair rate structures by which water providing entities are compensated for water provided to other agencies in the agreement.

Interagency agreements between rural municipalities and SCLIWC should also be explored. The possibility of providing additional water to those outlying communities that would require additional infrastructure to tie to the urban water systems. As SCLIWC owns tanks throughout the region, agreements with other municipalities could provide additional storage, redundancy, and resiliency to the rural area groundwater systems.

6.2 INFRASTRUCTURE EXPANSION

Infrastructure needs mostly involve physical connection between systems, including transmission, storage, and booster pumping. Another area of important infrastructure is expanding treatment capacity to allow for the enhanced regionalization to be processed at the receiving plant. Infrastructure improvements would go a long way

to improve redundancy but is also the most expensive. However, it also provides the opportunity for cost sharing for shared facilities. A more complete understanding of the opportunities and needs will require a more detailed analysis.

6.3 DEEPENING OF WELLS

It was reported that during the 2016 drought, rural groundwater wells began to drop or run dry. Groundwater sources are typically resilient against acute drought events. When they are not, it is an indication that the wells are shallow, which would not be unexpected in a typically water rich location as Tompkins County. Evaluation of well depth and geotechnical conditions is beyond the scope of this review; however, an evaluation of deeper aquifer availability – in part utilizing existing aquifer studies where available - is recommended to determine if more resilient groundwater supplies are available in the region. Drilling deeper wells is not inexpensive, but the availability of that deeper groundwater resource is important to know, and exploration could, again, be a shared cost when multiple communities could benefit. Investment in deeper wells is much more sound investment than other marketed improvements such as the unhelpful "injection" of wells which is a commonly marketed private solution.

6.4 CONSERVATION PROGRAMS

The first step in water resiliency is implementing conservation practices to best manage the existing resource. An emphasis on water savings is a clear option to help mitigate water demand across the County even outside of drought conditions. The Cornell University *After-Action Report on the 2016 Drought* points to conservation efforts reducing water demand upwards of 20 percent. It is unclear if this reduction was calculated as the result of water conservation or water restrictions. Conservation and education efforts have proven track records of working and can be inexpensive compared to infrastructure investment. Formal conservation programs and incentives in individual systems can have a benefit; however, regionally coordinated (countywide) initiatives can increase program success and spread the program cost. Best practices, including rate structures, are often highly localized. General planning steps are highlighted in water conservation program materials from the American Water Works Association (AWWA) planning manual (M52 and awwa.org/Resources-Tools/Resource-Topics/Water-Conservation) including guidance on:

- Water conservation rates
- Water use efficiency measures
- Community involvement
- Financing and pricing
- Conservation performance measurement, tracking, and reporting

6.5 DATA COLLECTION AND TRACKING OF WATER DISTRICT WELLS

Increased monitoring of groundwater in relation to active supply wells is another area that can provide information to users and water districts. Since so many towns rely on groundwater, having a record of which wells are expected to run dry first would be important step for developing emergency plans for when to pull from other sources. While this information exists for some areas thanks to regional USGS aquifer studies, increased aquifer level monitoring in towns and villages heavily dependent on wells will help inform future decisions on investments in infrastructure and agreements.

7. RECOMMENDATIONS

Based on the available data, infrastructure, existing agreements, and water resources, Tompkins County has a shared need to address the water resiliency, but there is not a regional structure in place to coordinate the entire county. To begin to address the issue, this technical memorandum recommends the following:

A) Establish a formal regional water providers' consortium (drought planning team) representing the key stakeholders committed to addressing the water supply issues on a regional (or even just Countywide) basis. Convene the consortium regularly to continue to progress the issues, needs and solutions. Suggested members of such a consortium would include:

- Tompkins County Environmental Health Department
- Tompkins County Department of Planning & Sustainability
- SCLIWC
- City of Ithaca
- Cornell University
- Rural center water providers
- State agencies including the Department of Environmental Conservation as appropriate

This consortium could initially address:

- Develop a regional profile of current and future demand and availability
- Determine if there are there surface and groundwater compatibility issues
- Support creation of updated interagency agreements between SCLIWC, the City of Ithaca, and Cornell University
- Address existing ordinances that currently prevent regionalization of the water system.
- Research the legal ability to provide backup water to key locations outside of current service area boundaries. If legal, identify any unintended consequences of such provision, including potential negative impacts to development, land use and the environment to creating a more regionalized water system
- Determine if rural community stakeholders are interested in a regional redundant system and if there is interest outline necessary infrastructure needed to support this
- Come to consensus as to whether the climate change forecast alone justifies the capital investment to address a periodic event
- Determine the cost sharing structure for capital investment, water rates, ownership, and operation and maintenance, etc.

- Determine if alternative, acute-drought solutions, such as trucking potable water to rural users, are adequate given the infrequency of severe drought events
- Evaluate well depth and geotechnical conditions or an evaluation of deeper aquifer availability to determine if more resilient groundwater supplies are available in the region.
- Increase monitoring of groundwater in active supply wells to provide drought information to users and water districts.
- Identify funding mechanisms to conduct an engineered system study for an interconnected regional system specifying specific infrastructure improvement needs
- Develop and prioritize a list of regional water infrastructure capital needs to provide water for participating stakeholders based on the *IAED Water and Sewer Evaluation Update, December 2021*
- Implement a regional water conservation program

B)) To maximize current supplies and reduce demands, and in turn potentially reduce the capital investment for regionalization, the consortium could begin to address coordinated regional conservation through the following:

- Define demand in terms of domestic, industrial, and agricultural uses. That breakdown will inform an approach to conservation.
- Develop and implement a regional conservation program.
- Draft and ratify an updated Intermunicipal Agreement in 2022 or 2023 to help support the coordinated transmission and compensation for longer term disruptions including drought that in particular allows for the potential of wheeling water through the SCLIWC, City of Ithaca, and Cornell University systems.
- Explore key funding opportunities for infrastructure improvements to allow water to be supplied from the City of Ithaca to SCLIWC
- Develop a regional water resource portfolio and the availability of additional resources such as available capacity from Cayuga Lake, the region's most reliable source-of-supply
- Analyze existing aquifer studies to determine more reliable groundwater resources, and as appropriate conduct further studies.
- Recommend that all water providers develop a water restriction protocol to implement during acute events when conservation is inadequate.
- Recommend that all water providers meter and calculate production, demand, water loss, and projection of future needs.
- Recommend that all water providers review existing interagency agreements, identify system-specific gaps and unaddressed needs, and update or create new agreements.

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