Southern Lewis County Regional Water Feasibility Study

Lewis County, New York

February 2017

(Issued Final – October 2018)

Project Administrator:
Lewis County
Department of Planning & Community Development

Study Participants:
Town of Leyden
Town of Lewis
Town of Lyonsdale
Village of Constableville
Village of Lyons Falls
Village of Port Leyden
Village of Turin

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Executive Summary

The public water systems in Southern Lewis County are at a critical juncture. Many components of the systems are very old, often dating back more than one hundred years. In recent history, only the most critical repairs and maintenance tasks have been performed, usually due to emergency situations or for regulatory compliance; and little, if any, preventative maintenance or system auditing has been performed.

This reactive approach has been due to economic conditions in the area. Industry has largely left the area; the population has started to decrease and is aging; and a high percentage of the population are on low and fixed incomes. Minimizing expenses has allowed the communities to maintain very affordable water rates for their residents, when compared to typical rates paid across New York State. The continued path of low rates and little investment is not sustainable. Critical upgrades and regulatory compliance tasks are needed simply to maintain the existing systems as they are. Continued changes to the regulatory environment and any opportunities to improve and/or expand on the systems will only increase costs moving forward.

Rather than continuing to operate independent of each other, the communities should work cooperatively to increase efficiency and maximize their overall buying power, while improving their systems individually and regionally. Funding agencies look favorably on communities working together, and those sources, along with increased water rates, will be crucial to the sustainability of the water systems throughout the region.

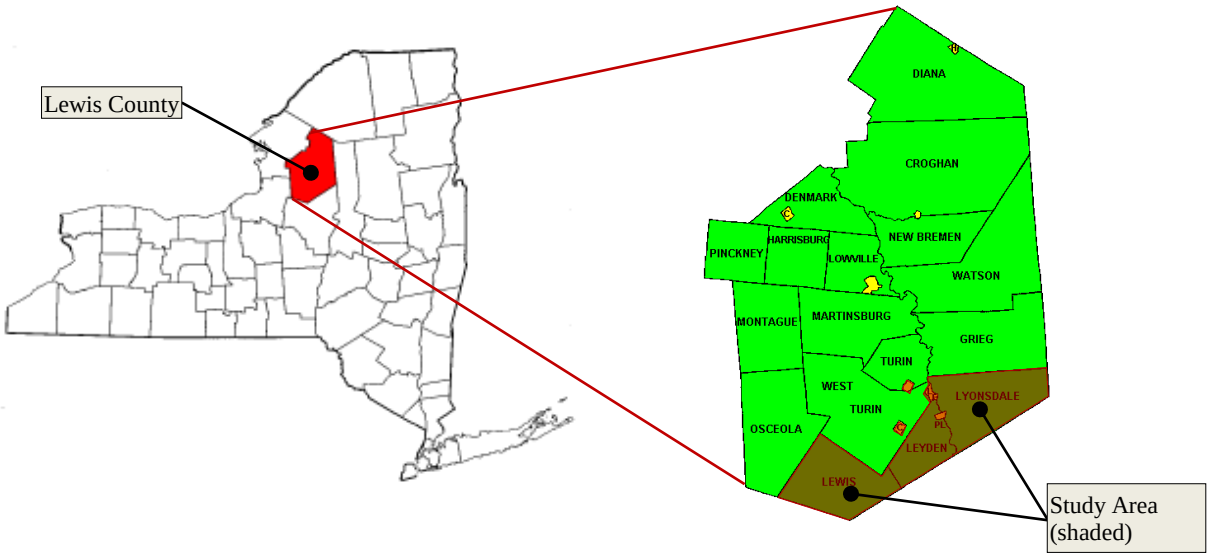
The recommended method to achieve these goals is the creation of a Regional Water Resources Agency, or similar entity, and/or the creation of a regional water district. The Agency can provide a centralized approach to the management, maintenance, and improvement of the water district and associated infrastructure. There are many scenarios that could be pursued which this study aims to explain. Ultimately, the individual communities will determine how much involvement and control they want to maintain over their systems.

An important takeaway of this study is that actions must be taken now in order to maintain the quality, availability, and sustainability of public water to current and future residents of the region.

1 Introduction

1.1 General

The focus of this study is the southern portion of Lewis County, NY. More specifically, the study area includes the Towns of Lewis, Leyden, and Lyonsdale; and the Villages of Constableville, Lyons Falls, Port Leyden, and Turin.



A list of abbreviations used in this report can be found in Appendix A.

In 1972, the County hired a consultant to analyze the various community systems and develop a strategic plan for providing potable water to meet public demands thorough 2020. Unfortunately, few, if any of the recommendations for the study area were implemented within the southern Lewis County area. A similar study was prepared by a different consultant in 2009 and little or no follow through occurred on the report's recommendations.

According to the DOH, there are eight public water systems within the study area. Four municipalities (Village of Constableville, Village of Lyons Falls, Village of Port Leyden, and Village of Turin) each provide potable water to residents and businesses through community water systems. Additionally, there are three non-community transient water systems (Hill Top Market, Milk Plant Tavern, and Tug Hill Hideaway) and one non-community non-transient water system (West Leyden Elementary School) within the study area. These water systems are identified in Table 1-1.

The DOH defines the different water system types as follows:

- Public water system: any entity which provides water to the public for human consumption through pipes or other constructed conveyances. In New York, any system with at least 5 service connections or that regularly serves an average of at least 25 people daily for at least 60 days out of the year is considered a public water system.
- Community water system: a public water system that serves the same people year-round.
- Non-community water system: a public water system that serves the public but does not generally serve the same people year-round.

- Non-community transient water system: a non-community water system that serves different people for more than six months out of the year.
- Non-community non-transient water system: a non-community water system that serves the same people for more than six months per year, but not year-round.

Understanding the water supply systems within the study area is essential to addressing any issues associated with their continued operation and viability as well as identifying potential areas where service could feasibly be extended or upgraded.

TABLE 1-1
NYS DOH PUBLIC WATER SYSTEMS (PWS) IN SOUTHERN LEWIS COUNTY (STUDY AREA)

PWS Name	DOH PWS ID	System Type	Total Population (from SDWIS)
Constableville Village	NY2402360	C-Community Water System	310
Hill Top Market	NY2430019	NC-Non-community transient water system	25
Lyons Falls Village	NY2402366	C-Community Water System	850
Milk Plant Tavern	NY2419025	NC-Non-community transient water system	50
Port Leyden Village	NY2402368	C-Community Water System	820
Tug Hill Hideaway	NY2405519	NC-Non-community transient water system	120
West Leyden Elementary School	NY2402985	NCNT-Non-community non-transient water system	250 (Approx. 160 per School)
Turin Village	NY2402369	C-Community Water System	350

In addition to the existing water service areas, an understanding of the regulations affecting public water systems is required to address issues associated with water quality and quantity within the study area. There are numerous regulatory and legal issues which affect the design, operation, and management of these systems. Appendix B contains a current description of the various regulations and programs, from both State and Federal Agencies, that impact water system design and operations.

1.2 Project Objectives

The objectives of this study are:

- Summarize and evaluate the existing public water systems throughout the study area and determine their existing capacity and general condition.
- Identify where upgrades or enhancements to existing public water systems are needed to maintain quality water supply to existing customers at an affordable cost; and to support distribution expansion or economic development opportunities.
- Identify areas where expansion is likely or needed; and promote economic development in areas where current systems can support development and growth is supported by the community in their comprehensive plan or other community-adopted land use plan(s).
- Identify strategies that can be employed to promote operational and cost efficiencies including determining the feasibility of developing a water resources agency, or similar type of entity, for providing a centralized location for shared services and resources.
- Stabilize water rates going forward. It's important to note that the goal of this study is not to reduce existing costs or water rates but to control future costs. Investing money now can translate to reduced cost increases later.

1.3 Statement of Need

The availability, quality, and sustainability, and quality of potable water are matters of concern throughout the study area. Approximately half of the study area population are served by the community water systems operated by the Villages of Constableville, Lyons Falls, Port Leyden, and Turin. The remaining half of the population are served by individual water systems (i.e. water from a dug, driven, or drilled well).

The existing community water systems have made varying levels of upgrades over the years to their treatment, distribution, and storage facilities in response to their age and deteriorating condition. However, upgrades are still required to replace antiquated infrastructure which has, in many cases, exceeded its useful life. Continued targeted investments in all systems are needed in order to continue to provide quality water to residents and encourage economic development, where feasible.

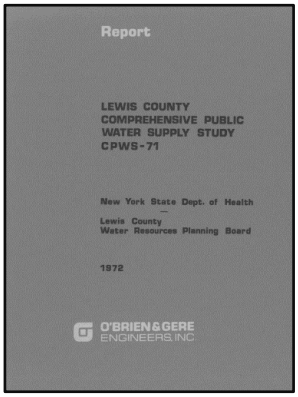
The water system operators for the communities are working part time to fulfill their operator duties while maintaining other jobs, some outside of their respective communities. There is an increasing amount of responsibility required of operators and an ever increasing number of rules and regulations to abide by.

Economic growth is likely to be limited to small areas, but the overall capacity of the water systems must be verified to meet or encourage any future development opportunities, should they occur. In addition, expanding water service to areas where water quality and/or service quality are poor and development is expected to increase will help to ensure the health and welfare of residents now and in the future.

The establishment of a centralized water resources agency, or similar entity, for investment, management, operation, maintenance, and long term planning for the study area could provide the vehicle for accomplishing the goals herein and ensuring continued potable water supply for residents.

1.4 Previous Reports / Studies

Lewis County Comprehensive Public Water Supply Study CPWS-71 (1972)
O'Brien & Gere Engineers, Inc.; Syracuse, NY



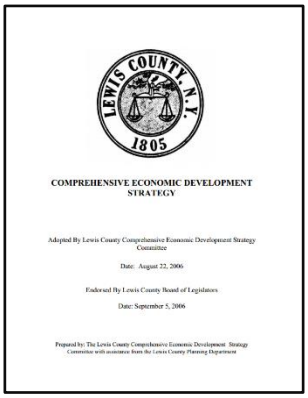
This purpose of this study was to develop a master plan for water supply in Lewis County. It included projections of population, water needs, and system improvements to the year 2020, evaluated all existing public water supply systems relative to DOH standards at the time, and made recommendations for improvements, where required. It further recommended the creation of four new water systems in hamlets throughout the County; one of which is within the area of this study (Hamlet of West Leyden). It evaluated the creation of an intermunicipal system connecting the Villages of Constableville, Lyons Falls, Port Leyden, and Turin water systems; the intermunicipal system was deemed too costly to justify the benefits.

'Village of Lyons Falls Water Supply System Study' (actual title unknown) (1991)
Bernier Carr & Associates, P.C.; Watertown, NY
This study was prepared to address the inadequacies of the Village water supply system, establish needed improvements, and provide cost estimates to upgrade the existing system to achieve compliance with current regulations at the time. A copy of the study was not found during the completion of this report. Its existence is known based on reference made to it in the 2009 report.

Comprehensive Economic Development Strategy (August 22, 2006)

Lewis County Economic Development Strategy Committee and Lewis County Planning Department

This plan served to establish a widely supported baseline for future economic development in Lewis County and was intended to be a living document which would be continually revised and updated. The report discussed the importance of adequate water supply and its associated cost as factors in stimulating economic growth. It highlighted the abundant natural water supply in Lewis County and the importance of water infrastructure to take advantage of the available supply.


COMPREHENSIVE ECONOMIC DEVELOPMENT STRATEGY

Adopted By Lewis County Comprehensive Economic Development Strategy Committee

Date: August 22, 2006

Endorsed By Lewis County Board of Legislators

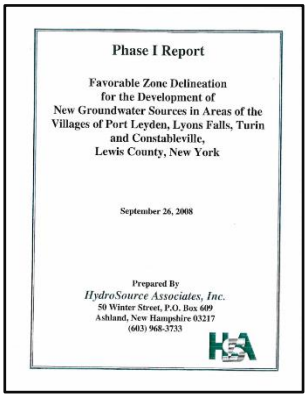
Date: September 5, 2006

Prepared by: The Lewis County Comprehensive Economic Development Strategy Committee with assistance from the Lewis County Planning Department

Phase I Report-Favorable Zone Delineation for the Development of New Groundwater Sources in Areas of the Villages of Port Leyden, Lyons Falls, Turin, and Constableville, Lewis County, New York (September 26, 2008)

HydroSource Associates, Inc.; Ashland, NH

This report was prepared to assess local hydrogeologic parameters and identify favorable areas for the development of high-yield, sand-and-gravel or bedrock groundwater sources capable of producing high-yield and sustainable potable groundwater supplies to serve areas of Lewis County. The report identified favorable zones that warranted more detailed groundwater exploration and development efforts, rationale for their selection, and recommendations for proceeding with further work in the zones.


Phase I Report

Favorable Zone Delineation for the Development of New Groundwater Sources in Areas of the Villages of Port Leyden, Lyons Falls, Turin and Constableville, Lewis County, New York

September 26, 2008

Prepared By
HydroSource Associates, Inc.
50 Winter Street, P.O. Box 609
Ashland, New Hampshire 03217
(603) 968-3733

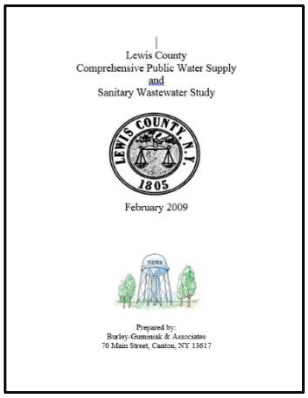
Lewis County Comprehensive Public Water Supply and Sanitary Wastewater Study (February 2009)

Burley-Guminiak & Associates; Canton, NY

This study was prepared to update the 1972 study while taking into consideration changes in the New York State and EPA drinking water regulations; and gains in the technology related to the supply, delivery, monitoring, and testing of potable water systems since 1972.

Recommendations in this report included:

- District formation for outside users
- New water districts
- Review of DWSRF applications
- Mapping of watershed protection areas
- Coordination with DANC for operational assistance
- Well exploratory program

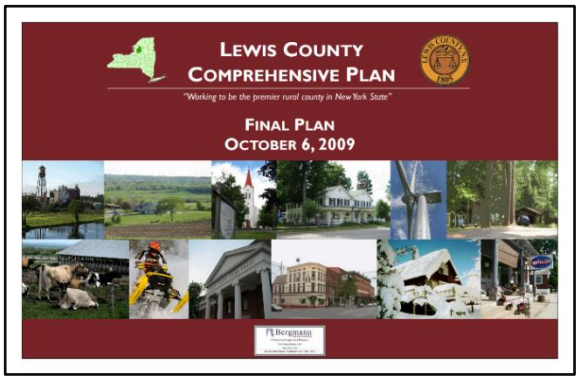

Lewis County
Comprehensive Public Water Supply
and
Sanitary Wastewater Study

February 2009

Prepared by:
Burley-Guminiak & Associates
70 Main Street, Canton, NY 13617

Lewis County Comprehensive Plan (October 6, 2009)
Bergmann Associates; Rochester, NY

The purpose of this plan, like any comprehensive plan, was to provide an overall framework for future public and private investment and decision making in the county. The intent of the plan was to articulate an overall vision for the county and the means to achieve the objectives set forth in it. Significant effort was taken to provide a level of continuity across the county. Two 'high priority' recommendations of the plan were to implement the recommendations of the county-wide water study and to encourage adjacent towns and villages to consider consolidating water operations.



1.5 Regional Coordination

Regional coordination is a recurring high priority of the Comprehensive Plan including the following policy statement from the plan:

> *"Lewis County will be a leader in Upstate New York for inter-governmental cooperation and strategic partnerships. The county has a large geographic area with low population densities and some communities lack the critical mass to support all the desired services of its residents. Therefore, we must leverage our collective assets rather than compete or exist independent of one another. We recognize that constrained budgets at every level of government require us to make difficult choices. As such, we will engage in meaningful dialogue across municipal boundaries, and continue to engage entities with regional significance such as the Tug Hill Commission, Adirondack Park Agency and Fort Drum. These efforts, both formal and informal, will result in increased efficiencies, improved health and well-being, and benefits that are irrespective of physical boundaries."*

Refer to Appendix C for a summary of the above statement; and related objectives and action items which this study aims to progress.

Economic Development along with the retention of agricultural industry, existing businesses, residents, and tourism; as well as the attraction of new businesses and residents to the region are all critical to the future of the County. Infrastructure improvements such as the dependability and availability of public water are critical to, and greatly increase the potential of, successfully achieving the above goals.

Expansions to water systems, new water systems, and any potential local economic development opportunities that arise need to be balanced with the overall development and character goals of each community to ensure any expansions or potential developments are consistent with local plans.

1.6 Community Character

The study area is a very rural region, even relative to the rural nature of Lewis County as a whole. The majority of the study area is forest and farmland with small areas of rural living and even smaller village areas. Agricultural and related businesses are central to the region's identity and economic base. Much of the area, mainly the parts within the Black River Valley, are part of the Lewis County Agricultural District 6. Though public water supply is not generally required by agricultural users, it is sometimes preferred to individually developing the required well water supply. There are also several outdoor

tourism and recreational opportunities in the region which attract visitors including snowmobiling, boating, hunting, fishing, hiking, and camping. The Comprehensive Plan makes note of a lack of adequate lodging for the area to fully capitalize on its tourism potential. Lodging development in particular requires a significant amount of potable water, and public water supplies are highly desirable to hotel and motel developers.

1.7 Population Projections

General

In order to comprehensively assess water needs within the study area, it is important to understand several issues that impact the water systems, particularly population. A review and analysis of the population trends and their implications on the demand for water was conducted as part of the 1972 and 2009 comprehensive water supply studies. Although this information is useful for historical background and reference, populations have recently been recalculated based upon the completion of the 2010 census and these new numbers will be utilized, where possible.

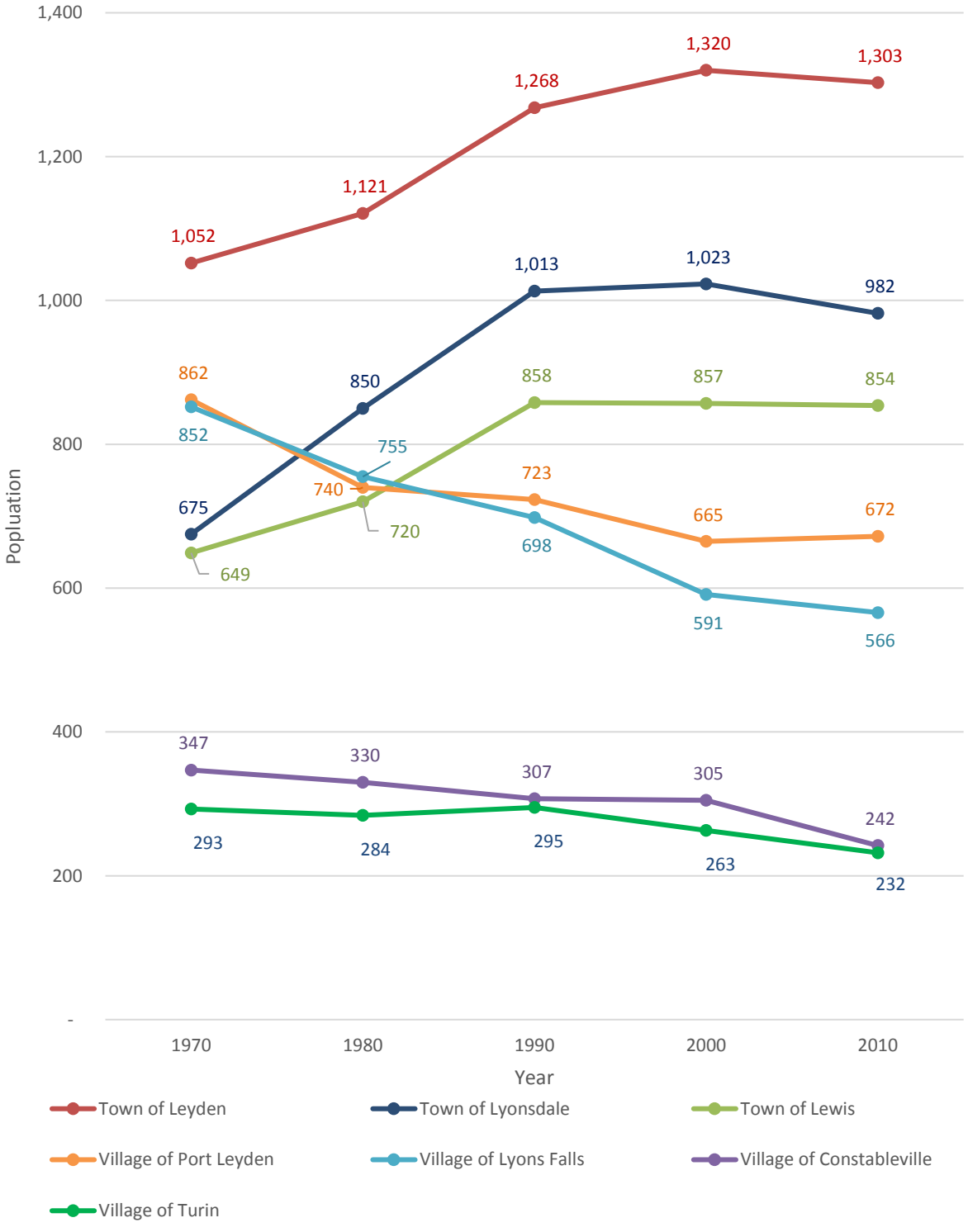
This section estimates the magnitude and location of future water supply needs of the study area for a 20-25 year planning period. Existing population projections were analyzed for Lewis County and compared with historical trends among the municipalities within the study area. Future demands were then calculated based on estimates of population served by community water systems.

Historical Trends

Lewis County was formed in 1805 from land that was, to that point, part of Oneida County. The population of Lewis County grew quickly from the time of its creation (pop. 6,433 in 1810) to about 1860 (pop. 28,580 in 1860) and peaked before the turn of the 20th century (pop. 31,416 in 1880). The population declined steadily for several decades (pop. 22,521 in 1950) before beginning another growth period until the turn of the 21st century (pop. 26,796 in 1990). Since 1990, the population has changed very little with growth of around 0.5% in each of the last two censuses.

The population within the study area has closely mirrored the overall county since 1970, peaking in 1990 at 5,162. The population was 4,851 as of the 2010 census. When separated, the individual Town and Village populations within the study area show different trends. The four Villages have declined steadily and averaged approximately 27% decrease since 1970. The three Towns (excluding the Village populations) all grew at similar rates through 2000 before beginning a very slow decline; overall averaging an approximately 32% increase since 1970.

FIGURE 1-1
HISTORICAL POPULATION DATA

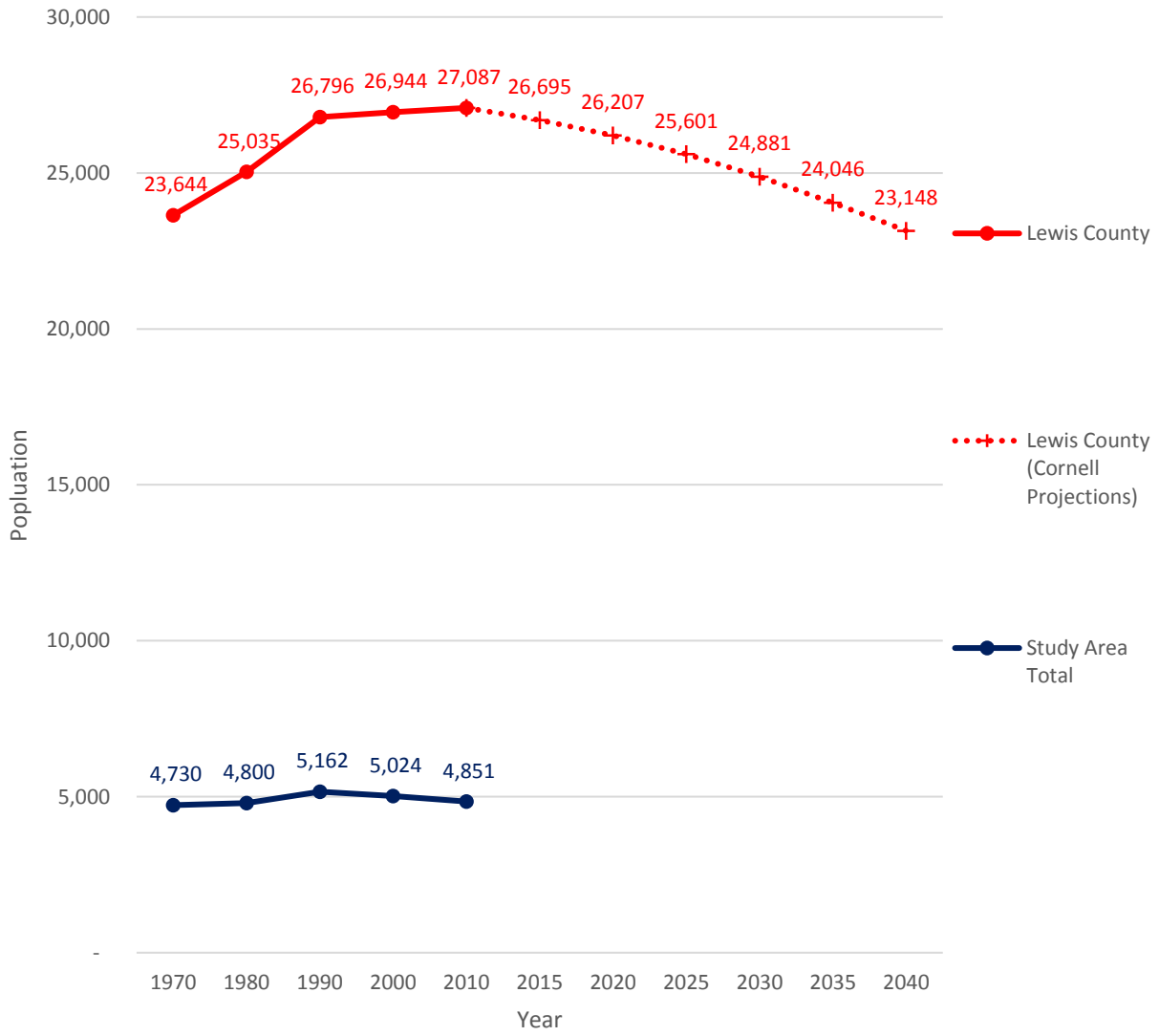


Notes:
1. The Town of Leyden population excludes Village of Port Leyden population within the Town.
2. The Town of Lyonsdale population excludes Villages of Lyons Falls and Port Leyden populations within the Town.

Population Projections

Population projections were obtained from PAD. PAD provides data gathering and analysis for a variety of organizations throughout NY State, working closely with the DOL, the U.S. Census Bureau, and other organizations. The projections were done in 2011 in five year intervals to the year 2040. The projections are based on rates of change estimated from historic data, meaning that they reflect what would happen if the rates of population growth and decline stay as they were. They are not predictions of future conditions but are meant to gain insight into what might happen if the future looks like the past. All projections, regardless of their base data, still contain uncertainties regarding assumptions of national and local socio-economic conditions, as well as location of major employment centers or other projects which influence population growth.

FIGURE 1-2
POPULATION TRENDS AND PROJECTIONS



As a whole, Lewis County is projected to begin a steady decrease in population. The study area peaked around 1990, about 20 years earlier than the expected peak for the county as a whole. The population projections shown in Table 3-1 are based on the PAD data and include age group breakdowns. The 25-44 age group, commonly associated with home buying and young families, is expected to decrease, while the 65 and over group is expected to increase. This is consistent with many other rural communities and a common trend occurring statewide as the baby-boomer generation continues to age.

TABLE 1-2
LEWIS COUNTY POPULATION PROJECTIONS (PAD)

Age Group	1990	2000	2010	2015	2020	2025	2030	2035	2040
0-4	2,244	1,655	1,776	1,575	1,521	1,442	1,385	1,345	1,302
5-14	4,657	4,351	3,683	3,766	3,665	3,459	3,334	3,207	3,108
15-24	3,634	3,566	3,423	3,152	2,986	3,019	2,907	2,764	2,640
25-44	8,133	7,588	6,269	6,180	6,039	5,847	5,548	5,315	5,094
45-64	4,894	6,074	7,860	7,697	7,191	6,469	6,026	5,901	5,770
65 plus	3,234	3,710	4,076	4,325	4,805	5,365	5,681	5,514	5,234
85 plus	345	443	544	592	609	585	606	674	776
TOTAL	26,796	26,944	27,087	26,695	26,207	25,601	24,881	24,046	23,148

Population projections typically anticipate the following assumptions:

- Infrastructure improvements in terms of water, wastewater, and transportation needs will be able to keep pace with demands.
- The regional economy will remain viable and quality of life issues continue to keep pace with the County's housing demands.
- Higher density growth will occur around existing centers. This may receive greater emphasis as communities struggle with the cost of infrastructure upgrades and expansions.
- No new major employment facilities will be established in outlying areas.
- Environmental constraints and zoning to preserve rural agrarian communities will continue to play a major role in development patterns and population densities.

1.8 Water Demands

General

The primary focuses of water demand projections are the larger public water systems within the Villages of Constableville, Lyons Falls, Port Leyden, and Turin because they are the largest consumers of public water resources in the study area. The expansion of these systems and the construction of new public water systems to serve other population centers and/or anticipated changes in population will form the basis for water supply planning in southern Lewis County.

Current Water Demands

Existing water usage is based on records obtained from the water systems during the development of this study and comparisons to the 1972 and 2009 studies.

TABLE 1-3
2015 WATER USE

Municipality	Water Source	Population Served (from SDWIS)	DEC Permitted Water Withdrawal (GPD)	2015 Average Daily Flow (GPD)	2015 Maximum Daily Flow (GPD)	Per Capita Average Daily Water Use (GPD)
(V) Constableville	Smith Springs	310	NA	62,778	130,021	203
(V) Lyons Falls	Burnt Shanty Road Wells	850	313,000	145,052	241,500	171
(V) Port Leyden	Holmes Road and Moose River Road Infiltration Galleries	820	120,000	153,258	225,000	187
(V) Turin	Charles Street Wells	350	108,000	42,273	98,700	120
West Leyden Elementary School	Well	250 (Approx. 160 per School)	NA	Unknown	Unknown	Unknown

TABLE 1-4
HISTORICAL PER CAPITA AVERAGE DAILY WATER USE (GPD)

Municipality	1972 Report	2009 Report	2015
(V) Constableville	198	161	203
(V) Lyons Falls	145	165	171
(V) Port Leyden	116	146	187
(V) Turin	191	171	120

75 GPD per capita is generally accepted as a standard usage rate. A few factors are affecting per capita water use, causing values to be higher than expected:

1. Three of the four villages do not meter their water use (Turin does) and therefore users are likely not taking sensible measures to conserve use.
2. Very old infrastructure is likely causing abnormally high leakage levels.
3. A large number of dairy cattle are present in the Constableville and Turin systems. Typical water use per head of cattle ranges between 30 and 50 GPD.

TABLE 1-5
EXPECTED VS. ACTUAL WATER USE

Municipality	Approx. Population Served (from SDWIS)	Approx. Head of Cattle	Expected Water Use (GPD) (75 per person + 40 per head of cattle)	Actual 2015 Average Use	Estimated Excess Use and Leakage (GPD)	Estimated Excess Use and Leakage Rate
(V) Constableville	310	800	55,250	62,778	7,528	12%
(V) Lyons Falls	850	0	63,750	145,052	81,302	56%
(V) Port Leyden	820	0	61,500	153,258	91,758	60%
(V) Turin	350	200	34,250	42,273	8,023	19%

Future Water Demands

Future water supply estimates were determined based on current water demands and county population projections compared to the population currently served in each system. 2015 Average Daily Flows were used as a baseline for determining projected water uses. Flows in excess of 75 GPD per capita were not adjusted in order to account for water uses not affected by population changes (i.e. system leaks, testing, and non-residential uses).

TABLE 1-6
PROJECTED AVERAGE DAILY WATER DEMANDS (GPD)

Municipality	2015 (Actual)	2030	2040
(V) Constableville	62,778	61,000	60,000
(V) Lyons Falls	145,052	142,000	139,000
(V) Port Leyden	153,258	149,000	146,000
(V) Turin	42,273	41,000	40,000

Other factors including system expansions, changes in operations (i.e. metering), and system maintenance (i.e. leak detection and repairs) would affect future water use which would, in turn, affect water demand projections.

1.9 Employee Analysis

As part of this study, interviews were conducted with elected officials and water system operators from each municipality to ascertain an accurate understanding of existing conditions as well as to determine the issues and challenges facing their current and future operations. Detailed financial operating costs and human resources information were collected from each system. Major water production and delivery costs, priorities for future needs to be addressed, and improvements to be made were discussed.

A few common themes were identified amongst the four Villages in the study area. These include:

- Impending costs of capital improvements facing their systems. Much of the existing infrastructure throughout the systems has exceeded its design life and will require replacement at considerable expense.
- Maintaining system compliance with various regulations. Ever changing regulations for water systems present a challenge for small communities trying to maintain compliance. Doing so requires a constant investment in training of staff for the proper operation, maintenance, and record keeping for the systems.
- Incomplete and inaccurate utility record mapping. DANC has completed GIS mapping of existing underground water utilities for the Village of Lyons Falls and Village of Port Leyden. This type of mapping is very valuable for record keeping, cost tracking, and capital project planning. Similar mapping is not available for the Village of Constableville or the Village of Turin. Mapping for the Village of Turin is anticipated to be completed by DANC in 2017, pending funding.
- Insufficient equipment and personnel to perform leak detection and maintenance repairs and minor system improvements in-house.

Another issue facing the system operators in the study area is the nature of the water system operators' positions. In all cases, operators are performing their duties on a part-time basis; in some cases, the operators' primary positions are not with the Village of the system in which they operate. This situation can be problematic, particularly with the age and condition of the water systems and the always expanding regulations with which they must comply.

TABLE 1-7
WATER SYSTEM OPERATOR SUMMARY

PWS Name	DOH PWS ID	Operator	Operator NY Certification No.	Certification Level	Certification Expiration Date
Constableville Village	NY2402360	Shane Rogers	NY038368	C	May 31, 2017
Lyons Falls Village	NY2402366	Shane Rogers	NY038368	C	May 31, 2017
Port Leyden Village	NY2402368	Joshua Marmon	NY0040288	C	September 30, 2017
Turin Village	NY2402369	Thomas Smith	NY0031585	IIA	April 30, 2017
West Leyden Elementary School	NY2402985	Robert Healt	NY0040191	C	May 31, 2017

The issues facing the system operators come at a time when the overall population of the area is decreasing and the state of the local economy makes it increasingly difficult to increase rates on people whose incomes have remained constant or decreased over the last decade.

1.10 Project Funding and Financing Opportunities

There are two primary sources of funding and financing for municipal water projects. They are the DWSRF and USDA RD. The New York State Water and Sewer Infrastructure Co-funding Initiative brings together representatives from DOH, EFC, DEC, Department of State, Office of Community Renewal, USDA RD, Office of the State Comptroller, and New York State Energy Research and Development Authority to ensure optimum funding potential and assistance for New York's communities.

Drinking Water State Revolving Fund (DWSRF)

The DWSRF is administered jointly by EFC and the DOH. Since its inception in 1996, the program has provided more than $5.24 billion in low-cost financing, including over $337 million in grants to disadvantaged communities for drinking water improvement projects across the State.

The DWSRF provides a significant financial incentive for public and private water systems to finance needed drinking water infrastructure improvements (e.g. treatment plants, distribution mains, storage facilities, etc.). The DWSRF provides market rate financing, subsidized low-interest rate financing and limited grants for construction of eligible water system projects.

As financings are repaid, money will be available for new financings – a true revolving fund. For communities with demonstrated hardship, interest rates for eligible projects may be reduced to as low as zero percent. In addition, in the event of severe financial hardship, financial hardship grants pursuant to the Federal Safe Drinking Water Act may be available.

EFC's Community Assistance Program is designed to provide direct assistance to small, rural communities in New York State for the organization and completion of water/wastewater projects eligible for SRF financing. In the development of the SRF, the EPA recognized that leaders of smaller communities generally lacked the resources to organize a major infrastructure project, retain the needed professional services, and develop funding applications, in addition to running the day to day affairs of their community. The program consists of two related aspects: project development services; and funding coordination. More information is available here: https://www.efc.ny.gov/Default.aspx?tabid=104.

Each year, the State prepares an Intended Use Plan (IUP) that describes how the State intends to use available DWSRF resources for the year to meet the objectives of the SDWA and to further the goal of protecting public health. The IUP includes a list of projects expected to qualify for financing within the fiscal period addressed by the IUP. A project must be listed in an IUP to be eligible for financing.

EFC administers the financial aspects of the DWSRF. Complete applications for the DWSRF financing are submitted to EFC, the financing is obtained through EFC, and repayments are made to EFC.

DOH manages the technical review for DWSRF projects and regulates the safety and adequacy of drinking water delivered by public water systems in New York State. For the DWSRF, DOH accepts project listing forms and technical reports; scores, ranks, and lists projects on the IUP, and reviews technical documents for both the project listing and the complete application.

Municipal applicants may apply for financing for any DWSRF-eligible project. A municipality means any county, city, town, village, district corporation, county or town improvement district, school district, Indian nation or tribe recognized by the State or the United States with a reservation wholly or partly within the boundaries of New York State, any water authority now existing in a city, or any agency of

New York State which is empowered to construct and operate an eligible project, or any two or more of the foregoing which are acting jointly in connection with an eligible project.

Projects eligible for DWSRF financing include investments to upgrade or replace infrastructure needed to achieve or maintain compliance with federal or state health standards, and provide the public with safe, affordable drinking water. Examples of such projects are:

- Rehabilitation or development of new drinking water sources to replace contaminated supplies.
- Installation or upgrade of treatment facilities to ensure compliance with state and federal drinking water standards or treatment/performance criteria.
- Installation or upgrade of storage facilities, including finished water reservoirs, to prevent microbiological contamination or to provide adequate delivery pressures.
- Installation or replacement of transmission and distribution mains to prevent contamination caused by leaks or breaks.
- Funding and/or construction to promote the consolidation of water supply services, particularly in circumstances where individual homes or water systems generally have an inadequate quantity of water, the water supply is contaminated, or the system is unable to maintain adequate compliance for financial or managerial reasons.
- The purchase of a portion of another system if the purchase is part of a consolidation plan to bring the system(s) into compliance.
- Capital investments to improve the security of drinking water systems.
- Any of the above listed project types which are publicly-owned, and which were previously financed after July 1, 1993, may be eligible for refinancing.

The DWSRF uses Median Household Income (MHI) and local poverty rate to evaluate a project's eligibility for their different hardship programs. The first step to becoming eligible for DWSRF funding is to have the project listed on the IUP annual list with a score at or above the Hardship Application Eligibility Line.

TABLE 1-8
DWSRF HARDSHIP FUNDING ELIGIBILITY FOR MUNICIPALITIES[1]

Municipality	MHI[2]	Percent of State MHI[3]	Family Poverty Rate[2]	Hardship Financing (0%) Eligible[4]	Hardship Grant Eligible[5]
(V) Constableville	$48,869[6]	84%	3.0%	Yes	No[6]
(V) Lyons Falls	$44,844	77%	5.1%	Yes	Yes
(V) Port Leyden	$31,477	54%	23.8%	Yes	Yes
(V) Turin	$41,406	71%	8.0%	Yes	Yes
(T) Lewis	$40,972	71%	13.9%	Yes	Yes
(T) Leyden	$40,662	70%	17.5%	Yes	Yes
(T) Lyonsdale	$36,905	64%	15.7%	Yes	Yes

Notes:
1. Refer to 2017 Final IUP for more information: (https://www.efc.ny.gov/Default.aspx?tabid=108).
2. From 2013 American Community Survey data. An income survey, Census Designated Place (CDP), or other acceptable demonstration of a more accurate MHI for the service area may be used in lieu of the published MHI.
3. State MHI is $58,003 from 2013 American Community Survey data.
4. According to 2017 Final IUP, Section 7.3 "Hardship Eligibility Criteria". One of the criteria is a MHI equal to or less than the State MHI of $58,003.
5. According to 2017 Final IUP, Section 7.3 "Grant Eligibility Criteria". The criteria include an MHI of less than 80% of the State MHI which is $46,402; or, if MHI is 80% to 100% of the State MHI, then the family poverty rate must be equal to or greater than the State average family poverty rate (11.7%). Grants are limited to the lesser of 60% of total project costs or $2,000,000, with a five year waiting period for additional grant eligibility once the $2,000,000 is reached.
6. Constableville MHI is noticeably higher than the rest of the municipalities. This is potentially not accurate due to sampling error. An income survey could be done to obtain an accurate MHI which could result in grant Hardship Grant Eligibility for the Village.

More information about the DWSRF, including information on the application process and application package for publicly-owned municipal systems, and the latest IUP and Amendments, can be found by visiting the website: https://www.efc.ny.gov/Default.aspx?tabid=83.

USDA Water and Environmental Programs (WEP)

Through the USDA RUS Water and Environmental Programs, rural communities obtain the technical assistance and financing necessary to develop drinking water. Safe drinking water systems are vital not only to public health, but also to the economic vitality of rural America. USDA Rural Development is a leader in helping rural America improve the quality of life and increase the economic opportunities for rural people. WEP is administered through National Office staff in Washington, DC, and a network of field staff in each State. WEP programs are available for water facilities in rural communities with populations of 10,000 or less; they include:

- Water Loans and Grants
- Water Loan Guarantees
- Water Predevelopment Planning Grants
- Water Revolving Loan Funds
- Water Technical Assistance and Training Grants

USDA RD State and Local Offices are the primary source of information and assistance for WEP programs:

USDA Rural Development
New York State Office
441 S. Salina St, Suite 357
Syracuse, NY 13202
(315) 477-6400

Watertown Service Center (serving Lewis County):
21168 NYS Route 232
PO Box 838
Watertown, NY 13601
(315) 782-7289, ext. 4

The USDA RD considers a community's debt service costs relative to MHI to determine grant eligibility, requiring a community to bear a certain level of debt service before grants are considered. They also use MHI to calculate an annual target service charge (TSC) based on similar system costs of communities in the same region of the state. TSC's represent the total average user costs (debt service and usage charges) and are a factor when determining the amount of grant funds to be provided.

TABLE 1-9
USDA RD FUNDING ELIGIBILITY FOR MUNICIPALITIES

Municipality	MHI[1]	EDUs[2]	Existing Annual Cost/EDU[3]	Target Service Charge/ EDU[4]	Existing Annual Debt Service/EDU (% of MHI)[5]	Interest Rate (and Grant Cap)[6]
(V) Constableville	$55,694[7]	141	$452	$780	0.36%	Intermediate[7]
(V) Lyons Falls	$41,250	388	$229	$516	0.17%	Poverty or Intermediate
(V) Port Leyden	$31,417	374	$258	$361	0.34%	Poverty or Intermediate
(V) Turin	$37,614	160	$354	$451	0.32%	Poverty or Intermediate
(T) Lewis	$39,038	NA	NA	$566	NA	Poverty or Intermediate
(T) Leyden	$40,234	NA	NA	$604	NA	Poverty or Intermediate
(T) Lyonsdale	$38,482	NA	NA	$558	NA	Poverty or Intermediate

Notes:

1. Median Household Income from U.S. Census Bureau 2006-2010 American Community Survey 5-Year Estimates.
2. Estimated based on USDA methodology for non-metered systems: (Annual system usage-Leakage)/60,000 with usage estimated by the approximate population at 75 GPD pp (which assumes no leakage and omits cattle usage from the calculation).
3. Estimated based on Total Revenue for 2015-2016 FY/USDA EDUs.
4. Estimated based on USDA RD Estimated Annual Costs for Water/Wastewater Projects. This is a sliding scale based on MHI and is different for Towns and Villages.
5. Estimated based on existing Total Annual Debt Service/USDA EDUs.
6. The USDA RD provides loans with one of three interest rates: poverty, intermediate, and market. Criteria for interest rate determination are:
   Poverty Rate: MHI < $45,505 and correcting a health and/or sanitary standard.
   Intermediate Rate: MHI < $45,505 but no health and/or sanitary standard; or MHI between $45,505 and $56,882.
   Market Rate: MHI > $56,882.
   Current rates are 2.000%, 2.750%, and 3.375%, respectively.
   Grant assistance will be considered by USDA RD when the debt service per EDU exceeds the following % of MHI:
   0.5% when the MHI < $45,505.
   1.0% when the MHI is between $45,505 and $56,882.
   Grant Caps are determined based on the loan rate:
   Poverty Rate: 75% of total project cost up to $750,000.
   Intermediate Rate: 45% of total project cost up to $500,000.
   Market Rate: Grants not available.
7. Constableville MHI is more than 25% higher than the rest of the municipalities. This is likely not accurate due to sampling error. A detailed income survey could be done to obtain an accurate MHI which could result in lower target service charges, lower interest loans, and additional grant money for the Village.

2 Inventory of Existing Conditions

2.1 Introduction

This section focuses on information collected regarding the general nature, source, and condition of public water supply systems throughout the study area. A detailed review and analysis of these systems was conducted as part of the 2006 *"Comprehensive Economic Development Strategy"* and by Burley-Guminiak & Associates in the 2009 *"Lewis County Comprehensive Public Water Supply and Sanitary Wastewater Study"*. Portions of that information are included in the summary of each system below and updated, where applicable, to reflect current conditions.

The three non-community transient water systems were excluded from further investigation as they are small privately owned systems which would not be feasible to incorporate into the objectives of this study.

Refer to Maps 2-1 – 2-4 in Appendix D for existing system maps.

2.2 Village of Constableville

DOH Public Water Supply ID: 2402360
DEC Water Withdrawal Permit: NA
NY Certified Water Operator: Shane Rogers; NY Certification #NY038368; Expires May 31, 2017

Overview

The Village of Constableville operates a public water system which provides water to local residents and businesses within the Village and a few outside users in the Town of West Turin. There are a total of approximately 162 service connections (128 residential, 14 business, 3 farms, and 17 other) providing water to a population of approximately 310 people. Of the 162 services, 7 are for outside users (5 residential, 1 business, 1 farm) located in the Town of West Turin; the outside users are not districted. According to daily records provided from March 2013 thru April 2016, the average daily water usage is approximately 64,000 GPD and the maximum daily flow was 130,000 GPD.

History

Most of the existing system was constructed in 1906 including the 1,000,000 gallon reservoir that still exists today. Two springs (the Smith Springs) existed prior to 1906 but were incorporated into the 1906 system. Water then flowed via gravity from the reservoir to a hypo-chlorination building located on Crofoot Hill Road where metering also occurred. The reservoir, springs, and hypo-chlorinator building were all located in the Town of West Turin northwest of the Village. From the chlorination building the water flowed to the Village through the eight inch diameter transmission main along Crofoot Hill Road which still exists today; this main replaced an older one which generally followed an unnamed creek into the center of the Village. Other than the new treatment plant and associated transmission line alterations, very few upgrades have been made to the original system.

Circa 1971-1972, the average daily production was 71,000 GPD and the maximum daily flow was 107,000 GPD.

Water Supply Source

Water is obtained via surface water from two natural springs (known as Smith Spring and Upper Smith Spring or collectively as Smith Springs) and an unnamed creek located outside of the Village in the Town of West Turin. There is a dam providing an approximately 1,000,000 gallon reservoir for raw water storage on the creek; it is located east of Smith Road. The dam is registered with the DEC and is a hazard classification A. The springs are located further north on the west side of Smith Road in state forest lands and their flow is piped to the reservoir through a four inch diameter transmission line. Water is then piped from the reservoir through an eight inch diameter transmission main to the filtration plant. The springs predate the original 1906 system and their original installation is understood to be pre-1900. The reservoir was constructed in 1906 and was last cleaned of sediment in 1998. There is not a current Water Withdrawal Permit on file with the DEC for the Village water system though the system does appear to have the capability to withdraw more than the 100,000 gallons per day threshold volume set by the DEC as indicated by periodic peaks of greater than 100,000

Picture: 1,000,000 gallon reservoir

gallons per day usage. Neither a Source Water Assessment, a Source Water Protection Plan, nor a Water Conservation Plan have been completed for the Village.

Water Treatment and Storage

Treatment is provided in a filtration plant located on Crofoot Hill Road in the Town of West Turin where slow sand filtering; chlorination to disinfect for bacteria, viruses, and other micro-organisms; and metering are provided. The plant was constructed in 2000. The plant includes (3) 560 square foot slow sand filter beds, which are operated and cleaned on a rotating basis; typically 1 or 2 beds are manually cleaned each year. The design surface loading rate of the beds is unknown. The plant is designed for automatic chlorine dosing. Corrosion of metal pipes and system components is a persistent problem within the plant due to lack of heat, ventilation, and dehumidification. The plant includes two clear-wells which provide a total of approximately 180,000 gallons of potable water storage. A propane standby generator is located outside the plant. An alarm dialer is located in the office to provide notification of alarm conditions.

Picture: Water Plant Pipe Gallery

Picture: Water Filtration Plant

Transmission and Distribution

Water is piped from the filtration plant to the village via two transmission mains. The original eight inch transmission main was installed in 1906 and runs along Crofoot Hill Road (High Street) into the Village. A six inch ductile iron transmission main was installed in the 1990's to create a loop and system redundancy; it branches off the eight inch transmission main a short distance from the filtration plant, is routed across private properties (mostly open fields) to West Main Street (near St. Mary's Cemetery), and continues along West Main Street into the Village.

The distribution system within the Village is mostly original 1906 pipes of varying sizes, most of which are cast iron. Some portions have been replaced over the years including a new 6" loop at Factory Road (early 1990's); approximately 400 feet of eight inch on Main Street (circa 2007), and a portion of eight inch line on John Street (circa 2012). The system generally has generous pressure; 106 PSI was reported along Main Street and most homes are equipped with pressure regulators.

Metering and Billing

Overall system metering is done at the filtration plant. The services within the system are unmetered. The Village bills for water biannually (March 1st and September 1st) at a flat fee based on the type of service connection. Outside users are billed at the same rates as Village users.

TABLE 2-1
VILLAGE OF CONSTABLEVILLE UNIT COUNTS AND BILLING RATES

Service Type	Units	2016-2017 Annual Billing Rate
Farm	5	$798
Business	14	$398
Church	4	$340
Historic	1	$326
Household	119	$374
Multiple Units	9	$242 base (+ $114/unit)
Hook up only	5	$242
Cemetery	2	$114
Miscellaneous	5	$114

Water Quality and Monitoring

A review of Annual Water Quality Reports from 2012-2015 indicates there were no water quality violations detected. The SDWIS indicates one non-health based monitoring and reporting violation in 2009 which was corrected.

Annual Budget

Budget vs. Actual records were provided for the fiscal years 2011-2012 through 2015-2016.

In 2011-2012, an approximately $50,000 increase (as compared to other years for which records were provided) in transmission and distribution expenses was incurred along with an income of approximately $13,000 for "Federal Aid, Emergency Management" (which was not present in other years). It is assumed that the $50,000 was for a new 8" pipe bypassing the old Church Street Bridge crossing over the Sugar River via a new crossing at the John Street Bridge, as this upgrade was reported around the same time. In 2015-2016, an inter-fund transfer was made to the water fund for $7,667.

Not including the revenue and expenses due to the required repair discussed above, the system was gainfully operated for the years data was provided with average revenue of approximately $52,300 and average expenses of approximately $50,400. The expenses can be further broken down into $28,255.50 for annual debt service (further discussion below) and the remainder of $22,144.50 for operation and maintenance of the system.

The Village does not have a reserve fund.

Debt Service

The Village has two outstanding loans, both of which are related to the construction of the water filtration plant around 2000. There is a 20 year/0% interest DWSRF loan (DWSRF Project #15822) for $535,126 which has four annual payments of $26,760 ($107,040 total) remaining as of the end of 2015; the last payment is due in 2019. There is also a 38 year/4.5% interest USDA Rural Development loan for $25,700 which has 24 years and a principal balance of $19,900 remaining. Semi-annual interest payments and annual principal payments total approximately $1,495.50 per year; the last payment is due in 2040.

2.3 Village of Lyons Falls

DOH Public Water Supply ID: 2402366
DEC Water Withdrawal Permit: WSA9634; Facility ID: WR0000936
NY Certified Water Operator: Shane Rogers; Certification #NY038368; Expires May 31, 2017

Overview

The Village of Lyons Falls operates a public water system which provides water to local residents and businesses within the Village and several outside users in the Towns of Leyden, Lyonsdale, and West Turin. There are a total of approximately 302 service connections providing water to a population of approximately 850 people. Of the 302 services, 61 are for outside users located in the Towns of Leyden, Lyonsdale, and West Turin. The Town of Leyden outside users are districted into Town of Leyden Water District #1. The other outside users are not districted. About half of the outside users are located in an area known as Gouldtown immediately east of the Village limits in the Town of Lyonsdale. The Gouldtown area has been provided water under a contract put into place in the 1950's which, according to the Village, was due to be updated at some point but was not. According to daily records provided from January 2013 thru May 2016, the average daily water usage is approximately 137,000 GPD and the maximum daily flow was 248,000 GPD.

History

The Village originally constructed a water system in 1896. At the time, water was supplied by the Beauty Spring Water Company, which obtained its supply from Beauty Spring. The spring was located on Burnt Shanty Road about 1.7 miles southeast of the Black River Bridge. Water was transmitted to and distributed throughout the Village by gravity through a network of wooden water mains.

In 1906, the Village constructed a 2,500,000 gallon capacity collecting reservoir on Beauty Creek about 0.4 miles upstream of Beauty Spring, and a transmission and distribution system of cast iron pipes. According to records of the then State Water Supply Commission, the annual yields of the Beauty Creek and Beauty Spring sources were 790,000 GPD and 165 GPM (240,000 GPD), respectively.

In 1957, Beauty Spring was acquired by the Village as an auxiliary source of supply water and the Village obtained the right to use the auxiliary source to serve the Gouldtown area. In order to do so, the Village had to construct an intake at the spring and then divert the water to a hypo-chlorination building on River Road. This water did not always meet state standards for color or coliform bacteria.

The system operated this way until the 1990's when several improvements were made including new supply wells and new storage tanks.

Circa 1971-1972, the average daily production was 146,300 GPD, the maximum daily flow was 363,300 GPD, and system pressures generally ranged from 43 to 95 PSI except for the westernmost end of McAlpine Street where pressures would drop below 20 PSI during the night. The western end of McAlpine Street was served via a 5 horsepower 120 GPM pump with a lift of 90 feet; this pump station was constructed in 1955.

Water Supply Source

Water is obtained via groundwater from two wells located approximately 1.1 miles southeast of the Village on the north side of Burnt Shanty Road in the Town of Lyonsdale. The wells, known as Well #1 and Well #2, were drilled in 1992. The Well #1 pump was recently replaced in January 2016.

A Water Withdrawal Permit is on file with the DEC which was issued on April 30, 1998 and authorizes a withdrawal of 218 GPM (313,920 GPD). A Water Conservation Plan was put into place during the Water Withdrawal Permit application process. There are outstanding permit conditions and special permit

conditions. A Source Water Assessment was completed for the Village by the DOH in 2003 and a Source Water (Wellhead) Protection Plan was subsequently completed by NYRWA in 2013. That Plan outlines additional information regarding the wells:

"These wells, referred to as Well #1 and Well #2, were drilled in 1992 to replace the Village's unfiltered surface water reservoir. The two supply wells are 12-inches in diameter, 20 feet deep, and screened from 16 to 20 feet below ground. A distance of approximately 65 feet separates well #1 and #2. Wells #1 and #2 were tested to have safe yields of 140 gallons per minute (gpm) and 83 gallons per minute (gpm) respectively.

The supply wells tap a very shallow glacial sand aquifer. Logs for the test and production wells indicate 7.5 to 10 feet of brown sand to coarse gravel overlies glacial till at a total depth of less than 22 feet. Overlying the coarser sand and gravel is silty sand and clay. The depth to the water table is between 8 and 13 feet. Surficial geologic mapping from the New York State Geological Survey indicate that the area is covered with glaciolacustrine sand with areas of exposed till and rock.

Picture: Well #1

Pump tests completed in 1995 by Catoh, Inc. of Weedsport, NY have been analyzed by New York Rural Water Association (NYRWA). The geometric mean transmissivity for the aquifer is 61,645 gpd/ft. The geometric mean storativity of the aquifer is 0.045. Based upon an average saturated thickness of 8 feet, the mean hydraulic conductivity of the aquifer is 7,706 gpd/ft^2 or 1030 ft/day. This is a typical value for coarse-grained sand and gravel deposit.

Assuming a hydraulic gradient of 0.008 (from regional stream gradients) and an effective porosity of 0.3 for sand, the average groundwater flow velocity in the aquifer computes to 27.5 feet per day. This is a comparatively high groundwater flow velocity. At this rate, the distance to the 60-days groundwater time of travel boundary would be 1,650 feet. The very high groundwater flow velocity is indicative of an aquifer that would be very sensitive to potential contamination.

Given the shallow nature of the aquifer, the groundwater flow direction is believed to mirror the local topographic gradients."

Water Treatment and Storage

Treatment is provided via chlorination. There is a chlorination building adjacent to the two supply wells on Burnt Shanty Road, from which chlorine is automatically added to the water supply. Also located at the Burnt Shanty Road well site is a 100,000 gallon capacity concrete storage tank, also installed in 1992. There is a second concrete storage tank located inside the Village on McAlpine Street (NY State Route 12D), west of the McAlpine Street overpass over NY State Route 12; this tank has a 200,000 gallon capacity and was constructed in 1994. The altitude valve at the McAlpine Street tank was replaced around 2013. The Village has a SCADA system.

Picture: Burnt Shanty Road well, chlorination, and storage tank site

Transmission and Distribution

Water is piped from the Burnt Shanty Road tank/well site via an eight inch gravity transmission main which follows Burnt Shanty Road westerly to River Road then northwesterly into the Village. Another eight inch gravity transmission main is routed from the McAlpine Street tank site northeast into the Village. There is a pump station at the McAlpine Street tank site for an auxiliary line that serves a few residences near that location. A section of the main from McAlpine Street which ran along the Route 12 overpass froze and broke; and approximately 300 feet of the line was replaced in 2014. The line was relocated to go under Route 12 instead of on the overpass to prevent the problem from recurring. The replacement section was constructed with twelve inch pipe, about half of which is HDPE plastic pipe. The distribution system within the Village is comprised of eight inch, four inch, and two inch diameter pipes. Most of the system is cast iron from the early 1900's; though some sections have been replaced with ductile iron over the years including approximately 750 feet of eight inch line on Belmont Street (circa 1975), 500 feet of eight inch on Franklin Street (circa 1987), and 350 feet of fourteen inch pipe under Route 12 mentioned above (2014). Other water main replacements within the Village were reported to have been completed in the 1990's but the exact locations and extent of replacements were not indicated. All two inch piping is HDPE plastic pipe. The system generally has moderately low pressures ranging from around 40 PSI to 70 PSI based on hydrant test results provided from 2012.

Picture: McAlpine Street pump station

Picture: McAlpine Street 200,000 gallon storage tank

Metering and Billing

Overall system metering is performed in a pit at the Burnt Shanty Road Tank/Chlorination Building site. Though many meters exist throughout the system, many of them do not work and therefore metering is not used for billing. The Village bills for water quarterly at a flat fee of $60/quarter/unit ($240/year/unit). Outside users are billed at a rate of 1.5 times the cost of inside users ($90/quarter/unit; $360/year/unit).

TABLE 2-2
VILLAGE OF LYONS FALLS UNIT COUNTS AND BILLING RATES

Service Type	Units	2016-2017 Annual Billing Rate
Inside User	241	$240
Outside User	61	$360

Seasonal users may opt for a rate of ½ the above if their water is turned off when not in use. Businesses and apartments are handled on a case by case basis and generally billed per unit at the above rates.

The outside users within the Town of Leyden are within Town of Leyden Water District #1. The Town of Leyden handles billing of these customers by adding a $16.25 quarterly ($65 annually) surcharge onto the above rates. The Town maintains a small capital reserve fund.

Water Quality and Monitoring

A review of Annual Water Quality Reports from 2013-2015 indicates there were no water quality violations detected. The SDWIS indicates two non-health based monitoring and reporting violations in 2012 which were corrected.

Annual Budget

Budget vs. Actual records were provided for the fiscal years 2011-2012 through 2015-2016.

In 2013-2014, expenses for water transmission increased approximately $15,000 (as compared to prior years) to approximately $19,000. The increase was more dramatic in 2014-2015 and 2015-2016 when the value rose to approximately $184,000 and $106,000, respectively. The records provided did not indicate how the water fund was balanced for those years and net losses of between $6,000 and $169,000 were recorded. It is assumed that the cost increases were for a new 14" pipe bypassing the old McAlpine Street Bridge crossing over Route 12 via a new crossing under Route 12 as this upgrade was completed in 2014.

Not including the additional expenses due to the required repair discussed above, the system was gainfully operated for the years data was provided with average revenue of approximately $90,600 and average expenses of approximately $80,700. The expenses can be further broken down into $27,498 for annual debt service (further discussion below) and the remainder of $53,202 for operation and maintenance of the system.

The Village does not have a reserve fund.

Debt Service

The Village has one outstanding loan for the construction of the water storage tanks around 1994. The loan is a 38 year/4.5% interest USDA Rural Development loan for $786,400 which has 17 years and a principal balance of $164,400 remaining. Semi-annual interest payments and annual principal payments total approximately $27,498 per year; the last payment is due in 2033.

2.4 Village of Port Leyden

DOH Public Water Supply ID: 2402368
DEC Water Withdrawal Permit: WSA 9589; Facility ID: WWR0001246
NY Certified Water Operator: Joshua Marmon; Certification #NY0040288; Expires September 30, 2017

Overview

The Village of Port Leyden operates a public water system which provides water to local residents and businesses within the Village and several outside users in the Towns of Leyden and Lyonsdale. There are a total of approximately 391 service connections providing water to a population of approximately 820 people. Of the 391 services, 54 are for outside users located in the Towns of Leyden and Lyonsdale. The Town of Leyden outside users are districted into Town of Leyden Water District #2. The other outside users are not districted. According to daily records provided from January 2013 thru March 2016, the average daily water usage is approximately 137,000 GPD and the maximum daily flow was 233,000 GPD.

History

The Village originally derived its water supply from a single 550,000 gallon spring fed reservoir located on a tributary of Cold Brook on the north side of Moose River Road about 2 miles east of the Village in the Town of Lyonsdale. The original reservoir and distribution system were constructed in 1897. In 1912, after experiencing several water shortages, the Village constructed a second 200,000 gallon reservoir on a more northerly tributary of Cold Brook on the south side of Holmes Road about 2 miles east of the Village in the Town of Lyonsdale. The system operated this way until 1994 when several improvements were made to bring the system into compliance with the Federal Surface Water Treatment Rule of 1989.

Circa 1971-1972, the average daily production was 114,700 GPD, the maximum daily flow was 133,900 GPD, and system pressures generally ranged from 35 to 87 PSI.

Water Supply Source

Water is obtained via groundwater through two infiltration galleries located approximately 2 miles east of the Village in the Town of Lyonsdale. Both galleries are located approximately 4,000 feet east of the Holmes Road/Moose River Road intersection and were installed circa 1994. The galleries are accessed by logging roads; the north gallery from Holmes Road and the south gallery from Moose River Road. They are located in separate drainage basins of Cold Brook, and are separated by approximately 3,000 feet. Raw water is piped from the galleries to a chlorination building near the Holmes Road/Moose River Road intersection. The north gallery is piped to the chlorination building via an eight inch main; approximately the westernmost 3,200 feet of pipe is cast iron (circa 1912) and the remainder (approximately 1,500 feet) is ductile iron (circa 1994). The south gallery is piped to the chlorination building via an eight inch and ten inch main; approximately the western most 3,000 feet is ten inch cast iron (circa 1897) and the remainder (approximately 750 feet) is eight inch ductile iron (circa 1994). A Water Withdrawal Permit is on file with the DEC which was issued on November 26, 1997 and authorizes a withdrawal of 120,000 GPD. There are outstanding permit conditions. A Water Conservation Plan was not found. A Source Water Assessment was done by the DOH in 2005 but a Source Water Protection Plan was never completed. The Source Water Assessment indicated "no noteworthy risks to water

Picture: Moose River Road Infiltration Gallery

quality" and "It should be noted that infiltration galleries, in general, can be highly sensitive to petroleum products and solvents; neither are of particular concern for this source supply".

Water Treatment and Storage

Treatment is provided via chlorination in a small building located on Moose River Road about 400 feet east of the Holmes Road/Moose River Road intersection where chlorine is automatically added to the water supply. According to the 2009 Water Supply Study, a 2,000 gallon underground pressure tank was also added in 1994 to provide necessary detention for required contact time. There is a 325,000 gallon glass-lined steel storage tank located on Elm Street (Rugg Road) approximately 900 feet west of the Village. The tank was also installed circa 1994 as well as a new twelve inch ductile iron main along Rugg Road connecting the tank to the rest of the system. Although the system is equipped with a SCADA system, the tank is not equipped or connected to it so the Village has no way of monitoring the tank level.

Picture: Chlorination building

Picture: Rugg Road 325,000 gallon storage tank

Transmission and Distribution

Water is piped from the chlorination building westward to the village via an eight inch cast iron main which was part of the original 1897 system. Approximately 4,500 feet of the four inch, six inch, and eight inch distribution system in the village center was replaced with new eight inch ductile iron pipe in 1994. Other portions of the system remain over 100 years old. The system pressures are generally acceptable but users on Pearl Street and Elm Street regularly experience low pressure problems. 80 PSI is reported at the DPW garage in the Village.

Metering and Billing

Overall system metering is performed at the chlorination building. The services within the system are unmetered. The Village bills for water quarterly at a flat fee of $60.50/quarter/unit ($242/year/unit). Outside users are billed at a rate of $68/quarter/unit ($272/year/unit).

TABLE 2-3
VILLAGE OF PORT LEYDEN UNIT COUNTS AND BILLING RATES

Service Type	Units	2016-2017 Annual Billing Rate
Inside User	337	$242
Outside User	54	$272

The outside users within the Town of Leyden are within Town of Leyden Water District #2. The Town of Leyden handles billing of these customers by adding a $16.25 quarterly ($65 annually) surcharge onto the above rates. The Town maintains a small capital reserve fund.

Water Quality and Monitoring

A review of Annual Water Quality Reports from 2012-2015 indicates there were no water quality violations detected. The SDWIS does not indicate any other violations.

Annual Budget

Budget records were provided for the years 2013 through 2016.

The system operated at a loss for the years 2013-2015 and inter-fund transfers between $6,000 and $11,000 were made in order to balance the fund each year. For the years data was provided, the fund had an average revenue of approximately $97,100 and average expenses of approximately $100,800. The expenses can be further broken down into $40,334 for annual debt service (further discussion below) and the remainder of $60,466 for operation and maintenance of the system.

The Village does not have a reserve fund.

Debt Service

The Village has three outstanding 38 year/4.5% interest USDA Rural Development loans for the construction of the system improvements in the 1990's. The first loan is for $746,200 which has 18 years and a principal balance of $367,000 remaining; semi-annual interest payments and annual principal payments total approximately $36,515 per year; the last payment is due in 2034. The next loan is for $40,000 with 20 years and a principal balance of $20,200 remaining; semi-annual interest payments and annual principal payments total approximately $2,009 per year; the last payment is due in 2036. The third loan is for $48,800 with $18,000 remaining; semi-annual interest payments and annual principal payments total approximately $1,810 per year; the last payment is due in 2036.

2.5 Village of Turin

DOH Public Water Supply ID: 2402369
DEC Water Withdrawal Permit: WSA 9625; Facility ID: WWR0001578
NY Certified Water Operator: Thomas Smith; NY Certification #NY0031585; Expires April 30, 2017

Overview

The Village of Turin operates a public water system which provides water to local residents and businesses within the Village and outside users in the Town of Turin. There are a total of approximately 163 service connections providing water to a population of approximately 350 people. Of the 163 services, 43 are for outside users (40 residential, 3 farms, and 1 school) located in the Town of Turin; the outside users are not districted. According to daily records provided from March 2013 thru September 2016, the average daily water usage is approximately 42,000 GPD and the maximum daily flow was 100,000 GPD.

History

The Village originally constructed a water system in 1905; water was originally supplied by a collecting reservoir on Lee Gulf Creek with a reported capacity of 1,000,000 gallons at the time of construction. Water flowed from the reservoir through an 8-inch diameter main approximately 0.6 miles to a chlorination building on Lee Gulf Road where disinfection by hypo-chlorinator and metering occurred. From the chlorination building, water flowed through approximately 1.1 miles of 6-inch diameter transmission pipeline into the Village for distribution.

In 1963, the safe yield of supply was estimated to be 250,000 GPD assuming the reservoir was cleaned to its original capacity. In 1969, the reservoir had been silted in such that its capacity was estimated to have been reduced to only 210,000 gallons and approval was granted by the then Water Resources Commission for the construction of a 1.1 million gallon impounding reservoir about 500 feet downstream of the original reservoir. The new reservoir was completed in 1969 but was not put into service until sometime after 1972.

Circa 1971-1972, the average daily production was 59,800 GPD, the maximum daily flow was 81,700 GPD, and system pressures were all above 65 PSI.

In 1994, the bulk of the current supply and storage systems were installed including two new groundwater wells, a greensand filtration plant, and a new 200,000 gallon water storage tank.

Water Supply Source

Water is obtained via groundwater from the two groundwater wells, known as Well #1 and Well #2 located near Charles Street Park in the Village. Both wells were installed circa 1994. Raw water is piped via four inch ductile iron pipe from the wells to the water filtration plant located approximately 200 feet to the south (also constructed circa 1994). A Water Withdrawal Permit is on file with the DEC which was issued on January 16, 1998 and authorizes a withdrawal of 75 GPM (108,000 GPD). A Water Conservation Plan was put into place during the Water Withdrawal Permit application process. A Source Water Assessment was done by the DOH in 2005. The most recent Source Water (Wellhead) Protection Plan provided is from 1998 (prepared by NYRWA). The 2009 Water Supply Study indicated that, at the time, the Village was "in the process of adopting a wellhead protection plan. The plan is currently being reviewed by the NYSDEC". The newer plan was not found and it is assumed to never have been adopted.

The 1998 Wellhead Protection Plan outlines additional information regarding the wells:

> "These wells…are located on Village-owned land west of the Turin Fire House…Well #1 and #2 are 50 and 52 feet deep, respectively. Both are completed in fractured limestone bedrock of the Trenton/Black River Group.
>
> Well #1 has been tested to safely yield 67 gallons per minute. Well #2 safely yields 42 gallons per minute. Water quality from these wells is satisfactory."

It is noted (by handwritten note) in the 1998 Wellhead Protection Plan that that 21 feet of pipe was added to Well #2 in October 2011 bringing it to a total depth of 73 feet.

Picture: Site of Charles Street wells

The summary of the 2005 Source Water Assessment indicates:

> "…these wells as having a medium-high susceptibility to microbials, metals, petroleum products, and herbicides/pesticides…due primarily to shallow well construction in an unconfined aquifer, and geographic proximity to documented petroleum contamination".

The Village expressed a desire to develop new or additional source water wells but no plan is currently in place to do so.

Water Treatment and Storage

Treatment is provided in a greensand filtration plant located in Charles Street Park where filtering; chlorination to disinfect for bacteria, viruses, and other micro-organisms; and metering are provided. The plant which includes three iron filters was constructed circa 1994. Each filter is designed for 37.5 GPM (54,000 GPD) which results in a plant design capacity of 108,000 GPD with one filter out of service. The sand was most recently replaced circa 2012. There is a 200,000 gallon single pedestal elevated steel water storage tank located adjacent to the filtration plant. The tank was installed circa 1994 and is in need of being repainted. The Village expressed a desire to develop a new tank which could serve as a replacement to or as additional storage to the existing tank.

Picture: Filters in plant

Picture: 200,000 gallon storage tank

Transmission and Distribution

Water is piped from the storage tank east to Route 26 (North State St.) via an eight inch ductile iron main which was installed around 1994 with the tank. At the same time, a new eight inch main was installed along North State Street to the State St./Main St. intersection. The remaining system consists of mains along West Main St., East Main St., and South State St.; most of which are original from the early 1900's and, though no system mapping exists, is believed to be generally comprised of six inch and four inch lines with smaller sizes out toward the ends of the lines. Pressure problems were not reported; simply based on the height of the storage tank (approximately 160') and topography, around 60-70 PSI is expected throughout most of the Village. However, small pipes and old pipes could significantly reduce the actual pressure in certain areas.

Metering and Billing

Overall system metering is performed at the filtration plant. Services within the system are metered. The Village bills for water semiannually at the rates below:

TABLE 2-4
VILLAGE OF TURIN UNIT COUNTS AND BILLING RATES

Service Type	Units	2016-2017 Semiannual Billing Rate (includes first 5,000 gallons)	Usage Rate (over 5,000 gallons)
Inside User	120	$110	$2.80/1,000 gallons
Outside User	43	$130	$2.80/1,000 gallons

The Village expressed a desire to begin replacing meters throughout the Village but no plan is currently in place to do so.

Water Quality and Monitoring

A review of Annual Water Quality Reports from 2011-2013 indicates there were no water quality violations detected; 2014 and 2015 reports were not provided. The SDWIS indicates one health-based violation in 2010 which was corrected; and four non-health based monitoring and reporting violations between 2005 and 2010, all of which were corrected.

Annual Budget

Budget records were provided for the fiscal years 2013-2014, 2015-2016, and 2016-2017. The budgets indicate an operational balance each year with revenue and expenses averaging approximately $56,700. The expenses can be further broken down into $19,098 for annual debt service (further discussion below) and the remainder of $37,602 for operation and maintenance of the system.

The Village has a reserve fund with an approximate balance of $100,000.

Debt Service

The Village has one outstanding loan for the construction of the water filtration plant and storage tank around 1994. The loan is a 38 year/4.5% interest USDA Rural Development loan for $346,800 which has 17 years and a principal balance of $225,000 remaining. Semi-annual interest payments and annual principal payments total approximately $19,098 per year; the last payment is due in 2033.

2.6 West Leyden Elementary School

DOH Public Water Supply ID: 2402985
DEC Water Withdrawal Permit: NA
NY Certified Water Operator: Robert Healt; NY Certification #NY0040191; Expires May 31, 2017

Overview
The Adirondack Central School District operates a non-community non-transient water system which provides water to staff and pupils of the West Leyden Elementary School in the hamlet of West Leyden in the Town of Lewis. There are currently a total of approximately 160 building occupants served by the small system. Daily flows are not recorded so average and maximum daily flows were not available.

History
The school was originally built in the early 1900's with a large addition added mid twentieth century; it has always been served by a private well.

Water Supply Source
Water is obtained via groundwater from a well located in a concrete vault on the school property about 150 feet northwest of the building. The age of the current well is unknown. It is believed to be approximately 60' deep. There is not a current Water Withdrawal Permit on file with the DEC for the water system as the withdrawal should be much less than the 100,000 gallons per day threshold volume set by the DEC for water withdrawal permits, however no flow metering is done by the school. Neither a Source Water Assessment, a Source Water Protection Plan, nor a Water Conservation Plan were located for the system. The district was recently ordered by the DOH to make modifications to the well for compliance with current standards; the main focus of the modifications is to get the well head extended to above grade as it is currently located below grade in a concrete vault and therefore more susceptible to contamination. The district has until June 2017 to make the required modifications.


Picture: Well pit

Water Treatment and Storage
Chlorination is provided within the school building. There is also a 1,000 gallon storage tank inside the building.


Picture: Chlorination inside building

Water Quality and Monitoring
The school had a violation for coliform in June 2016. Mr. Healt believes the sample was tainted as it was the only violation of any kind in at least the last eight years and the next test passed without a problem.

3 Local Recommendations

3.1 Introduction

This section focuses on each of the existing municipally operated community water systems within the study area; existing deficiencies with their respective infrastructure and operations; and recommendations to rectify those deficiencies. Most of the recommendations in this section could be incorporated into any regional effort outlined further in section 4 of this report. They are separated here because many of them must be addressed whether a regional initiative is implemented or not.

In order to make this study an active, living document, the recommendations in this section include checkboxes to track and record the progress of each municipality and to help keep the momentum moving forward.

3.2 Water Rate Analysis

A factor that must be considered is the current water rates for the four villages. In every case the rates are lower than the target service charges required by the typical funding agencies (refer to Table 1-9). The rates for each of the Villages would need to be raised enough to meet those target service charges in order to be eligible for the grants and loans from the funding agencies. Table 3-1 summarizes approximate necessary rate increases in order to meet USDA Target Service Charges. The rate increases will further the communities' ability to perform critical maintenance items. Table 3-2 summarizes approximate total project capacities that could be achieved by these rate increases and probable USDA loan terms and grants.

TABLE 3-1
RATE INCREASES REQUIRED TO MEET USDA TARGET SERVICE CHARGE

Municipality	Existing Annual Cost/EDU (from Table 1-9)	USDA RD Target Service Charge/EDU (from Table 1-9)	Estimated Rate Increase Required
(V) Constableville	$452	$550[1]	22%
(V) Lyons Falls	$229	$516	125%
(V) Port Leyden	$258	$361	40%
(V) Turin	$354	$451	27%

Notes:
1. The target service charge for Constableville is approximated assuming a reduction will be made by performing an income survey.

TABLE 3-2
RATE INCREASES VS. CAPITAL PROJECT CAPACITY

Municipality	Additional Revenue Generated Through Required Rate Increase (New Debt Capacity)	Local Project Share Capacity (38 year; 2.75% loan)	Total Project Capacity (assuming 45%/$500,000 maximum grant)
(V) Constableville	$12,320	$275,000	$500,000
(V) Lyons Falls	$110,000	$2,500,000	$3,000,000
(V) Port Leyden	$38,636	$900,000	$1,400,000
(V) Turin	$15,291	$350,000	$640,000

3.3 Village of Constableville

Deficiency: No Water Withdrawal Permit

The Village does not have a Water Withdrawal Permit from the DEC. State Law requires that all water withdrawal systems with the capability to withdraw 100,000 gallons per day or more ("threshold volume") obtain a Water Withdrawal Permit from the DEC. Water use records indicate peak daily flows in excess of 100,000 gallons per day, albeit infrequently. The actual withdrawal of water from the Village springs is not metered and the presence of the reservoir in the supply chain makes it difficult to definitively determine the capacity of the springs but it is very likely the Village does, in fact, have the capacity to withdraw more than 100,000 gallons per day.

Recommendation:

- Obtain a Water Withdrawal Permit from the DEC.
  More information is available here: http://www.dec.ny.gov/lands/55509.html.

Approximate Cost: $8,000-$10,000

Deficiency: No Water Conservation Plan

The Village does not have a Water Conservation Plan. Water Conservation Plans are typically developed during the Water Withdrawal Permit application process with the DEC, which explains the absence of a plan in the Village. All applications for Water Withdrawal Permits to the DEC require a Water Conservation Program that demonstrates an applicant's water conservation and efficiency measures.

Recommendation:

- Prepare a Water Conservation Plan.
  More information is available here: http://www.dec.ny.gov/lands/86945.html.

Approximate Cost: (included in the Water Withdrawal Permit Costs)

Deficiency: No System Audit/Leak Detection Program

Water system leaks not only waste a precious resource but also represent money being lost through non-use of that resource. Detecting and repairing leaks is very important in order to ensure that adequate and dependable water service is delivered to current and future users. Studies have found that the percentage of water lost to leaks in older systems in the northeastern section of the country regularly exceed 50% and communities that have performed leak detection surveys have realized a water consumption savings of 30%.

Recommendation:

- At least once per year, conduct a system water audit which includes utilization of metered production and consumption data to determine unaccounted-for water. When unaccounted-for water is found to exceed 15% of the system water production, initiate a leak detection program that covers the entire water distribution system within a three year period. A program can be implemented by hiring an outside service provider; or investing in the necessary equipment and training to perform the task in-house or collaboratively with surrounding communities.

Approximate Cost: No cost for audit program implementation (once system wide metering is implemented). $5,000-$10,000 annually for leak detection program.

Deficiency: No Source Water Protection Plan

The Village does not have a Source Water Protection Plan in place. The purpose of a Source Water Protection Plan is to reduce or eliminate the potential risks to drinking water supplies and are of particular importance for groundwater supplies. The SDWA requires each state to develop a SWAP to complete assessments of sources of public drinking water and make the assessments available to the public. In New York State, the DOH implemented the program and completed SWAPs for all public water systems in New York State. The SWAP is critical to the development of an effective Source Water Protection Plan but a SWAP for the Village was not found during the preparation of this study. The DOH should be consulted prior to developing a Source Water Protection Plan.

Recommendation:

- Develop a Source Water Protection Plan. NYRWA offers assistance with Source Water Protection Plan development.
  More information is available here: http://www.nyruralwater.org/news/new-nyrwa-source-water-protection-program.

Approximate Cost: $5,000-$10,000.

Deficiency: No System Mapping

The Village does not have a comprehensive GIS system map of their transmission and distribution infrastructure. Such mapping is instrumental for future planning, maintenance, and potential expansion of the system.

Recommendation:

- Develop GIS mapping of all system infrastructure. DANC and NYRWA both offer GIS mapping services to municipalities.
  More information is available here: http://danc.org/operations/engineering/engineering-services, and here: http://www.nyruralwater.org/services/water-mapping-services.
  Note: The Villages of Lyons Falls and Port Leyden already have GIS mapping prepared by DANC. The Village of Turin is expected to have GIS mapping completed by DANC in 2017, pending funding. DANC may be the preferred provider of these services to maintain consistency of the mapping and data hosting with the other Villages.

Approximate Cost: $10,000-$15,000.

Deficiency: Outside Users are not districted

The outside users of the Village system are not currently districted as is required by law. All outside users of the system are in the Town of West Turin. The sizes, location, and ownership of underground pipes outside of village limits are mostly unknown.

Recommendation:

- Work with the Town of West Turin to formalize the required Water District(s).

Approximate Cost: $5,000-$10,000 per district (Town expense).

Deficiency: Old Infrastructure

Most of the Village transmission and distribution system is very old and beyond its intended useful life; much of the piping dates back to the original system construction in 1906.

Recommendation:

- A plan should be implemented in order to incrementally replace underground pipes. Priority should be given to areas with known service issues (low pressure, rust, small lines, etc.).

Approximate Cost: $90/LF for replacement with 8" PVC; $105/LF for replacement with 8" ductile iron. Total = $3,200,000 for all transmission piping, and distribution piping within the Village (approximately 32,000 feet total).

Total = $360,000 for distribution piping outside the Village (approximately 3,600 feet total).

Deficiency: Lack of Metered Billing

Water connections in the system are not currently metered. Though this makes for a simplified approach to billing and accounting, it is not providing for accountability for water use within the system. Metering water use is arguably the easiest and most effective way to conserve water.

Recommendation:

- Implement metered services system wide and adjust billing and accounting procedures accordingly.

Approximate Cost: $400 per meter = $65,000 for system wide implementation.

Deficiency: Surcharge at Filtration Plant

On occasion, the filtration plant experiences a surcharge of water in the clear wells and filter beds and actually overflows the clear wells and filter beds and leaks out of the building. It is not clear exactly why this occurs but it is reported to happen after certain rain events during periods of low water use in the system. It may be related to an elevation differential between the reservoir and the plant which could be correctable with specialty valving and/or control upgrades.

Recommendation:

- Determine cause of the surcharge and provide necessary renovations to the plant in order to address the problem.

Approximate Cost: To be determined.

Total for all Village of Constableville Recommendations: $3,320,000.
Total for pipe replacement outside of Village limits: $360,000.

3.4 Village of Lyons Falls

Deficiency: Outstanding Water Withdrawal Permit Conditions

The Village has a Water Withdrawal Permit from the DEC. However, when the permit was issued in 1998, it included several special conditions; some of those conditions have not been met. Notable outstanding conditions are itemized below. There are other special conditions which are not documented as having been satisfied and therefore may also be still outstanding. FOIL requests were made to the DEC and DOH which did not yield any additional information.

Recommendations:

- Work with DEC to ensure all conditions of the Water Withdrawal Permit are satisfied and full compliance with the permit is achieved.

Approximate Cost: To be determined.

Deficiency: Insufficient Water Supply Capacity

A notable outstanding condition of the Water Withdrawal Permit is special condition 2:

> "Within two years of the effective date of this permit, the permittee shall either:
>
> a. Develop an additional source of water (or sources) such that the water system can meet the design average daily demand (215,000 gpd) with the largest producing well out of service, and complete the necessary Water Supply Permit application(s) for that water source (or water sources).
> b. Submit documentation showing that the existing water system, through a combination of other factors, can meet the design average daily demand (which could be different than the existing 215,000 gpd) with the largest producing well out of service."

Recommendation:

- Develop an additional source of water such that the system can meet the current design average daily demand (approximately 145,000 GPD or 100 GPM) with the largest well out of service. Currently, there are two wells with capacities of 140 GPM and 78 GPM. An alternative to developing the extra source may be to implement other water conservation measures in order to get the average daily demand below 112,000 GPD (78 GPM).

Approximate Cost: To be determined based on which alternative is selected.

Deficiency: Lack of Metered Billing

Another notable outstanding condition of the Water Withdrawal Permit is special condition 8:

> "Individual meters shall be provided to measure all water supplied to each individual customer receiving service from this system…"

Though meters exist throughout the system, many of them do not work and therefore metering is not utilized for the system. Though this makes for a simplified approach to billing and accounting, it is not providing for accountability for water use within the system. Metering water use is arguably the easiest and most effective way to conserve water.

Recommendation:

- Implement metered services system wide and adjust billing and accounting procedures accordingly.

Approximate Cost: $400 per meter = $121,000 for system wide implementation.

Deficiency: Outdated Water Conservation Plan

The Village has a Water Conservation Plan but it has not been updated since the 1998 Water Withdrawal Permit application process. The plan should be updated and/or replaced.

Recommendation:

- Prepare a new Water Conservation Plan.
  More information is available here: http://www.dec.ny.gov/lands/86945.html.

Approximate Cost: $2,000-$4,000.

Deficiency: No System Audit/Leak Detection Program

Water system leaks not only waste a precious resource but also represent money being lost through non-use of that resource. Detecting and repairing leaks is very important in order to ensure that adequate and dependable water service is delivered to current and future users. Studies have found that the percentage of water lost to leaks in older systems in the northeastern section of the country regularly exceed 50% and communities that have performed leak detection surveys have realized a water consumption savings of 30%.

Recommendation:

- At least once per year, conduct a system water audit which includes utilization of metered production and consumption data to determine unaccounted-for water. When unaccounted-for water is found to exceed 15% of the system water production, initiate a leak detection program that covers the entire water distribution system within a three year period. A program can be implemented by hiring an outside service provider; or investing in the necessary equipment and training to perform the task in-house or collaboratively with surrounding communities.

Approximate Cost: No cost for audit program implementation (once system wide metering is implemented). $5,000-$10,000 annually for leak detection program.

Deficiency: Outside Users are not districted

Not all of the outside users of the Village system are currently districted as is required by law. Outside users of the system are in the Towns of Leyden, Lyonsdale, and West Turin. The Town of Leyden outside users are districted into Town of Leyden Water District #1. The Town of Lyonsdale and Town of West Turin outside users are not districted. The sizes, location, and ownership of underground pipes outside of village limits are mostly unknown.

Recommendation:

- Work with the Towns of Lyonsdale and West Turin to formalize the required Water District(s).

Approximate Cost: $5,000-$10,000 per district (Town expense).

Deficiency: Old Infrastructure

Most of the Village transmission and distribution system is very old and beyond its intended useful life; much of the piping dates back to the early 1900's.

Recommendation:

- A plan should be implemented in order to incrementally replace underground pipes. Priority should be given to areas with known service issues (low pressure, rust, small lines, etc.).

Approximate Cost: $90/LF for replacement with 8"PVC; $105/LF for replacement with 8" ductile iron. Total = $3,800,000 for all transmission piping, and distribution piping within the Village (approximately 38,000 feet total).

Total = $675,000 for distribution piping outside the Village (approximately 6,750 feet total).

Total for all Village of Lyons Falls Recommendations: $3,955,000.

Total for pipe replacement outside of Village limits: $675,000.

3.5 Village of Port Leyden

Deficiency: Outstanding Water Withdrawal Permit Conditions

The Village has a Water Withdrawal Permit from the DEC. However, when the permit was issued in 1997, it included special conditions; some of those conditions have not been met. Notable outstanding conditions are itemized below. There are other special conditions which are not documented as having been satisfied and therefore may also be still outstanding. FOIL requests were made to the DEC and DOH which did not yield any additional information.

Recommendations:

- Work with DEC to ensure all conditions of the Water Withdrawal Permit are satisfied and full compliance with the permit is achieved.

Approximate Cost: To be determined.

Deficiency: Lack of Metered Billing

A notable outstanding condition of the Water Withdrawal Permit is special condition 1:

> "Individual meters shall be provided to measure all water supplied to each individual customer receiving service from this system…"

Water connections in the system are not currently metered. Though this makes for a simplified approach to billing and accounting, it is not providing for accountability for water use within the system. Metering water use is arguably the easiest and most effective way to conserve water.

Recommendation:

- Implement metered services system wide and adjust billing and accounting procedures accordingly.

Approximate Cost: $400 per meter = $156,400 for system wide implementation.

Deficiency: Outdated Water Conservation Plan

The Village has a Water Conservation Plan but it has not been updated since the 1997 Water Withdrawal Permit application process. The plan should be updated and/or replaced.

Recommendation:

- Prepare a new Water Conservation Plan.
  More information is available here: http://www.dec.ny.gov/lands/86945.html.

Approximate Cost: $2,000-$4,000.

Deficiency: No System Audit/Leak Detection Program

Other notable outstanding conditions of the Water Withdrawal Permit are special conditions 2 and 3:

> "Within one year, and at least once each year thereafter, the permittee shall conduct a system water audit which includes utilization of metered production and consumption data to determine unaccounted-for water." and
>
> "When unaccounted-for water is found to exceed 15% of system water production, the permittee must initiate a leak detection program that covers the permittee's entire water distribution system within a three year period."

Water system leaks not only waste a precious resource but also represent money being lost through non-use of that resource. Detecting and repairing leaks is very important in order to ensure that adequate and dependable water service is delivered to current and future users. Studies have found that the percentage of water lost to leaks in older systems in the northeastern section of the country regularly exceed 50% and communities that have performed leak detection surveys have realized a water consumption savings of 30%.

Recommendation:

- Implement a regular system water audit schedule and leak detection program, as necessary to satisfy the above conditions. A program can be implemented by hiring an outside service provider; or investing in the necessary equipment and training to perform the task in-house or collaboratively with surrounding communities.

Approximate Cost: No cost for audit program implementation (once system wide metering is implemented). $5,000-$10,000 annually for leak detection program.

Deficiency: No Source Water Protection Plan

The Village does not have a Source Water Protection Plan in place. The purpose of a Source Water Protection Plan is to reduce or eliminate the potential risks to drinking water supplies and are of particular importance for groundwater supplies. The SDWA requires each state to develop a SWAP to complete assessments of sources of public drinking water and make the assessments available to the public. In New York State, the DOH implemented the program and completed SWAPs for all public water systems in New York State. The SWAP is critical to the development of an effective Source Water Protection Plan. The DOH SWAP for the Village was completed in 2005.

Recommendation:

- Develop a Source Water Protection Plan. NYRWA offers assistance with Source Water Protection Plan development. More information is available here: http://www.nyruralwater.org/news/new-nyrwa-source-water-protection-program

Approximate Cost: $5,000-$10,000.

Deficiency: Outside Users are not districted

Not all of the outside users of the Village system are currently districted as is required by law. Outside users of the system are in the Towns of Leyden and Lyonsdale. The Town of Leyden outside users are districted into Town of Leyden Water District #2. The Town of Lyonsdale outside users are not districted. The sizes, location, and ownership of underground pipes outside of village limits are mostly unknown.

Recommendation:

- Work with the Town of Lyonsdale to formalize the required Water District(s).

Approximate Cost: $5,000-$10,000 per district (Town expense).

Deficiency: Old Infrastructure

Most of the Village transmission and distribution system is very old and beyond its intended useful life; much of the piping dates back more than 100 years.

Recommendation:

- A plan should be implemented in order to incrementally replace underground pipes. Priority should be given to areas with known service issues (low pressure, rust, small lines, etc.).

Approximate Cost: $90/LF for replacement with 8"PVC; $105/LF for replacement with 8" ductile iron. Total = $3,200,000 for all transmission piping, and distribution piping within the Village (approximately 32,000 feet total).

Total = $500,000 for distribution piping outside the Village (approximately 5,000 feet total).

Deficiency: Easements for Transmission Main

Portions of the transmission lines from the infiltration galleries into the Village run through private property. The ownership is not properly documented nor are the proper easements in place for access. In one case, a private homeowner was required to pay for repairs to a damaged portion of the transmission line through their property.

Recommendation:

- Properly document the location of all mains running through private property; obtain necessary easements; and properly establish ownership and maintenance responsibilities of the lines.

Approximate Cost: To be determined.

Total for all Village of Port Leyden Recommendations: $3,390,000.

Total for pipe replacement outside of Village limits: $500,000.

3.6 Village of Turin

Deficiency: Outstanding Water Withdrawal Permit Conditions

The Village has a Water Withdrawal Permit from the DEC. However, when the permit was issued in 1998, it included several special conditions. There are special conditions which are not documented as having been satisfied and therefore may also be still outstanding. FOIL requests were made to the DEC and DOH which did not yield any additional information.

Recommendations:

- Work with DEC to ensure all conditions of the Water Withdrawal Permit are satisfied and full compliance with the permit is achieved.

Approximate Cost: To be determined.

Deficiency: Outdated Water Conservation Plan

The Village has a Water Conservation Plan but it has not been updated since the 1998 Water Withdrawal Permit application process. The plan should be updated and/or replaced.

Recommendation:

- Prepare a new Water Conservation Plan.
  More information is available here: http://www.dec.ny.gov/lands/86945.html.

Approximate Cost: $2,000-$4,000.

Deficiency: No System Audit/Leak Detection Program

Water system leaks not only waste a precious resource but also represent money being lost through non-use of that resource. Detecting and repairing leaks is very important in order to ensure that adequate and dependable water service is delivered to current and future users. Studies have found that the percentage of water lost to leaks in older systems in the northeastern section of the country regularly exceed 50% and communities that have performed leak detection surveys have realized a water consumption savings of 30%.

Recommendation:

- At least once per year, conduct a system water audit which includes utilization of metered production and consumption data to determine unaccounted-for water. When unaccounted-for water is found to exceed 15% of the system water production, initiate a leak detection program that covers the entire water distribution system within a three year period. A program can be implemented by hiring an outside service provider; or investing in the necessary equipment and training to perform the task in-house or collaboratively with surrounding communities.

Approximate Cost: No cost for audit program implementation (once system wide metering is implemented). $5,000-$10,000 annually for leak detection program.

Deficiency: Old Source Water Protection Plan

The Village has a Source Water (Wellhead) Protection Plan in place. However, the Wellhead Protection Plan was prepared in 1998 and is due to be revisited and possibly updated. The purpose of a Source Water Protection Plan is to reduce or eliminate the potential risks to drinking water supplies and are of particular importance for groundwater supplies. The SDWA requires each state to develop a SWAP to complete assessments of sources of public drinking water and make the assessments available to the public. In New York State, the DOH implemented the program and completed SWAPs for all public water systems in New York State. The SWAP is critical to the development of an effective Source Water Protection Plan. The DOH SWAP for the Village was completed in 2005 but only a one page summary document was found during the preparation of this report.

Recommendation:

- Revisit and revise as required the 1998 Wellhead Protection Plan. NYRWA offers assistance with Source Water Protection Plan development.
  More information is available here: http://www.nyruralwater.org/news/new-nyrwa-source-water-protection-program

Approximate Cost: $5,000-$10,000.

Deficiency: No System Mapping

The Village does not have a comprehensive GIS system map of their transmission and distribution infrastructure; in fact there is no record mapping available. Such mapping is instrumental for future planning, maintenance, and potential expansion of the system.

Recommendation:

- Develop GIS mapping of all system infrastructure. DANC and NYRWA both offer GIS mapping services to municipalities.
  More information is available here: http://danc.org/operations/engineering/engineering-services, and here: http://www.nyruralwater.org/services/water-mapping-services.
  Note: The Villages of Lyons Falls and Port Leyden already have GIS mapping prepared by DANC. The Village of Turin is expected to have GIS mapping completed by DANC in 2017, pending funding.

Approximate Cost: $10,000-$15,000.

Deficiency: Outside Users are not districted

The outside users of the Village system are not currently districted as is required by law. All outside users of the system are in the Town of Turin. The sizes, location, and ownership of underground pipes outside of village limits are mostly unknown.

Recommendation:

- Work with the Town of Turin to formalize the required Water District(s).

Approximate Cost: $5,000-$10,000 per district (Town expense).

Deficiency: Old Infrastructure

Most of the Village transmission and distribution system is very old and beyond its intended useful life; much of the piping dates back to the early 1900's.

Recommendation:

- A plan should be implemented in order to incrementally replace underground pipes. Priority should be given to areas with known service issues (low pressure, rust, small lines, etc.).

Approximate Cost: $90/LF for replacement with 8"PVC; $105/LF for replacement with 8" ductile iron. Total = $1,300,000 for transmission and distribution piping within the Village (approximately 13,000 feet total).

Total = $2,560,000 for distribution piping outside the Village (approximately 25,600 feet total).

Total = $3,200,000 for all transmission piping, and distribution piping within the Village (approximately 32,000 feet total).
Total = $360,000 for distribution piping outside the Village (approximately 3,600 feet total).

Deficiency: Water Storage Tank Painting
The tank is due to be repainted.
Recommendation:

- Have the tank repainted.

Approximate Cost: $500,000.

Total for all Village of Turin Recommendations: $1,849,000.
Total for pipe replacement outside of Village limits: $2,560,000.

4 Regional Considerations

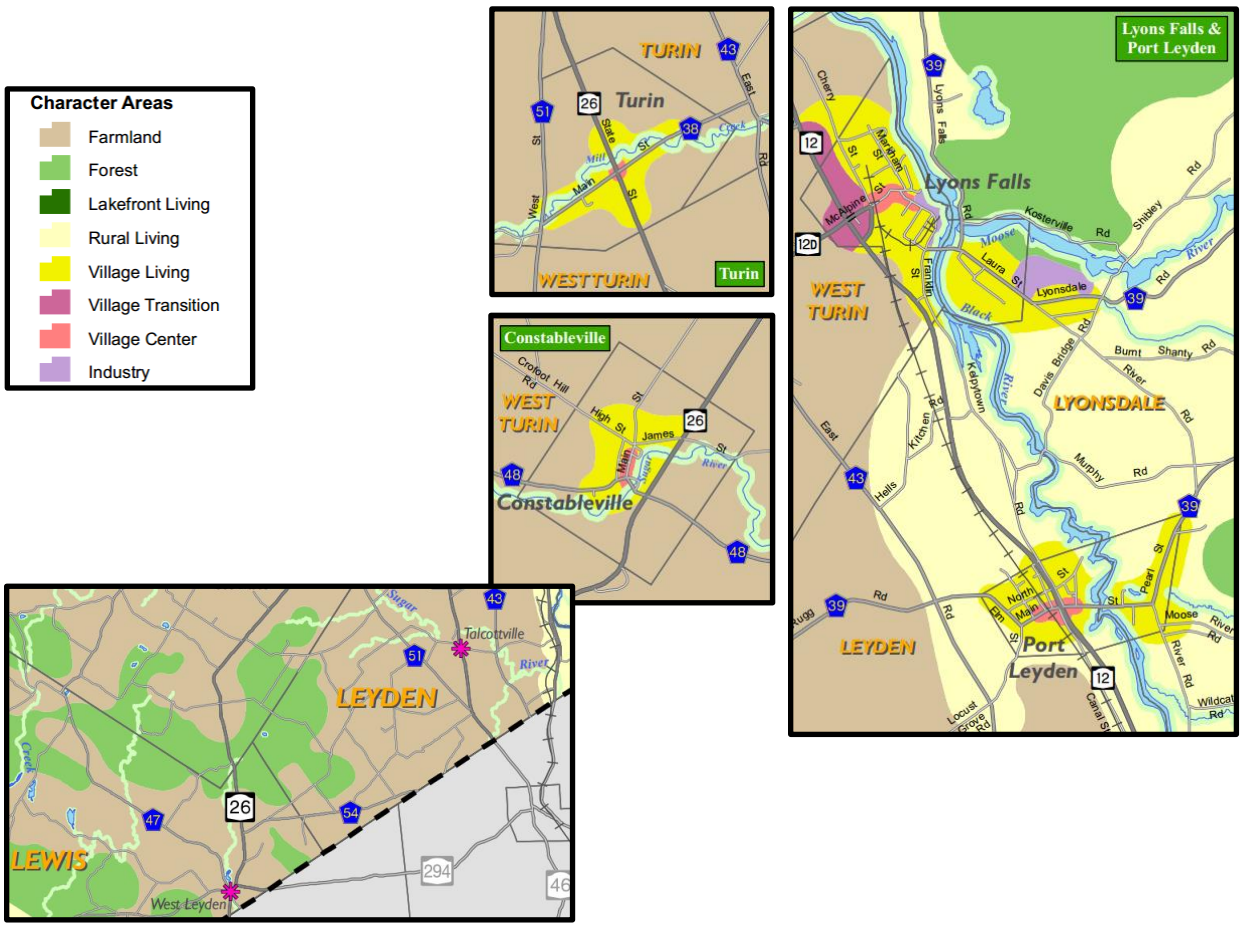
4.1 Introduction

This section focuses on exploring ways that the individual systems can work together to improve service and make operations more efficient going forward; where interconnection of existing systems may be feasible; and where new services may be warranted for hamlets that are not currently provided public water.

The 2009 Comprehensive Plan was an important reference for the completion of this section. Of particular focus was the County Character Area Plan (CCAP) within the Comprehensive Plan. From the Comprehensive Plan:

> *"The CCAP provides recommendations for land use patterns from a county-wide perspective. These recommendations are not enforceable at the local level, as each Town or Village retains the local control to pursue land use regulations at their discretion. However, each community should consider these recommendations, and work closely with the Lewis County Department of Economic Development and Planning, Tug Hill Commission, Adirondack Park Agency, and other relevant agencies to develop a sound land use plan. A coordinated and collaborative approach across municipal boundaries will ensure important natural and community resources are preserved and that growth and investment are focused in appropriate locations."*

Below are parts of the CCAP Map from the Comprehensive Plan:
(refer to Appendix E for the entire map)



Regional infrastructure expenditures are likely not feasible for the small communities to invest in, particularly given the financial state of those communities and other improvements, many of which are of a higher priority, outlined in this report. Regional infrastructure may, however, be an area that Lewis County could choose to fund, or assist with in other ways, in order to promote future growth and development within southern Lewis County.

4.2 System Expansions and Interconnections

One of the objectives of this study was to determine the need and feasibility of expanding and/or interconnecting existing public water systems. As outlined in section 2 of this report, the systems generally have little capacity to expand service without the development of additional water source(s). Potential for new sources water is discussed in section 4.3. Depending on the magnitude of any increased service areas, it may also be necessary to create additional storage capacity. Significant benefits of interconnecting systems are increased reliability; the ability to share source water and storage capacity; and the ability to provide water to, and perhaps even stimulate, development along the interconnection.

The areas in the CCAP that would typically be associated with public water systems are the village and industry areas. As made evident by the CCAP map, there are no major changes expected within the study area from what exists today. Any expansions would make the most sense working outward along main road corridors from the village boundaries which are already served with water; those areas are most likely to see the need for water in the future. Often times, extensions are done as needed in response to new development proposals. Extensions can also be done to promote development by contributing toward the goal of having 'shovel-ready' sites available for development.

Below are discussions of possible system interconnections within the study area. Several interconnections are discussed; Lyons Falls to Port Leyden, Lyons Falls to Turin, Lyons Falls to Constableville, and Port Leyden to Boonville. An interconnection between the Villages of Constableville and Turin was not examined because of the distance and topography between the Villages; and the rural nature, and therefore lack of development potential, along possible routes between them. Likewise, service to Talcottville and West Leyden (both potential new water service areas discussed later in this report) would not be feasible due to geography and little potential for other development to take advantage of the water route.

For planning purposes, the approximate total project cost for standard PVC water main extensions is $90/LF for 8" and $105/LF for 12". Ductile iron costs are about $105/LF and $125/LF, respectively.

Lyons Falls – Port Leyden Interconnection

This interconnection would connect via a route along River Road in the Village of Lyons Falls south to Kelpytown Road in the Village of Port Leyden with 8 or 12 inch piping (Refer to Map 3-1 in Appendix D). It is appealing for a number of reasons:

1. Proximity of the villages. The distance between the villages is approximately 1.5 miles and the water systems are even closer, coming within approximately 0.5 miles from each other in the Town of Leyden; where the Port Leyden system extends from the south and Lyons Falls from the north.
2. Ability to expand fire protection to the area which contains several dozen structures, many of them residences.
3. Opportunity to share existing and any future water source capacity.
4. Opportunity to share existing and any future water storage capacity.
5. Potential to provide water to any future development along Route 12 between the villages.
6. The interconnection would doubly serve as a means to make much needed infrastructure upgrades within the area. The existing underground pipes, from both villages, in this area are of unknown

size and age but generally the customers in this area report poor water pressure and unreliable service. The Town of Leyden unsuccessfully applied for CDBG money through the CFA process in 2015 for infrastructure improvements in the same area; the money was to be used for engineering services related to exploring the feasibility and specifics of the proposed upgrades.

Approximate Project Cost: $1,799,000 (before applying any potential aid). Refer to Appendix F for a more detailed cost analysis.

Lyons Falls – Turin Interconnection

This interconnection would connect via a route along Route 12 in the Village of Lyons Falls, north to Turin Road, and northwest to East Road and East Main Street in the Village of Turin with 8 or 12 inch piping (Refer to Map 3-2 in Appendix D).. The interconnection does not provide the same level of benefit, nor does it benefit as many properties as the Lyons Falls – Port Leyden interconnection, but it does have some benefits:

1. Proximity of the villages. The distance between the villages is approximately 1.6 miles and the distance between the water systems is about the same.
2. Opportunity to share existing and any future water source capacity.
3. Opportunity to share existing and any future water storage capacity.
4. Potential to provide water to any future development along Route 12 north of the Village of Lyons Falls.

Approximate Project Cost: $2,153,000 (before applying any potential aid). Refer to Appendix F for a more detailed cost analysis.

Lyons Falls – Constableville Interconnection

This interconnection would connect via a southwesterly route from Lyons Falls to Constableville along Routes 12D and 26 with 12 inch piping (Refer to Map 3-3 in Appendix D). The distance is longer, approximately 4.6 miles, compared to the Lyons Falls to Port Leyden and Lyons Falls to Turin connections and therefore the cost-benefit is diminished but it does still provide value to the communities; especially when considered with other interconnections:

1. Opportunity to share existing and any future water source capacity.
2. Opportunity to share existing and any future water storage capacity.

Approximate Project Cost: $2,921,000 (before applying any potential aid). Refer to Appendix F for a more detailed cost analysis.

Port Leyden – Boonville Interconnection

An interconnection between the Village of Boonville (Oneida County) and the Village of Port Leyden is discussed in Section 4.3 because the primary purpose of the interconnection would be to replace existing water sources in the study area.

4.3 Potential New Source Water

Opportunities for new source water were considered as part of this study. New water sources could be sought for a number of different reasons:

1. Additional capacity for growth and expansion.
2. Additional redundancy and reliability of service.
3. Improved water quality.
4. Reduced susceptibility to contamination.
5. Potential to abandon existing sources and treatment processes.

The preferred method of increasing water supply in the area is in the form of wells. Wells already in place throughout the region typically have good yield at relatively shallow depths and there are opportunities to develop new source(s) per the 2008 Favorability Zone Delineation report.

Notwithstanding any significant growth and subsequent increased water demand in the area, the need for new source water will be closely tied to the decisions of interconnecting any of the existing systems. For example, there are scenarios where an existing system may be in need of more source capacity but an interconnection with another system which has excess capacity could fill that need.

An appealing option for new source water would be to purchase it from another existing system. Purchasing water from an outside source allows a community the benefits of eliminating the burden of operation and maintenance of existing sources and treatment; eliminating the administration of source water regulatory compliance; and could provide for better water quality. Two nearby systems were considered for feasibility of obtaining water: the Villages of Lowville and Boonville.

The Village of Lowville is approximately 12 miles north of the study area. A review of the 2009 water study shows that average daily use is around 1,100,000 GPD and that their water treatment plant has a capacity of 1,500,000 GPD. The study area has a total average daily use of 400,000 GPD and therefore there is not sufficient capacity for the Lowville system to serve the study area when peaks within each of the systems are taken into consideration.

Boonville – Port Leyden Supply Extension

The Village of Boonville is approximately 7.5 miles south of the study area (Refer to Map 3-4 in Appendix D). Due to the capital expense of extending a water line from Boonville to the study area, the idea becomes more financially viable as more communities are interconnected and the cost can be shared among a greater population. Another benefit of the extension is the potential to provide water for any future development along the Route 12 corridor between Boonville and Port Leyden.

The Village of Boonville system was discussed with Kenneth Stabb, Superintendent of the Municipal Commission of Boonville, the entity responsible for operation of the system. Mr. Stabb indicated that the current system is supplied by two ground water wells which are not under the direct influence of surface water, and only chlorine disinfection is performed. The system is currently permitted for 1,100,000 GPD but only averages between 250,000 and 300,000 GPD with a peak around 350,000 to 400,000 GPD, indicating an excess capacity of 700,000 GPD. The study area uses a total of about 400,000 GPD, indicating that it is technically feasible to obtain water from Boonville.

Approximate Project Cost: $3,799,000 (before applying any potential aid). Refer to Appendix F for a more detailed cost analysis.

4.4 Potential New Service Areas

There are two areas within the study area that were reviewed for the potential of new water system development. The hamlets of West Leyden (Town of Lewis) and Talcottville (Town of Leyden) are small population centers with substantial density compared to other areas outside of Villages; neither hamlet currently has a public water supply. Developing a new water system would require the respective Town to create the required water district before the development of a water source (likely groundwater wells) and construction of the required storage, treatment, and distribution systems. Benefits of developing a water system include more reliable service, higher quality water, and the ability to provide fire protection which can lower homeowner's insurance rates for those covered. Specifics of each potential system and approximate costs for their development are included below.

West Leyden (Town of Lewis) System

The hamlet of West Leyden is located in the Town of Lewis at the intersection of NY Route 26 and Osceola Road (Refer to Map 4-1 in Appendix D). All properties are currently served by individual wells, including a school (West Leyden Elementary).

There are a few common problems with water wells in the hamlet. Most of the wells are reported to be hand dug wells from the 1940's and 1950's. High sulfur content, high salt content, small building lots, and inadequate separation from septic systems and other pollutant sources are reported throughout the hamlet. High salt content is speculated to be from very heavy salting of the roads in the area due to truck traffic going to and from a nearby landfill; the heavy salting began when the landfill was constructed in 2006. Several residences and at least one business (Milk Plant Tavern) within the hamlet have drinking water brought from outside sources. The tavern operates a PWS which is compliant with health regulations but the water taste is too poor for them to offer to customers. Many onsite wastewater (septic) systems in the area have been replaced over time due to being non-compliant with DEC standards and, in some cases, discharging directly to surface waters. In addition, there are many instances with insufficient separation to water wells from septic system components. These concerns, along with shallow groundwater contribute to a perceived, and probably real, water quality issue in the hamlet.

Multiple scenarios were looked at for developing a new system in West Leyden with the goal of optimizing the cost-benefit ratio for the required investment. A summary of properties near the hamlet 'center' is shown in the table below:

TABLE 4-1
SUMMARY OF PROPERTIES – WEST LEYDEN, NY (TOWN OF LEWIS)

Distance from hamlet center	No. of Properties	Approximate No. of Connections			
		Residences	Commercial	Farms	Schools
1/4 Mile Radius	76	70	5	2	1
1/2 Mile Radius	116	95	8	4	1

The population density quickly drops off after ¼ mile distance from the hamlet center is reached. A schematic drawing of a scenario that would provide an optimum ratio is included in Appendix C of this report. The proposed district would include approximately 86 properties including approximately 72 water services, with a total estimated population of 335 (including 160 for the school). Population is estimated based on school population from the School District; and population per housing unit for the Town of Lewis from PAD and the number of housing units within the proposed district. This is only one option of what a system could look like; the exact limits of the district and necessary infrastructure would be determined by the community through further engineering and financial analysis. Further testing of water quality in the area could aid with certain grant opportunities, should there be a real threat to residents' health.

There has been speculation about using the existing school well for the supply of a new system. This is a possibility but at least one additional well would have to be developed in order to meet current regulations for redundancy, and likely to meet demand. It would only make sense to reuse the school well if the additional source supply was in the same vicinity so treatment and storage could be centralized. Being that the school well is on private property, this scenario will probably not be the most economical. In the big picture of a new system, the cost for well development is a very small part of the total expense.

Approximate Project Cost: $1,746,000 (before applying any potential aid). Refer to Appendix F for a more detailed cost analysis.

Talcottville (Town of Leyden) System

The hamlet of Talcottville is located in the Town of Leyden near the NY Route 12D intersections with School Road and Domser Road (Refer to Map 4-2 in Appendix D). All properties are currently served by individual wells which tend to have very hard water with high sulfur and iron content.

Possible scenarios were limited for a new system in Talcottville due to the very small population and generally larger lots than what is present in West Leyden, by comparison. The Sugar River also makes servicing any properties north of the hamlet cost-prohibitive due to the limited number of services to be gained with a river crossing. Possibilities for a new system were investigated with the goal of optimizing the cost-benefit ratio. A summary of properties near the hamlet 'center' is shown in the table below:

TABLE 4-2
SUMMARY OF PROPERTIES – TALCOTTVILLE, NY (TOWN OF LEYDEN)

Distance from hamlet center	No. of Properties	Approximate No. of Connections		
		Residences	Commercial	Farms
1/4 Mile Radius	50	33	3	3
1/2 Mile Radius	70	43	3	4

Like West Leyden, the population density drops off dramatically after ¼ mile distance from the hamlet center is reached. A schematic drawing of a scenario that would provide an optimum ratio is included in Appendix C of this report. The proposed district would include approximately 63 properties including approximately 48 water services, with a total estimated population of 85. Population is estimated based on population per housing unit for the Town of Leyden from PAD and the number of housing units within the proposed district. This is only one option of what a system could look like; the exact limits of the district and necessary infrastructure would be determined by the community through further engineering and financial analysis.

Approximate Project Cost: $1,675,000 (before applying any potential aid). Refer to Appendix F for a more detailed cost analysis.

5 A Regional Approach

5.1 Introduction

Small communities will be significantly impacted by ever increasing water regulatory requirements through additional training costs, testing/monitoring costs, and/or completion of costly capital improvements required to gain compliance and maintain their existing systems. With the necessary infrastructure and compliance improvements looming, this is a prime opportunity to seriously consider collaboration between communities.

5.2 Water Resources Agency

The preferred method of implementing the goals and recommendations of this study is through the creation of a Regional Water Resources Agency or similar entity. The agency would help streamline and make all systems operate more efficiently and effectively by sharing services. The specific duties and responsibilities of the agency would be set by its members; they could include:

- Policy making
- Long-range planning (capital improvements, financial assistance, etc.)
- Billing (meter reading)
- System operation (GIS mapping, compliance reporting, system auditing, etc.)
- Maintenance (hydrant flushing, leak detection, valve exercising, emergency repairs, etc.)
- Operator training and certification
- Bulk purchasing of chemicals, equipment, and services (i.e. lab testing), regulatory compliance, system operation, system maintenance, meter reading, and billing.

While the specific responsibilities of the agency would be determined during the formation process, the ultimate objective is to advance the goals of cost savings and improving government efficiency; both common themes in today's economic environment. This study is an important step in that direction.

Members of the agency would represent various interests in the community including elected officials, residents, farmers, and local business owners. The agency would be created through the passage of a resolution and would likely be done by Lewis County with the Towns and Villages wishing to join. A sample of a resolution creating the Genesee County Water Resources Agency is included in Appendix G as an example of the language utilized.

The process of creating the agency can be started by using intermunicipal agreements (refer to Appendix H for an example agreement), then working toward the establishment of a staffed organization over an extended period of time as needed. This can be accomplished by first strategically identifying a community, or communities, that would be in favor of the creation of the agency. Once formed, this small agency would be the beginning of a larger entity whose role could change as conditions and needs warrant. Individual communities could choose to share different services; and retain various levels of control and autonomy over their respective systems with the newly created agency through the use of intermunicipal agreements. For example, a community may choose to maintain the day-to-day operation of their system while delegating compliance and billing duties to the agency. A potential means of minimizing costs would be to collaborate with an existing entity for the administration of the agency (e.g. DANC).

The ultimate success of this study is dependent on follow through and implementation of the goals and recommendations herein. It is recommended that the agency enter into agreements to provide a central

location for services that would be made readily available to each of the local communities. Specifically, it is recommended that the agency work toward the following items:

- Invest in community water systems that have available capacity or are capable of increasing their capacity with strategic upgrades. Investments will benefit the local community by providing sufficient water capacity to meet their current and future demands. Excess capacity beyond that amount would be allocated to the agency to utilize as needed for local economic development and ensure public health, safety and welfare. Any economic development opportunities or planning would be coordinated with the local community and their respective comprehensive plan or land use regulations.

- Collaborative leak detection and water auditing program.

- Shared services agreements for specialized or commonly utilized equipment related to construction and installation of pipeline and water appurtenances, including back hoes, excavators, and trenching protection.

- Central purchasing of supplies, including office supplies, piping, chemicals, equipment, and other materials. This would allow the agency to purchase materials in larger quantities, thereby reducing the cost to individual operators and the community.

- A designated individual or small team that can provide operator regulatory tasks in regards to OSHA, DOH, and other regulatory agencies (confined space policies, proper signage and procedure manuals, security and emergency plans, collecting and maintaining material safety data sheets).

- Centralized laboratory testing.

- Consistent source water protection policies.

- Creation of a Special District overlay for a regional water system to provide the framework to implement other items above. Such a district could also eliminate the need for individual Town districts for outside users of the existing water systems. The simplest form of such a district could be a boundary enveloping the Towns of Lewis, Leyden, Lyonsdale, Turin, and West Turin. The property owners connected to the public water supply would share in the costs of the district.

5.3 Cost Savings Analysis

As discussed in previous sections, the creation of a Regional Water Resources Agency would provide the member communities with better operational efficiency. The quantitative benefits of the agency, as outlined below, provide a clearer picture of the benefits of developing such a resource in lieu of relying on individual municipalities for managing all aspects of water system compliance, delivery, maintenance, and repair.

During interviews with community water department operators and staff, the idea of shared services and purchase agreements was a common topic of discussion. The analysis below addresses these items as the primary cost savings measures as a result of this study.

TABLE 5-1
2015-2016 VILLAGE EXPENSES

Municipality	Total	Debt Service	Operation and Maintenance
(V) Constableville	$57,700	$28,300	$29,400
(V) Lyons Falls	$85,000[1]	$27,500	$57,500
(V) Port Leyden	$108,700	$40,300	$68,400
(V) Turin	$59,600	$19,100	$40,500
TOTAL	$311,000	$115,200	$195,800

Notes:
1. Excludes increased costs for capital projects incurred in 2015.

In 2015-2016, the four existing Village water systems' combined annual operation and maintenance expenses were approximately $195,800. Beginning with that value as a combined operational budget, we can analyze the capacity to perform capital improvement projects (e.g. interconnections) based on savings realized from consolidating operations. It is reasonable to expect a savings of between 25 and 50 percent by combining operations. This is presented in Table 5-2. It should be noted that the indicated probable USDA loan terms and grants would be dependent on the Villages increasing their water rates to meet the USDA Rural Development Target Service Charges as discussed in Section 3.2.

TABLE 5-2
COMBINED OPERATIONS SAVINGS VS. CAPITAL PROJECT CAPACITY

Savings (%)	Annual Savings ($) (Debt Capacity)	Local Project Share Capacity (38 year; 2.75% loan)	Total Project Capacity (assuming 45% grant)[1]
25	$48,950	$1,100,000	$2,000,000
30	$58,740	$1,300,000	$2,370,000
35	$68,530	$1,600,000	$2,910,000
40	$78,320	$1,800,000	$3,280,000
45	$88,110	$2,000,000	$3,640,000
50	$97,900	$2,200,000	$4,000,000

Notes:
1. Individual projects would be subject to the $500,000 maximum grant cap.

6 Conclusion

It is important to restate that an objective of this study is not to reduce existing costs or water rates but to control future costs. Investing money now can translate to reduced cost increases later. Water rate increases, as discussed in the previous section, are not appealing to elected officials nor to their constituents. This is particularly true within the study area where a high percentage of residents are on low and fixed incomes. However, rate increases are necessary. Many investments are needed just to maintain the existing systems and, in the case of USDA RD, funding for those improvements and other enhancements will not be available until rates meet the target service charges.

Most of the existing systems have operated with minimal maintenance for over one hundred years and underground piping, for example, is at a critical point where replacement is required. The existing pipes will continue to deteriorate and the frequency of line breaks and emergency repairs will only increase going forward.

It is critical for the communities to each implement a comprehensive plan to complete the recommendations outlined in Section 3 of this report. It is recommended that the easier, less expensive administrative items be addressed immediately with a goal of completing the larger, more costly capital improvement items within five years.

The communities should also begin a concerted effort to consolidate operations for the simplest items. For example, using combined purchasing power for chemicals, lab testing, and leak detection can help the communities realize cost savings now. Sharing resources for compliance monitoring and reporting, and for routine maintenance tasks are also easy strategies to optimize efficiency now. The savings from each item may be small, but cumulatively they can make a difference. Furthermore, implementing the small items can be a way to ease into and experiment with the idea of further regionalization of the water systems, and can even be a catalyst for other cost sharing opportunities, even for services outside the scope of this study.

Ultimately, a collaborative regional approach to the region's water systems should be seriously considered. A Water Resource Agency, or similar entity, is the preferred means to long term optimization of the region's public water supply. System interconnections can provide much needed redundancy and improved reliability of service for all communities while creating additional development incentives for more areas. The cost savings realized from a regionalized approach will immediately create investment capacity with no added cost to users. However, increased water rates to meet the target service charges of funding agencies would not only directly add to available funds but would make the communities eligible for additional low interest loans and grants. Funding agencies look favorably on communities working together to optimize efficiency.

APPENDIX A

ABBREVIATIONS

Abbreviations

CDBG	Community Development Block Grant
CFA	New York State Consolidated Funding Application
DANC	Development Authority of the North Country
DEC	New York State Department of Environmental Conservation
DOH	New York State Department of Health
DOL	New York State Department of Labor
DWSRF	Drinking Water State Revolving Fund
EDU	Equivalent Dwelling Unit
EFC	New York State Environmental Facilities Corporation
EPA	United States Environmental Protection Agency
FOIL	New York State Freedom of Information Law
GIS	Geographic Information System
GPD	Gallons per Day
GPM	Gallons per Minute
IMA	Intermunicipal Agreement
IUP	DWSRF Intended Use Plan
MGD	Million Gallons Per Day
MHI	Median Household Income
NYRWA	New York Rural Water Association
PAD	Cornell Program on Applied Demographics
PSI	Pounds per Square Inch
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act
SDWIS	EPA Safe Drinking Water Information System
SWAP	NY DOH Source Water Assessment Program
TSC	Target Service Charge
USDA	United States Department of Agriculture
USDA RD	USDA Rural Development
USDA RUS	USDA RD Rural Utilities Services
USDA WEP	USDA RUS Water & Environmental Programs

APPENDIX B

REGULATIONS AFFECTING PUBLIC WATER SYSTEMS

Current Regulations Affecting Water Systems

Drinking water regulations set maximum permissible levels for certain contaminants and establish monitoring requirements for these contaminants. Water suppliers are assigned the day-to-day responsibility of meeting these regulations. Routine monitoring is required, with the results given to the Wyoming County Health Department, New York State Department of Health, and the United States Environmental Protection Agency (USEPA). Violations must be reported to the public.

Concern about the quality of the Nation's drinking water supplies prompted the Safe Drinking Water Act (SDWA) legislation in 1974. Its enactment was the beginning of a new era for owners, managers, and operators of public water systems. As a result of the SDWA, much more was known about the quality of drinking water than ever before. The USEPA was authorized to develop national standards that are the primary responsibilities of the state to enforce.

The SDWA has two parts. First, USEPA established National Primary Drinking Water Regulations for drinking water quality. Generally, these standards are numerical criteria for each contaminant that may be found in a drinking water supply and that may have an adverse effect on health. Drinking water standards establish maximum contaminant levels, the highest allowable concentration of a contaminant in drinking water. The maximum contaminant levels are determined through risk assessment procedures that take into consideration health effect, treatment technologies, sampling techniques, monitoring requirements and appropriate management practices. Maximum contaminant levels are usually expressed as milligrams per liter (mg/L), which are equivalent to parts per million (ppm).

Under certain conditions, USEPA may designate that a treatment technique be used in place of a maximum contaminant level. The Surface Water Treatment and Lead and Copper Rules require a treatment technique instead of a maximum contaminant level.

The second part of the SDWA pertains to water suppliers and monitoring water quality. Public water systems operators must monitor the quality of the water delivered to consumers and treat that water, if necessary, to assure that the concentration of each contaminant remains below the acceptable levels established by the EPA. Monitoring requirements differ according to whether the system is a community or non-community supply.

The 1986 Amendments to the SDWA greatly extended federal, state, and local responsibilities for protection of community water supplies. Water utilities are required to provide the necessary facilities, personnel, and operating vigilance to assure delivery of an adequate supply of safe water that consistently meets the requirements of the National Primary Drinking Water Regulations. In addition, the utilities have various decision-making responsibilities beyond direct operation and maintenance. Community water systems are subject to increased public scrutiny since the public must be notified of each drinking water violation, and they are subject to fines for violations.
Drinking water standards are provided by the USEPA for biological contaminants, pathogenic bacteria, such as viruses, protozoa, lead, radionuclides, by-products of disinfection, organic chemicals, nitrates, and other inorganic chemicals. Monitoring is also required for a number of unregulated parameters. Monitoring requirements for each contaminant are quite specific, and water systems must follow a prescribed schedule and procedure for contaminant sampling and analysis. States have the authority to waive monitoring requirements for many contaminants if those substances have never been used in an area or if water systems are not vulnerable to contamination by the substance. The USEPA's Drinking Water Treatment for Small Communities provides the following description of drinking water standards and protection programs.

Biological Standards

The principle immediate risk from drinking water contamination is biological in origin with verified outbreaks of waterborne diseases caused by lack of proper treatment facilities or a breakdown in such equipment. Throughout most of recorded history, human organic waste has posed the greatest threat to the safety of drinking water.

At a minimum, treatment that is required to control microbiological contamination must include disinfection to kill disease-causing organisms. The Surface Water Treatment Rule also requires surface water systems to install some form of filtration, to remove suspended solids that cause turbidity unless criteria for exemptions can be met. Turbidity is a measure of the cloudiness of water caused by the presence of suspended matter. Turbidity can be caused by many things, including the presence of micro-organisms, which can interfere with disinfection effectiveness. These treatment technologies, along with standards for microbes, coliforms, and a requirement that all systems be operated by qualified operators, expand control of disease-causing microbes.

Organic Chemical Standards

While microbiological contamination primarily produces infectious diseases, chemical pollutants can contribute to chronic toxicity or cancer. These substances range from industrial solvents and pesticides to cleaning preparations and degreasers. When used or discarded improperly, these chemicals pollute ground and surface waters used as sources of drinking water. Drinking water sources can be selected that are free of significant microbiological contaminants or protected from potentially harmful contaminants of human origin, but these same waters are vulnerable to a variety of chemicals usually related to pollution discharge or treatment.

Groundwater in the vicinity of improperly designed waste disposal sites often has been found to be heavily contaminated by migrating toxic chemicals. Many synthetic organic chemicals, compounds that contain carbon, have been detected in water supplies in the U.S. Some of these, such as the solvent trichlorethylene, a carcinogen, are volatile. They easily become gases and can be inhaled in showers or baths or while washing dishes. They can also be absorbed through the skin.

Technology and operating procedures are available to prevent release of many contaminants or control them in drinking water. However, costs can be substantial, especially for small systems, because they cannot benefit from economies of scale.

The technologies most suitable for organic contaminant removal in small systems are granular activated carbon and aeration. The carbon process has been designated as the best available technology for synthetic organic chemical removal. Packed column aeration has been selected as best for the removal of volatile organic chemicals. The granular activated process uses carbon that has been treated to make it extremely porous so that it can remove organic contaminants through absorption.

Aeration, also known as air stripping, mixes air with water to volatilize contaminants. The volatilized contaminant stream is either released directly to the atmosphere or is treated and then released.

Disinfection By-Product Standards

A wide variety of chemicals are added to drinking water to remove various contaminants. Among them are alum, iron salts, chlorine, and other oxidizing agents, all of which may leave residues or potentially hazardous disinfectant by-products (DBP) in the finished water. In fact, the most common source of

synthetic organic chemicals in treated drinking water is the interaction of chlorine or other disinfectants with the naturally occurring particles found in the water.

Chlorine, the major disinfectant used in treatment facilities, can undergo complex chemical reactions when mixed with contaminated water. In the 1970's, scientists at EPA discovered that chlorine can react with natural and man-made chemicals in water to create by-products known as trihalomethanes. At least one of these by-products, chloroform, is carcinogenic in animals. Other disinfectants also have been found to generate undesirable by-products. The establishment of a maximum contaminant level for total trihalomethanes (chloroform, bromoform, bromodichloromethane) will control these disinfection by-products. Future regulation of compounds such as haloacetic acids will control additional disinfection by-products.

The Stage 1 Disinfectant Byproduct Rule (Stage 1) was developed by the EPA in 1998 to control DBP concentrations in drinking water and to regulate the methods of disinfection in water treatment. The rule sets maximum contaminant levels (MCL's) and maximum residual disinfection levels (MRDL's). The EPA also established treatment techniques within the Stage 1 to remove the DBP precursors. The ruling includes a section on treatment techniques that requires that plants achieve a certain total organic carbon (TOC) percent removal. The TOC percent removal is based upon the raw water TOC and the alkalinity.

The MCL's for the Stage 1 include 0.080 mg/L for Total Trihalomethanes (TTHM's), 0.060 mg/L for haloacetic acids (HAA5), 0.010 mg/L for bromate, and 1.0 mg/L for chlorite. These levels were chosen "at the level at which no known or anticipated adverse effect on the health of the person would occur, and which allows an adequate margin of safety."

Ground water systems and small surface water systems were to comply with the Stage 1 by January 2004.

Disinfection by-products are difficult and costly to remove from drinking water once they have been formed. It is better to remove the natural organic matter prior to disinfectant addition.

From an economic standpoint, alternative disinfectants should be no more than expensive than chlorine. Several examples of existing alternative disinfectants include ozone, chloride dioxide, chloramines and ultra-violet radiation. However, none of these can satisfy all requirements such as being effective, inexpensive, and can provide a disinfectant residual in the distribution system to prevent regrowth of micro-organisms. Because of this a combination of alternative disinfectants is needed. Though such a strategy can be used to reduce trihalomethanes and total halogenated organic by-product levels, the combined use of these disinfectants will produce other disinfectant by-products.

Strategies used by small systems to minimize harmful chlorination by-products include:

a. Reducing the concentration of organic materials before adding chlorine. Water clarification techniques, such as coagulation, sedimentation and filtration, can effectively remove many organic materials. Activated carbon may be used to remove organic materials at higher concentrations or those not removed by other techniques.

b. Reevaluating the amount of chlorine used. The same degree of disinfection may be possible with lower dosages.

c. Changing the point where chlorine is added. If chlorine is presently added before treatment, instead it can be added after filtration, or after chemical treatment.

d. Using alternative disinfection methods. Ozonation and ultraviolet radiation, the alternative methods most practical for small systems, cannot be used as disinfectants by themselves. Both require a secondary disinfectant (usually chlorine) to maintain a residual in the distribution system.

Inorganic Contaminant Standards

Some common inorganic contaminants originate from localized geologic deposits of arsenic or selenium. Arsenic occurs naturally as an impurity in various minerals and in the ores of certain commercially mined metals. Much like radionuclides (mentioned below), arsenic contamination of a water supply can occur naturally and from man-made sources. While the majority of the water supplies throughout the United States do not have any concerns related to arsenic, the health effects associated with contamination warranted a ruling by the EPA.

The health risks include increased risk of cancer to the skin, bladder, lungs, kidney, liver, and prostate. In addition, arsenic creates non-cancerous health effects including cardiovascular issues and diabetes. The ruling lowered the MCL for arsenic from 50 ug/L to 10 ug/L and effects community water systems serving at least 15 service connections or 25 residences year round.

Another natural contaminant controllable with modern technology is fluoride. Many communities add it to their drinking water in regulated amounts to improve dental health. However, excessive exposure to this inorganic chemical can cause skeletal damage, as well as a brownish discoloration of teeth.

Inorganic contaminants currently regulated under the Safe Drinking Water Act include many metals, such as arsenic, barium, cadmium, copper, lead, mercury, and nickel; other elements, such as asbestos and fluoride; and radionuclides. Conventional treatment, coagulation/filtration (initial treatment that converts non-settleable to settleable particles), can be used to remove some inorganic contaminants.

Additional technologies focus on specific contaminants. Separation processes, reverse osmosis, and electrodialysis, use a semi-permeable membrane that permits only water, and not dissolved ions (atoms that have an electrical charge because they have gained or lost electrons) such as sodium and chloride, to pass through its pores. With reverse osmosis, contaminated water is subjected to a high pressure that forces pure water through the membrane, leaving most contaminants behind in a brine solution. The electrodialysis process employs electrical current to attract ions to one side of a treatment chamber. This process is effective in removing fluoride and nitrate, and can also remove barium, cadmium, selenium, radium, and other inorganics.

Ion exchange systems can be used to remove many ionic (charged) substances from water. Ion exchange works by exchanging charged ions in the water for ions of similar charge on an exchange medium, usually a synthetic resin. Inaction (a positively charged ion) exchange, the ions most often displaced from the resin are sodium ions. For anion (a negatively charged ion) exchange, the ion exchanged is usually chloride.

Radionuclide Standards

Radionuclides are present in most water sources at very low concentrations and are naturally occurring, with some man-made contamination. Examples include uranium, radium isotopes, and beta particle emitters. The main concern related to the presence of radionuclide in a public water supply is related to an increased risk of cancer. These radionuclides are found in drinking water supplies throughout the U.S., but certain geographic areas have particularly high levels.

Different types of ionizing radiation emitted by these contaminants may cause different levels of biological damage. Radium, when ingested, concentrates in bone and can cause cancers. Ingested uranium can also cause cancers in bone and can have a toxic effect on kidneys.

On December 8, 2003, the rule pertaining to maximum contaminant levels (MCL) of various radionuclides was updated for community water systems serving at least 15 service connections or 25 residences year round. The new rules for radionuclides are outlined below:

Contaminant	MCL	Health Effect
Alpha Particles	15 pCi/L	Increased risk of cancer.
Beta Particles and Photon Emitters	4 millirems per year	Increased risk of cancer.
Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer.
Uranium	30 ug/L	Increased risk of cancer and kidney toxicity

Today's treatment techniques are also effective against radionuclides. Reverse osmosis is effective for treating several radioactive contaminants in drinking water. Ion exchange can be used to remove radium and uranium. Radon removal requires use of granular activated carbon of aeration techniques. Each of the treatment processes for removing radionuclides from drinking water generates waste that must be specially handled and disposed of.

Corrosion By-Product Standards (Lead and Copper)

Exposure to excessive levels of lead and copper in drinking water is primarily caused by corrosion resulting from the contact of corrosive water with these materials found throughout water distribution systems and in the plumbing of private homes. Of particular concern is the presence of lead service lines and connections, lead pipes in the home and lead solder that is less than five years old. In 1986, EPA estimated that as many as 42 million people in the U.S. may be exposed to water lead levels in excess of 20 µg/l. In homes greater than ten years old that contain lead solder, it is not uncommon to find water lead levels in excess of 100 µg/l. The most cost effective way to prevent lead and copper corrosion by-products and reduce the risks posed to human health and the environment is through comprehensive corrosion reduction carried out by water suppliers.

Where lead is present in pipes and soldered connections, the lead dissolves into the water while the water is not moving, generally overnight, or other times when the water supply is not used for several hours at a time. The first water that comes from the faucet after long periods of no use may have lead in it. Future use of lead pipes and lead solder has been banned.

- In many areas of the U.S., homeowners and small water supply systems use water that is potentially corrosive to metallic materials (copper, lead, and zinc) in the distribution system. Corrosion can be caused by the use of minimally acidic or alkaline waters (low pH or alkalinity) and concentrations of dissolved solids. Health problems can result from ingestion of corrosion by-products, aesthetic quality of the water can decline and costs due to piping system deterioration may rise.

The Lead and Copper Rule was originally established in 1991 and later revised in 2000. The action levels for lead to 0.015 mg/L and for copper to 1.3 mg/L remained the same in the 2000 revisions, but they did include changes to monitoring, public education, and lead service line replacement.

Protection Programs

The SDWA provides several programs that establish environmental safeguards to prevent contaminants from reaching water sources.

- Wellhead Protection Program – Requires states to develop an overall goal and plan for groundwater resources and wellhead area protection. The New York State Wellhead Protection Program was completed in 1990.

- Sole Source Aquifer Demonstration Program – Prescribes a comprehensive land management plan that can be used to eliminate activities that have an adverse impact on public health and groundwater within the area surrounding a community supply well.

- Watershed Control Program – Restricts activities that have the potential to contaminate surface waters. The goal of the program is to preserve and improve raw water quality by identifying and controlling contamination sources in the watershed.

Safe Drinking Water Act Amendments of 1996

As a result of the 1986 regulation, many small water systems suffered economic hardships when sources required additional treatment. Many water system sources provided abundant quantity, but the quality of the source was so poor that it would be less expensive to develop new sources instead of treating existing supplies.

- On August 6, 1996, the SDWA Amendments of 1996 were signed into law. The 1996 Amendments emphasize sound science and risk based standard setting, monitoring relief for public water supply systems, small water supply system flexibility and community empowered source water protection. In response to the hardships provided by the 1986 Amendments, the 1996 Amendments include a multi-billion dollar Drinking Water State Revolving Fund, small system technical assistance and technology development, water system capacity assurance and operator certification programs.

The 1996 SDWA Amendments establish a new emphasis on preventing contamination problems through source water protection and enhanced water system management. The state will be required to create and focus prevention programs to help water systems improve operations and avoid contamination problems. The USEPA provides the following descriptions of the 1996 SDWA Amendments.

Prevention

- Source Water Protection – States must develop a program to delineate source water areas of public water systems and to assess the susceptibility of such source waters to contamination.

- Capacity Development – State programs must have two main components: (1) legal authority to ensure that new water systems have sufficient technical, managerial and financial capacity to meet drinking water standards, and (2) a strategy to identify and assist water systems needing improvements in managerial, technical, or financial capacity or aid to comply with standards.

- Operator Certification – Objective of program is to ensure every water system has an operator to perform certain key compliance functions, and who is trained and certified to the level that each state determines is appropriate to the functions, facilities, and operations of that system.

Consumer Information

- Consumer Confidence Reports – Requires all community water systems to prepare and mail (or publish in newspaper) to each customer at least annually a report with information regarding the system's source water and the level of contaminants in the drinking water purveyed.

Regulatory Improvements

- Risk-Based Contaminant Selection – The requirements that USEPA regulate an additional 25 contaminants every three years is eliminated. Instead, USEPA has the flexibility to decide whether or not to regulate a contaminant after completing a required review of at least five contaminants every five years. USEPA must use three criteria to determine whether or not to regulate a contaminant; that the contaminant adversely affects human health; it is known or substantially likely to occur in public water systems with a frequency and at level of public health concerns; and regulation of the contaminant presents a meaningful opportunity for health risk reduction.

- Unregulated Contaminants – USEPA must issue regulations establishing criteria for monitoring of unregulated contaminants, and within three years after enactment, and every five years thereafter, must issue a list of no more than 30 such contaminants for which monitoring is required.

- National Database – A national database covering regulated and unregulated contaminants will be established primarily using compliance monitoring detection data and information from the unregulated contaminant monitoring program.

- Information Collection – Without first issuing a regulation, the USEPA may now require systems to submit information for individual system compliance purposes, as well as a to establish new regulations.

- Cost-Benefit Analysis and Research for New Standards – For all future drinking water standards, the USEPA is to conduct a thorough cost-benefit analysis and provide comprehensive, informative and understandable information to the public. The USEPA is also required to use the "best available", peer-reviewed science and supporting studies" in carrying out actions within the standard setting section "to the degree that an Agency action is based on science".

- Small System Technologies, Variances, and Exemptions – A fundamental problem with the previous law was that in setting standards based on technology that large systems could afford, it did not recognize the often different economics of small systems. The new law contains multiple remedies. First, as part of a new drinking water standard, the USEPA is to identify technologies that comply with the standard and are specifically affordable for each of three groups of small systems. Second, where such technologies do not exist for a certain group of smaller systems or quality of source water, a "variance"

technology must be identified that need not meet the standards, but must provide the maximum protection affordable for such groups of smaller systems and source waters. Within two years, the USEPA must identify affordable compliance and, where appropriate, variance technologies for existing regulations and issue regulations for small system variances.

These new provisions create a logical and workable hierarchy of options for small systems. Most small systems whose source water quality does not meet a national standard will be able to comply if they are allowed to use treatment specifically affordable for systems of their size. For those systems which cannot afford such treatment, the State (with USEPA review, if applicable) will assess whether other changes (e.g. source water, restricting or connection to another system could enable them to meet the standard). Only if such changes are not practicable can a system be authorized to provide drinking water that does not fully meet a national standard. And that authorization will only be for the most protective technology the system can afford, which will give much more protection than was actually provided under all-or-nothing provisions of the 1986 Amendments.

- Compliance Time Frames – The Amendments extend to three years the previous 18 month deadline for systems to comply with new regulations, unless the USEPA determines an earlier date is "practicable". The USEPA or States (for individual systems) may give an additional two years if necessary for capital improvements.

- Monitoring Reforms – States may grant "interim monitoring relief" to systems having a population under 10,000 (exempting them from additional quarterly monitoring) if monitoring done at the time of "greatest vulnerability to the contaminant" fails to detect it and the State finds that further monitoring is unlikely to detect it. This relief may not cover any microbiological contaminants (or their indicators), disinfectants, or disinfection or corrosion by-products.

- States with an approved program for source water assessments may implement tailored, alternative monitoring requirements for any contaminant for which interim relief may be granted (except unregulated microbiological contaminants or indicators). This provision strikes a balance encompassing two key aims of the new law: more flexibility for States to craft a drinking water program that responds to local conditions and needs and the assurance that both regulation and deregulation under that program will be solidly founded on good science. The new law also explicitly protects "existing authorities" available to States to alter monitoring requirements through waivers or other USEPA initiatives, such as the chemical monitoring reform process now underway.

- Enforcement – The Amendments streamline processes for administrative compliance orders and penalties up to $5,000, raise the administrative and emergency penalty caps, make enforceable many SDWA provisions and requirements imposed under them by USEPA or primacy states and give up a two year enforcement moratorium for violations being remediated by a specific plan to consolidate with another system. States must also adopt administrative penalty authority for primacy.

- Arsenic – The USEPA is required to conduct additional research on arsenic, particularly the health effects at low levels of exposure, after consultation with the National Academy of Science (NAS) and others. The USEPA must propose a regulation no later than January 1, 2000, and issue a final regulation 12 months later.

The objective is to provide for a better understanding of arsenic's characteristics in drinking water that may create chronic health effects, within a time frame to regulate that is limited but no longer than permitted under the previous law. As the conference report suggests, the USEPA has already initiated a research partnership on this issue with the American Water Works Association Research Foundation and intends to continue in that direction under the statutory timetable.

- Radon – The USEPA is to arrange for a risk assessment by NAS, issue a cost benefit analysis within 30 months and issue a proposed regulation within 36 months. If the resulting MCL for radon is "more stringent than necessary to reduce the contribution to radon in indoor air from drinking water to a concentration that is equivalent to the national average concentration of radon in outdoor air", then the USEPA must establish MCL at a level that would reduce such contribution to the level equivalent to outdoor air radon.

- Sulfate – The USEPA must conduct, jointly with the Centers for Disease Control (CDC) and Prevention, a dose-response study for sulfate within 30 months. Sulfate will thereafter be considered in the first round of the new contaminant selection process. If the USEPA determines to regulate sulfate, such regulation shall include the flexible compliance options similar to those proposed by the USEPA in November 1994. This approach serves the purpose for sulfate that the new contaminant selection process does for the drinking water program as a whole: to allow for the better prioritization of the nation's resources to the severity of the risks.

- Cryptosporidium/Disinfection By-Products – Concern has recently mounted over the ability of certain pathogenic protozoan (*Cryptosporidium)* cysts to survive treatment processes and, thus, enter the distribution system. In addition, disinfection by-products are another on-going concern. A wide variety of chemicals are added to drinking water to remove various contaminants. All of which may leave residues or potentially hazardous by-products in finished water. The 1996 Amendments direct the USEPA administrator to develop an information collection rule to obtain information that will facilitate further revisions to the NPDW regulation for disinfectants and disinfection by-products, including microbial contaminants such as Cryptosporidium.

New York State Sanitary Code – Part 5 Drinking Water Supplies

Part 5 of the New York State Sanitary Code establishes the standards by which the New York State Department of Health and Wyoming County Health Department review and approve the construction and operation of all public water supply systems. Part 5 contains the following subparts:

5-1 Public Water Systems

This subpart applies to water quality for sources; the planning, siting treatment and approval of systems, which includes the distribution system; standards for corrosion control (copper and lead); containment maximums and monitoring requirements, including residual chlorine in all parts of the system; and quality control. The most current version of the regulations include an appendix that contains documents with additional detail on water works standards, wells, containment analysis and wells for public systems.

5-2 Water Well Construction

Defines the location, construction an abandonment of water wells used for public water supplies.

5-3 (Currently Reserved)

5-4 Classification of Community Water System Operators

Establishes the standards for which the New York State Health Department certifies operators of community water systems.

5-5 Water Quality Treatment Districts

Establishes the requirements for State approval relating to the formation and operation of water quality treatment districts. A water quality treatment district is defined as a district established under applicable provisions of the County Law and the Town Law which allow County or Town ownership and operation of point-of-use treatment systems.

New York State has accepted the responsibility for implementation of the Safe Drinking Water Act. Because of this, Part 5 is currently and will continue to undergo amendments to meet the minimum regulations established by the USEPA and more stringent regulations (where necessary) as established by the New York State Health Department.

New York State Public Water Supply

Article 15, Title 15 of the New York State Environmental Conservation Law establishes the Public Water Supply Program to regulate activities that involve permanently installed systems providing piped water to the public for drinking and other potable purposes. The program is administered by the NYSDEC and contributes to the protection and conservation of available water supplies by ensuring equitable and wise use of these supplies by those who distribute potable water to the public.

The Law requires that anyone planning to operate or operating such a system, with at least five service connections used year-round, must obtain a Water Supply Permit from NYSDEC before undertaking any of the following activities:

a. Installation of a new water supply system.

b. Acquisition, taking or development of any new or additional source of water supply not previously permitted in connection with the water supply system proposing to use such source.

c. Taking or condemning of lands for any new or additional sources of water supply or for the utilization of such supply.

d. Extension of supply or distribution mains into any new service area not specifically authorized by a previous NYSDEC permit for the system for which the extension is proposed.

e. Supplying water for use in any other municipality or civil division of the state that is already approved for service by a different water supplier.

f. Entering into a contract or other agreement to take a supply of water from another water supply system.

g. Purchasing or condemning any existing water supply system.

h. Sinking or drilling of additional production wells, regardless of whether or not an increase in overall groundwater taking is proposed.

i. Increasing the amount of water diverted from a surface watershed already in use by enlarging the conduits, increasing storage, or by other means.

j. Transportation or carrying of water through pipes, conduits, ditches or canals from any freshwater surface water or groundwater source in New York to any location outside the state, for their use.

Water Supply Permit applications will automatically involve the New York State Department of Health (NYSDOH) and when necessary, the Public Service Commission (PSC). The NYSDOH has a regulatory role in water quality and other sanitary aspects of a project relating to human health. The NYSDOH must approve plans and specifications prior to construction of the water supply project.

The PSC has certain jurisdiction over the operation of most nonmunicipal water supply corporations and thus becomes involved in the technical review and approval of the engineering plans and specifications for a project. The agency also has a role in the determination of rates charged by private water suppliers. The regulatory role of the PSC in water supply systems is similar to their involvement in the regulation of other public utilities.

Water Conservation

Legislation that went into effect January 1, 1989, changed Section 15-1503 of the New York State Environmental Conservation Law to require that water conservation be considered among the standards for permit issuance in the water supply program. Each applicant must document the local water conservation measures taken and those programs planned for future implementation.

Individual local water conservation programs will vary. Prospective permittees may have to increase their conservation efforts and report on the progress instituted in order to gain approval of their water supply project. According to the NYSDEC's Public Water Supply Program Applicant's Guide, a water supply program must contain a minimum of components including:

a. An overall summary of the water conservation program.

b. An assessment of the purveyor's water conservation potential.

c. A statement of water conservation goals and objectives.

d. An implementation timetable.

e. A list of people/agencies responsible for implementation of the program, as well as local agencies and offices which must approve components of the program.

f. A description of the program's funding sources.

g. A detailed description of the components of the water conservation program. Typical components include:

Metering Leak detection and repair

Water supply auditing Retrofitting with water saving plumbing fixtures
Pricing Drought and emergency procedures/planning
Outdoor use reductions Public education/information
Non-residential reuse/recycling

New York State Wellhead Protection Program

The NYSDEC's New York State Wellhead Protection Program submitted to the USEPA in 1990 provides the following description of state and local wellhead protection responsibilities and activities.

Agency Responsibilities

The NYSDEC is the principal agency responsible for developing and implementing state level aspects of the Wellhead Protection Program and for coordination. The NYSDOH is responsible for certain aspects related to public water supply well data, contingency planning, new well planning and Watershed Rules and Regulations. Regional and county planning agencies and county governments are responsible for county level planning, management and educational outreach elements in the overall program, in addition to any county level ordinances developed for wellhead protection. Town, village, and city governments are responsible for local land use control, local ordinances and other local level aspects of wellhead protection. Water suppliers have a role in developing local Watershed Rules and Regulations, education, land acquisition and other program aspects determined by NYSDEC and NYSDOH. The educational effort will be shared by all levels, including Cooperative Extension, the universities and the State Education Department. Federal agencies and other state agencies will participate as appropriate, as coordinated by NYSDEC with the assistance of the USEPA for federal agencies.

Wellhead Protection Area Delineation

- The Safe Drinking Water Act defines a Wellhead Protection Area (WHPA) as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or "wellfields". This definition is not specific because there is no time framework and because there is a requirement that contaminants be reasonably likely to reach the well, a condition that is very difficult to accurately predict. States are given flexibility by the Safe Drinking Water Act in determining delineation approaches.

New York State proposes that unconsolidated aquifer boundaries serve as the fundamental delineation of wellhead protection areas and that a multiple zone approach be used within the total WHPA for varying management relative to risk. This approach is modified for bedrock aquifers.

New York's approach proposes to allow local flexibility in an evolutionary process of delineation refinements, and to allow utilization of previously delineated protection areas, where appropriate.

There are many distinct advantages in this overall approach. A very important advantage is that considerable aquifer characterization and mapping work has already been accomplished. Second, it is consistent with the evolution and principal policies of both the comprehensive New York State Groundwater Management Program (1987) and New York State Water Resources Management Strategy (1989), in addition to the New York State Watershed Rules and Regulation policies.

Third, it focuses attention of local governments on the entire aquifer resource and facilities contingency planning and new (or future) well protection. Finally, it provides a base within which more sophisticated delineations (e.g. subdividing the overall WHPA) can be made as programs require and funding permits.

A possible drawback of using aquifer boundaries – that aquifers may be broad regional systems – is not a major problem in most of New York State. In Upstate New York, most public water supplies using groundwater are in unconsolidated aquifers or rather limited area extent. Most important recharge areas are within the boundaries of the unconsolidated aquifers, another advantage of this approach.

Potential Contamination Source Identification

The New York State Wellhead Protection Program proposes to use the classification of potential contamination sources based on process or operation proposed by the Office of Technology Assessment and endorsed by USEPA.

Many source inventory and identification programs are already in place or are being developed for individual groundwater protection programs. These include but are not limited to registries of hazardous waste disposal sites, petroleum storage locations, the Industrial Chemical Survey, records of the State Pollutant Discharge Elimination System (SPDES) and the hazardous material storage registry. Similar information is available for other potential sources (mining, municipal waste, etc.). Other inventories (pesticides, salt storage) are needed and certain improvements (locational data, data formats) are needed in the existing registries.

Groundwater Management Approaches

The emphasis in groundwater management efforts from the state level will be to continue to develop and implement the program recommendations made as part of the comprehensive groundwater management program, with a special focus on aspects relevant to geographic targeting of program elements. Groundwater protection for all fresh groundwaters in New York accomplished in the existing state regulatory programs by classifying all fresh groundwaters as potential drinking water sources, and using the stringent 6 NYCRR Part 703 groundwater standards as the management objectives state wide.

Solid and hazardous waste management programs formally utilize geographic targeting as a management tool. Other state level programs (e.g. spill response) have integrated major water supply aquifer targeting into day to day functions even though such targeting may not be explicitly stated in written policy.

Local governments, with the authority to regulate land use, have the capability of controlling new facilities through zoning and site plan review. Density of new development can also be controlled through zoning. Adoption of specific groundwater protection ordinances is also an avenue available to municipal and county governments, through sanitary codes or other approaches. Land acquisition for groundwater protection is a viable management tool for local governments and water suppliers. Watershed Rules and Regulations can be promulgated by the NYSDOH following initiation and development by public water purveyors, whether municipal or privately owned.

Contingency Planning

The existing contingency planning requirements of the New York State Department of Health's emergency planning program meet and exceed the requirements of the Safe Drinking Water Act. The existing New York program deals with all forms of water supply emergencies. In addition, the Superfund Amendments and Reauthorization Act (SARA) Title III emergency planning activities in New York support contingency planning needs for wellhead protection.

New Well Planning

The existing New York State Water Supply Permit Program enables the NYSDEC to require, as part of the permit approval process, the adoption of a groundwater (or wellhead) protection plan for proposed new wells. The New York State Wellhead Protection Program proposes that development of such a plan be required for new wells. The plan may include Watershed Rules and Regulations, local ordinances (town, village, or city) or county ordinances. Such plans often will entail the collection of hydrogeologic information to support WHPA delineations. Such plans must be consistent with existing authorities of the water supplier and they may include intermunicipal or county-level agreements or Watershed Rules and Regulations (NYSDOH).

Erie-Niagara Region Water Resources Management Study

Under the New York State Water Resource Management Strategy Act (1984), the NYSDEC and NYSDOH developed regional water resource management strategies to provide a basis for better state and local water supply management decisions. The findings and outcome of this program for the Erie-Niagara Region will impact regional planning and NYSDEC and Health Department approvals relative to water supply in Wyoming County. Therefore, County officials should, as representatives of the local water suppliers, continue their active role in the initial development and future updates of the WRMS.

New York State Water Law

Since water resources cross many individual, municipal, and political boundaries, the rights of others to use that water must be evaluated as part of the development of a new water supply. New York State Water Law summarizes the laws affecting a property owner's water rights in New York State. Water flowing in defined channels (surface and underground streams and lakes) is not subject to private or public ownership, only to its use. The rights to use water that accompany ownership of land adjacent to a water course are called the Riparian Rights. The general principle of Riparian Law is that each person has a right to use the water that flows along his land naturally as long as it does not deprive the people upstream or downstream of their rights to use the water. The Riparian owner generally has the right to a continued flow from the defined channel, without substantial decrease in its quality or quantity.

State law indicates that private landowners are not the absolute owners of the property. All property rights come from the state and may be restricted or taken by the state. Therefore, the state takes a strong interest in preserving and promoting its water resources. This affects traditional rights of landowners to use their lands and the waters on or adjacent to it. In general, Article 15 of the NYSDEC Environmental Conservation law was established to protect, conserve, and to develop the state's water resources. Title 15-Water Supply requires that a NYSDEC Water Supply Permit required to acquire or expand public water supply systems. As part of final approval, NYSDEC determines if compensation for damage is due to other owners as a result of these activities.

State Environmental Quality Review Act (SEQRA)

SEQRA was established under Environmental Conservation Law Section 8-0113 to incorporate consideration for environmental issues into the design and review process by state and local agencies. The SEQRA process must be addressed as part of the NYSDEC Water Supply Permit process.

Consolidated Laws of New York State

Sets the general municipal laws and specific laws for counties, towns, villages, and public authorities for operation in New York, including water supplies.

Future Regulations

Although the various regulations pertaining to public water supply systems is up-to-date as of the date of this study, research and industry publications have indicated that there may be additional regulations that will affect public water supply systems in the future. Based on various sources, the following regulations may be finalized or enacted following the publication of this study. Water managers, owners, and operators should continue to be diligent on these and other future regulations.

Groundwater Rule (Safe Water Drinking Act amendment)

The proposed groundwater rule was established to protect the public from bacteria and viruses found in some groundwater and to establish criteria for identifying wells with high risk of fecal contamination. Presently, only surface water systems and ground water systems under the influence of surface water are required to disinfect their water supplies.

The main components of the proposed rule are as follows:

- System sanitary surveys conducted by the State and identification of significant deficiencies.
- Hydrogeologic sensitivity assessments for water systems that do not disinfect.
- Source water microbial monitoring by systems that do not disinfect and draw from hydro geologically sensitive aquifers or have detected fecal indicators within the system's distribution system.
- Corrective action by any system with significant deficiencies or positive microbial samples indicating fecal contamination.
- Compliance monitoring for systems that disinfect to ensure that they reliably achieve 4-log (99.99 percent) inactivation or removal of viruses.

Stage 2 Disinfection By-Products Rule (Safe Water Drinking Act amendment)

Many of the rules included within the Stage 1 DBP Rule avoided the complex and less understood issues. The EPA and the M/DBP advisory committee decided to incorporate the results of the Stage 1 within the Stage 2.

The Stage 2 modifies the requirements of Stage 1 by altering monitoring locations and methods for calculating annual average levels of TTHM and HAA5. Monitoring locations will be determined by water systems through the performance of Initial Distribution System Evaluations (IDSE). The IDSE will be performed for the purpose of determining the locations with high DBP concentrations. These locations will be used as long-term sampling sites for DBP compliance monitoring.

Under Stage 1 the system operator was required to calculate a running average of all the sampling locations, which was then compared to the MCL's for TTHM and HAA5. Stage 2 modifies this procedure by requiring the system operator to calculate a location specific running average.

Revisions to 1989 Total Coliform Rule (Safe Water Drinking Act amendment)

The current total coliform rule (TCR), published in 1989, continues to be the only microbial drinking water regulation that applies to all public water systems. Systems are required to meet legal limits (i.e. Maximum Contaminant Levels (MCL)) for total coliforms, including fecal coliforms, as determined by monthly monitoring. The TCR specifies the frequency and timing of the monthly microbial testing by

water systems based on population served. The rule also requires public notification as indicated by monitoring results.

The proposed rule establishes a health goal (Maximum Contaminant Level Goal, or MCLG) and an MCL for *E. coli* and eliminates the MCLG and MCL for total coliform, replacing it with a treatment technique for coliform that requires assessment and corrective action. The proposed rule is establishing an MCLG and an MCL of 0 for *E. coli*, a more specific indicator of fecal contamination and potential harmful pathogens than total coliform. EPA is proposing to remove the current MCLG and MCL of zero for total coliform. Many of the organisms detected by total coliform methods are not of fecal origin and do not have any direct public health implication.

Proposed Radon in Drinking Water Rule (Safe Water Drinking Act amendment)

Water systems that use ground water or mixed ground and surface water (e.g., systems serving homes, apartments, and trailer parks) are affected. The proposed rule would not apply to community water systems that use solely surface water, nor to non-transient non-community public water supplies and transient public water supplies (e.g., systems serving schools, office buildings, campgrounds, restaurants, and highway rest stops).

The proposed MCLG for radon in drinking water is zero. This is a non-enforceable goal. The proposed regulation provides two options for the maximum level of radon that is allowable in community water supplies. The proposed MCL is 300 picoCuries per liter (pCi/L) and the proposed AMCL is 4,000 pCi/L.

Sampling requirements will be uniform for all for the first year: quarterly samples will be drawn and tested. Depending on levels of radon found, testing will then be once every 3 years, once per year, or quarterly testing if any test returns levels above the MCL or AMCL. The frequency of testing at a site can be modified according to recent performance.

Long Term 2 Enhanced Surface Water Treatment Rule
(Safe Water Drinking Act amendment)

This regulation will apply to all public water systems that use surface water or ground water under the direct influence of surface water. The purpose of Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) is to reduce illness linked with the contaminant *Cryptosporidium* and other pathogenic microorganisms in drinking water. The LT2ESWTR will supplement existing regulations by targeting additional *Cryptosporidium* treatment requirements to higher risk systems. This rule also contains provisions to reduce risks from uncovered finished water reservoirs and provisions to ensure that systems maintain microbial protection when they take steps to decrease the formation of disinfection byproducts that result from chemical water treatment.

Current regulations require filtered water systems to reduce source water *Cryptosporidium* levels by 2-log (99 percent). Recent data on *Cryptosporidium* infectivity and occurrence indicate that this treatment requirement is sufficient for most systems, but additional treatment is necessary for certain higher risk systems. These higher risk systems include filtered water systems with high levels of *Cryptosporidium* in their water sources and all unfiltered water systems, which do not treat for *Cryptosporidium*. The LT2ESWTR is being promulgated simultaneously with the Stage 2 Disinfection Byproduct Rule to address concerns about risk tradeoffs between pathogens and DBPs.

Under the LT2ESWTR, systems will monitor their water sources to determine treatment requirements. This monitoring includes an initial two years of monthly sampling for *Cryptosporidium*. Monitoring starting dates are staggered by system size, with smaller systems beginning monitoring after larger

systems. Systems must conduct a second round of monitoring six years after completing the initial round to determine if source water conditions have changed significantly.

Filtered water systems will be classified in one of four treatment categories (bins) based on their monitoring results. The majority of systems will be classified in the lowest treatment bin, which carries no additional treatment requirements. Systems classified in higher treatment bins must provide 90 to 99.7 percent (1.0 to 2.5-log) additional treatment for *Cryptosporidium*. All unfiltered water systems must provide at least 99 or 99.9 percent (2 or 3-log) inactivation of *Cryptosporidium*, depending on the results of their monitoring.

Systems that store treated water in open reservoirs must either cover the reservoir or treat the reservoir discharge to inactivate 4-log virus, 3-log *Giardia lamblia*, and 2-log *Cryptosporidium*. These requirements are necessary to protect against the contamination of water that occurs in open reservoirs.

APPENDIX C

POLICY AREA 7: REGIONAL COORDINATION

FROM COMPREHENSIVE PLAN HIGH PRIORITY GUIDE BOOK

POLICY AREA 7: REGIONAL COORDINATION

Policy Statement

Lewis County will be a leader in Upstate New York for inter-governmental cooperation and strategic partnerships. The county has a large geographic area with low population densities and some communities lack the critical mass to support all the desired services of its residents. Therefore, we must leverage our collective assets rather than compete or exist independent of one another. We recognize that constrained budgets at every level of government require us to make difficult choices. As such, we will engage in meaningful dialogue across municipal boundaries, and continue to engage entities with regional significance such as the Tug Hill Commission, Adirondack Park Agency and Fort Drum. These efforts, both formal and informal, will result in increased efficiencies, improved health and well-being, and benefits that are irrespective of physical boundaries.

Objectives and Action Items

The following objectives and action items provide guidance for county-level policy and decision making related to regional coordination.

Objective A: Investigate the benefits of shared and/or consolidated municipal services.

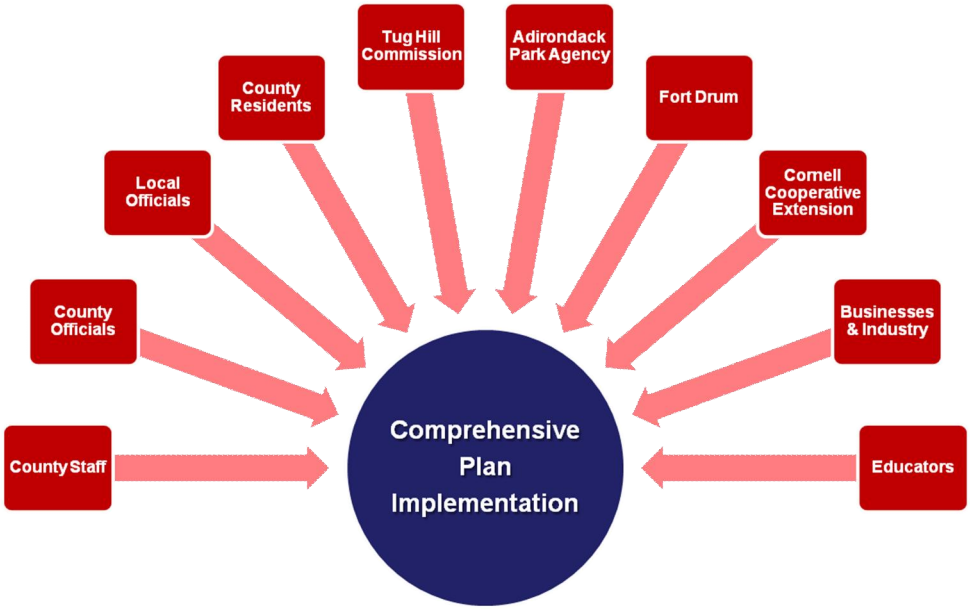
High Priority Action Items

1. The County should work with towns and villages to investigate the benefits of municipal consolidation and shared service agreements.

2. Continue to investigate opportunities for improved coordination of transportation services.

4. Investigate a cost of services analysis by municipality to benchmark municipal service delivery costs.

5. Investigate the options presented within the NYS Real Property Tax Administration Improvement Grant Study. Further evaluation of a county-wide assessment program or other options for consolidated assessment should be explored and implemented if determined beneficial to municipalities and residents.



Objective B: Improve education and outreach programming regarding municipal options for cooperation, consolidation, and shared services.

High Priority Action Items

2. Develop and facilitate educational and consultation panels to jointly discuss coordination and service consolidation with interested municipalities; panels to be composed of teams of experts, including legal, financial, and land use.

3. Create an educational presentation on the importance and impacts of the real property assessment process.

Objective C: Develop partnerships and agreements to leverage the efforts of county-wide agencies and organizations.

High Priority Action Items

1. Continue to work closely with DANC and FDRLO to improve opportunities for spill-over effects from investments at Fort Drum.

Objective D: Provide models, best-practices and improved education and outreach on issues pertaining to land use planning and zoning.

High Priority Action Items

1. Develop model code language and recommended best practices regarding land use regulations to address resource extraction, outdoor furnaces other relevant nuisance issues.

2. Develop an educational series that will improve the public's understanding and perceptions of planning and zoning, and disseminate tools and information regarding the development of comprehensive plans and zoning codes.

3. Develop model code language to provide consistent subdivision regulations regarding lot sizes and roadway access management to protect rural and agricultural character.

6. Develop educational/guidance programs to assist municipalities on 239-L, 239-M, and 239-N review procedures and other relevant training sessions in locations throughout the County.

7. Assist in the development and dissemination of literature and educational materials on the formation of joint planning and zoning boards.

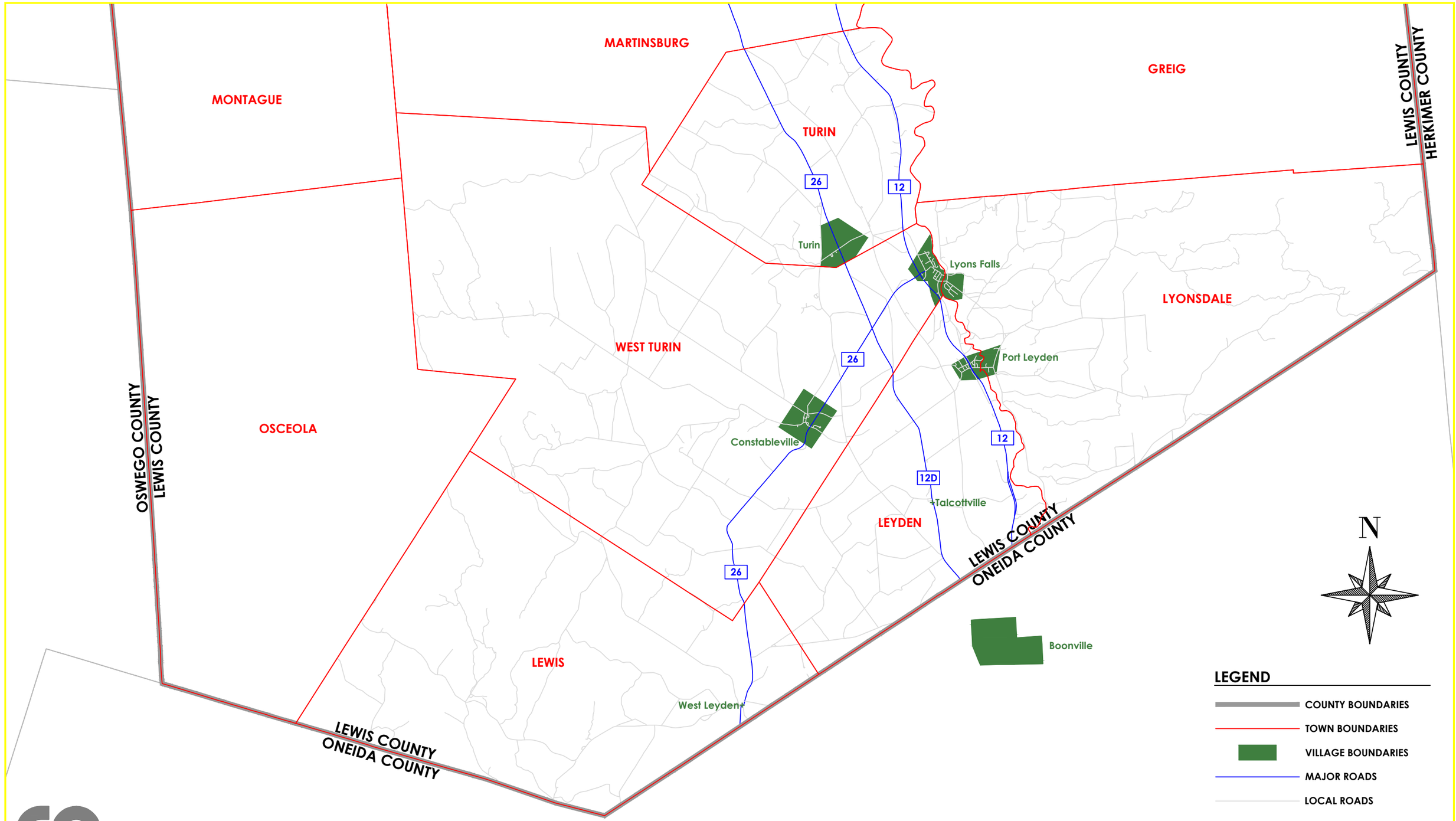
Objective E: Investigate opportunities for regionally applied planning efficiencies and improvements.

No high priority action items.

Website homepage for DANC.

APPENDIX D

MAPS



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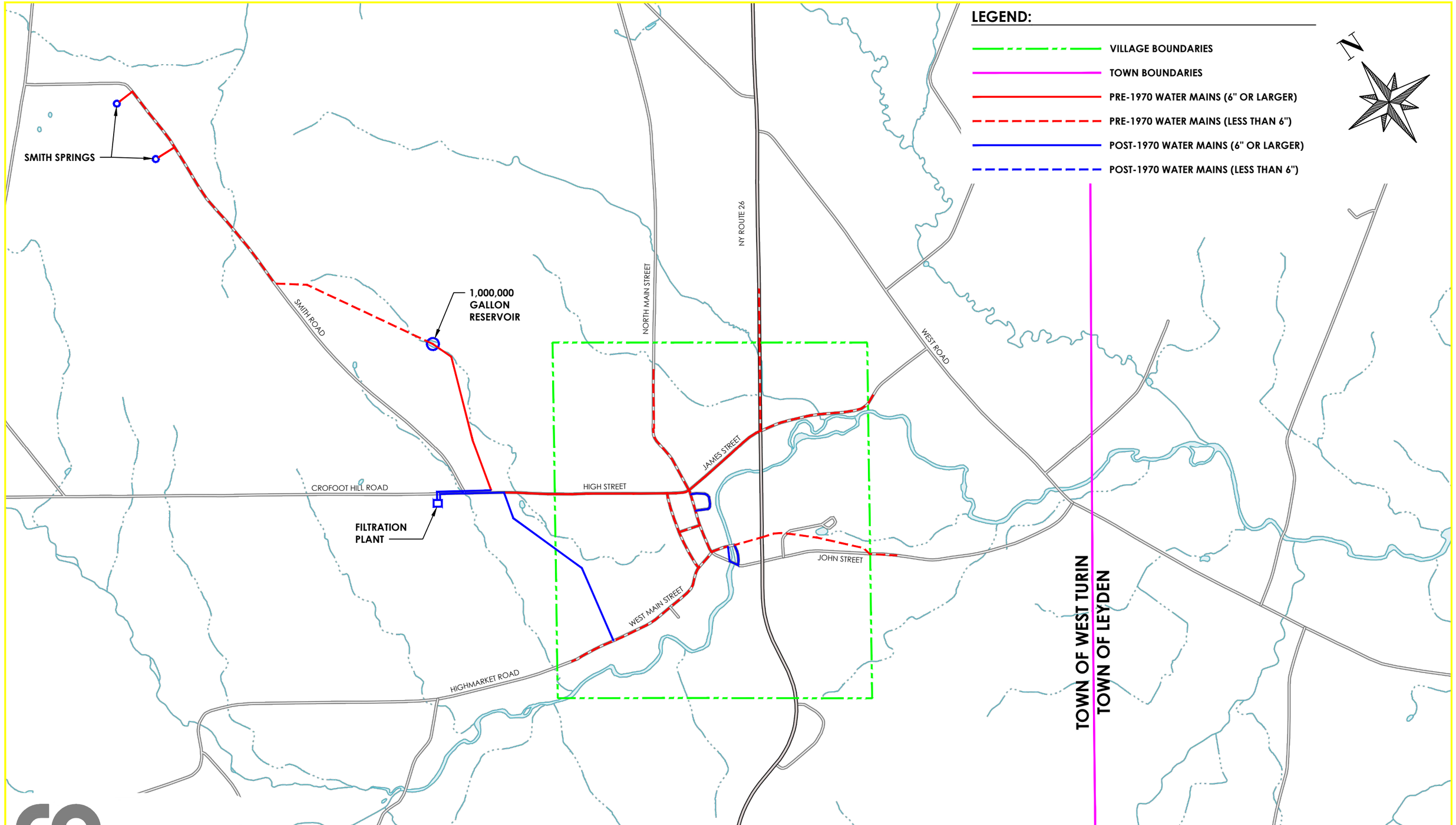
SOUTHERN LEWIS COUNTY REGIONAL WATER FEASIBILITY STUDY

FEBRUARY 2017

0 10000 20000 Feet

MUNICIPAL BOUNDARIES

MAP 1-1



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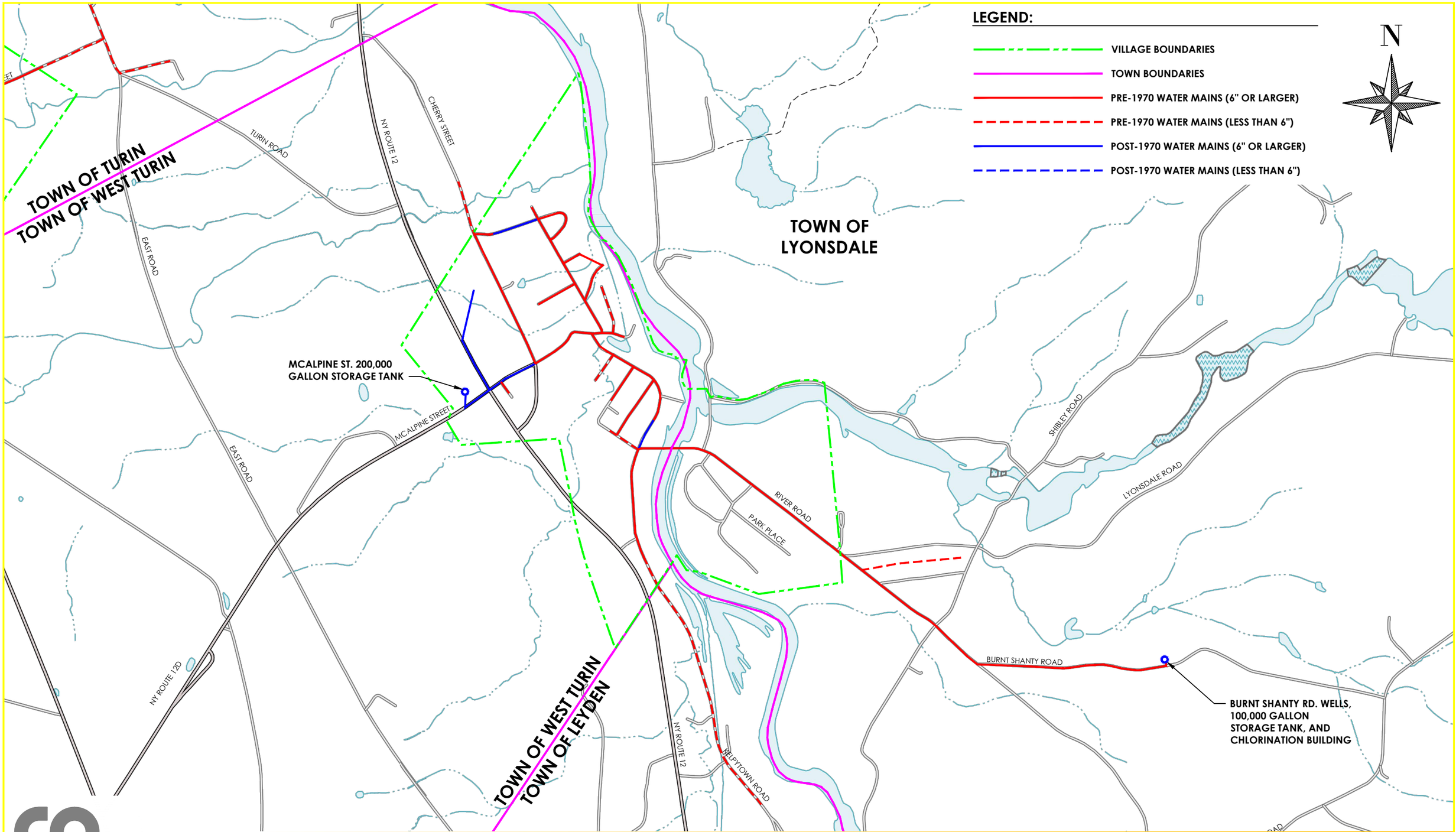
FEBRUARY 2017

VILLAGE OF CONSTABLEVILLE EXISTING CONDITIONS SYSTEM MAP

0 1000 2000 Feet

NOTE: WATER LINE VINTAGES AND SIZES ARE BASED ON AVAILABLE INFORMATION PROVIDED BY THE SYSTEM OPERATOR AND GIS DATA, WHERE AVAILABLE. THE INFORMATION IS INTENDED FOR PLANNING PURPOSES ONLY AND IS NOT GUARANTEED.

MAP 2-1



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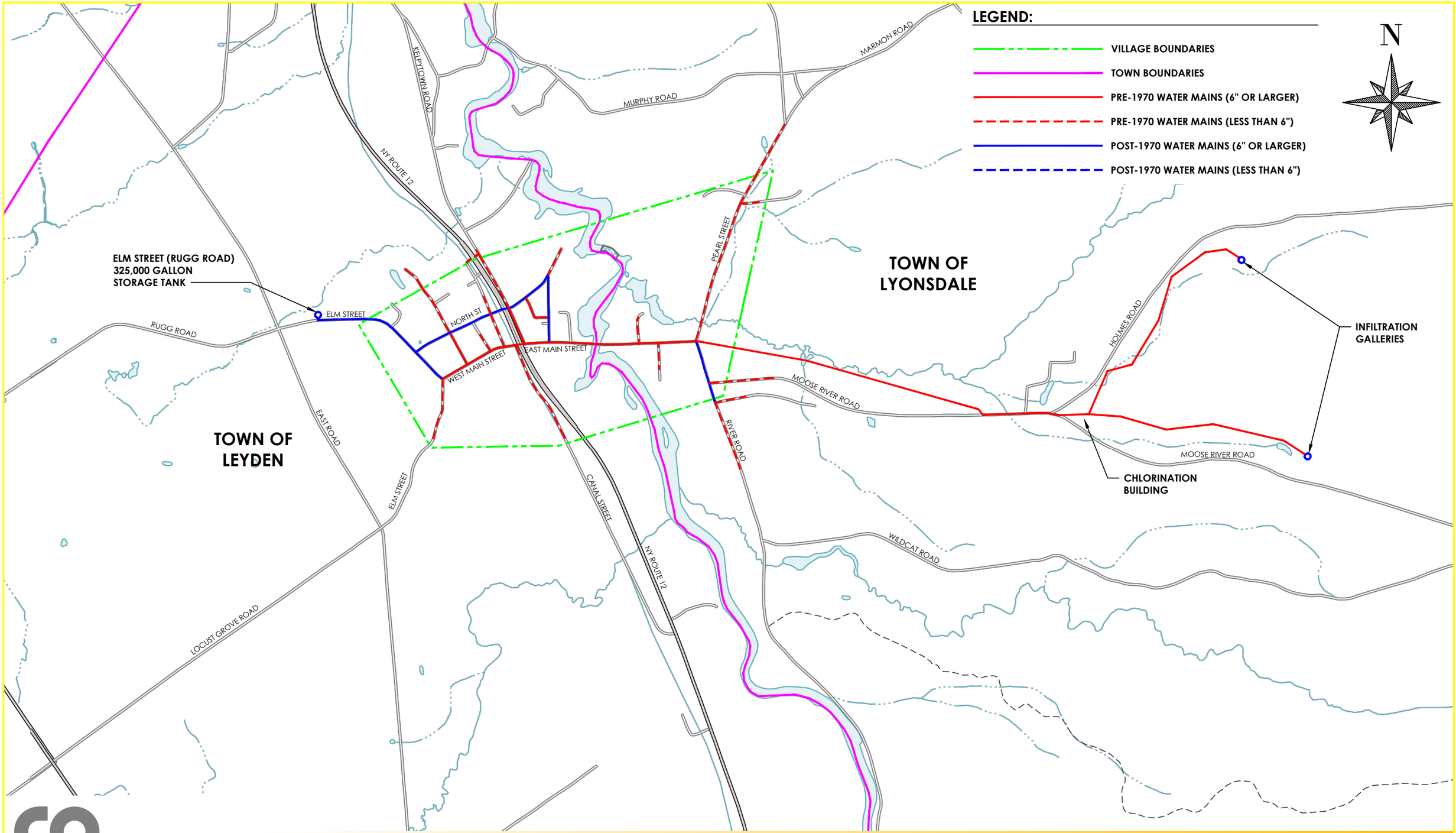
FEBRUARY 2017

VILLAGE OF LYONS FALLS EXISTING CONDITIONS SYSTEM MAP

NOTE: WATER LINE VINTAGES AND SIZES ARE BASED ON AVAILABLE INFORMATION PROVIDED BY THE SYSTEM OPERATOR AND GIS DATA, WHERE AVAILABLE. THE INFORMATION IS INTENDED FOR PLANNING PURPOSES ONLY AND IS NOT GUARANTEED.

MAP 2-2



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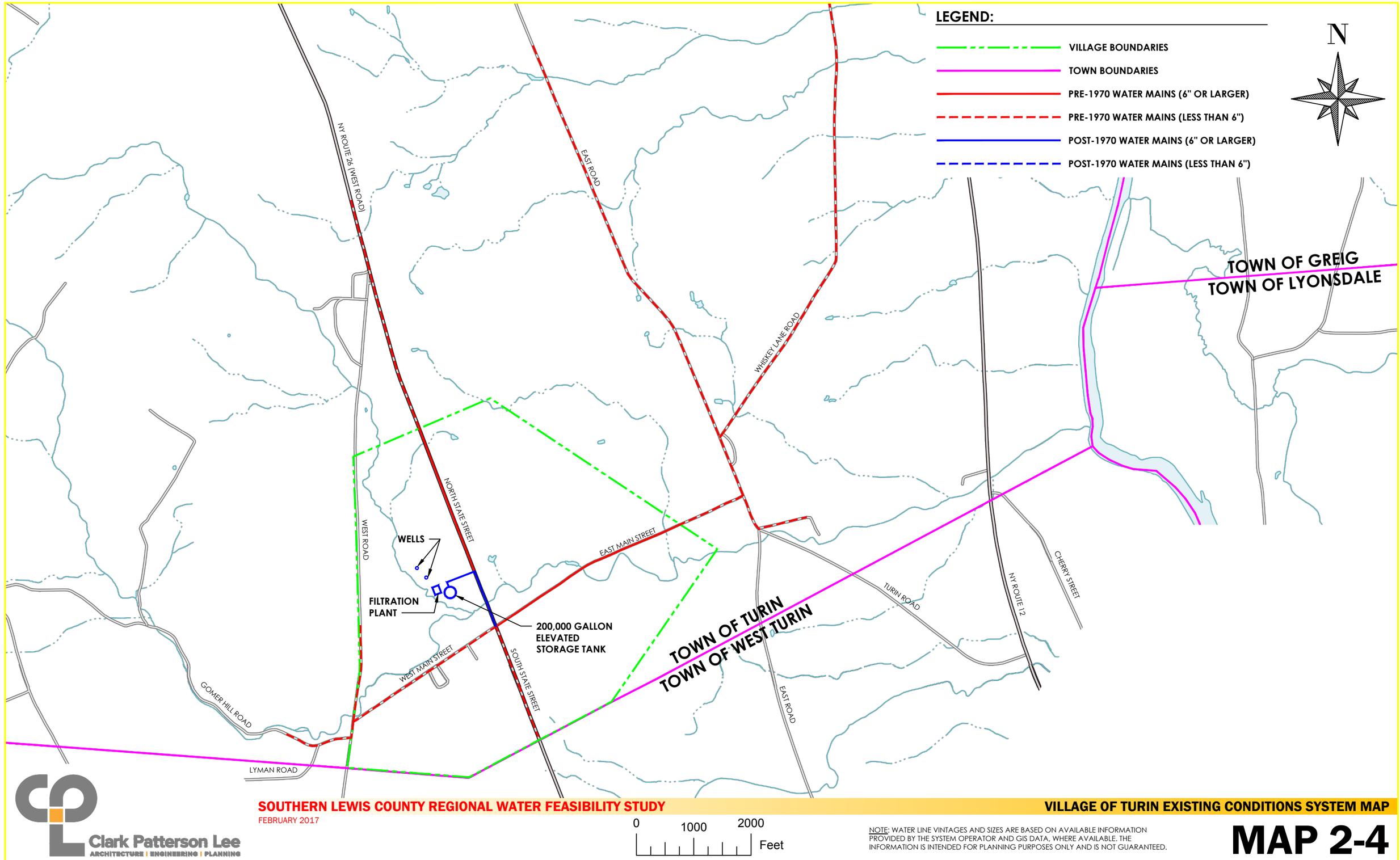
FEBRUARY 2017

VILLAGE OF PORT LEYDEN EXISTING CONDITIONS SYSTEM MAP

NOTE: WATER LINE VINTAGES AND SIZES ARE BASED ON AVAILABLE INFORMATION PROVIDED BY THE SYSTEM OPERATOR AND GIS DATA, WHERE AVAILABLE. THE INFORMATION IS INTENDED FOR PLANNING PURPOSES ONLY AND IS NOT GUARANTEED.

MAP 2-3



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FEBRUARY 2017

VILLAGE OF TURIN EXISTING CONDITIONS SYSTEM MAP

NOTE: WATER LINE VINTAGES AND SIZES ARE BASED ON AVAILABLE INFORMATION PROVIDED BY THE SYSTEM OPERATOR AND GIS DATA, WHERE AVAILABLE. THE INFORMATION IS INTENDED FOR PLANNING PURPOSES ONLY AND IS NOT GUARANTEED.

MAP 2-4

LEGEND:

PROPOSED INTERCONNECTION

N

MCALPINE STREET

EAST ROAD

ROUTE 12D

RIVER ROAD

PARK PLACE

SHIBLEY RD

BURNT SHANTY ROAD

BURNT SHANTY RD. WELLS, 100,000 GALLON STORAGE TANK, AND CHLORINATION BUILDING

TOWN OF WEST TURIN

TOWN OF LEYDEN

NY ROUTE 12

KELPYTOWN ROAD

MARMON ROAD

MURPHY ROAD

ELM STREET (RUGG ROAD) 325,000 GALLON STORAGE TANK

ELM STREET

RUGG ROAD

NORTH ST

WEST MAIN STREET

EAST MAIN STREET

PEARL STREET

TOWN OF LYONSDALE

MOOSE RIVER ROAD

HOLMES ROAD

EAST RD

0 1000 2000 Feet

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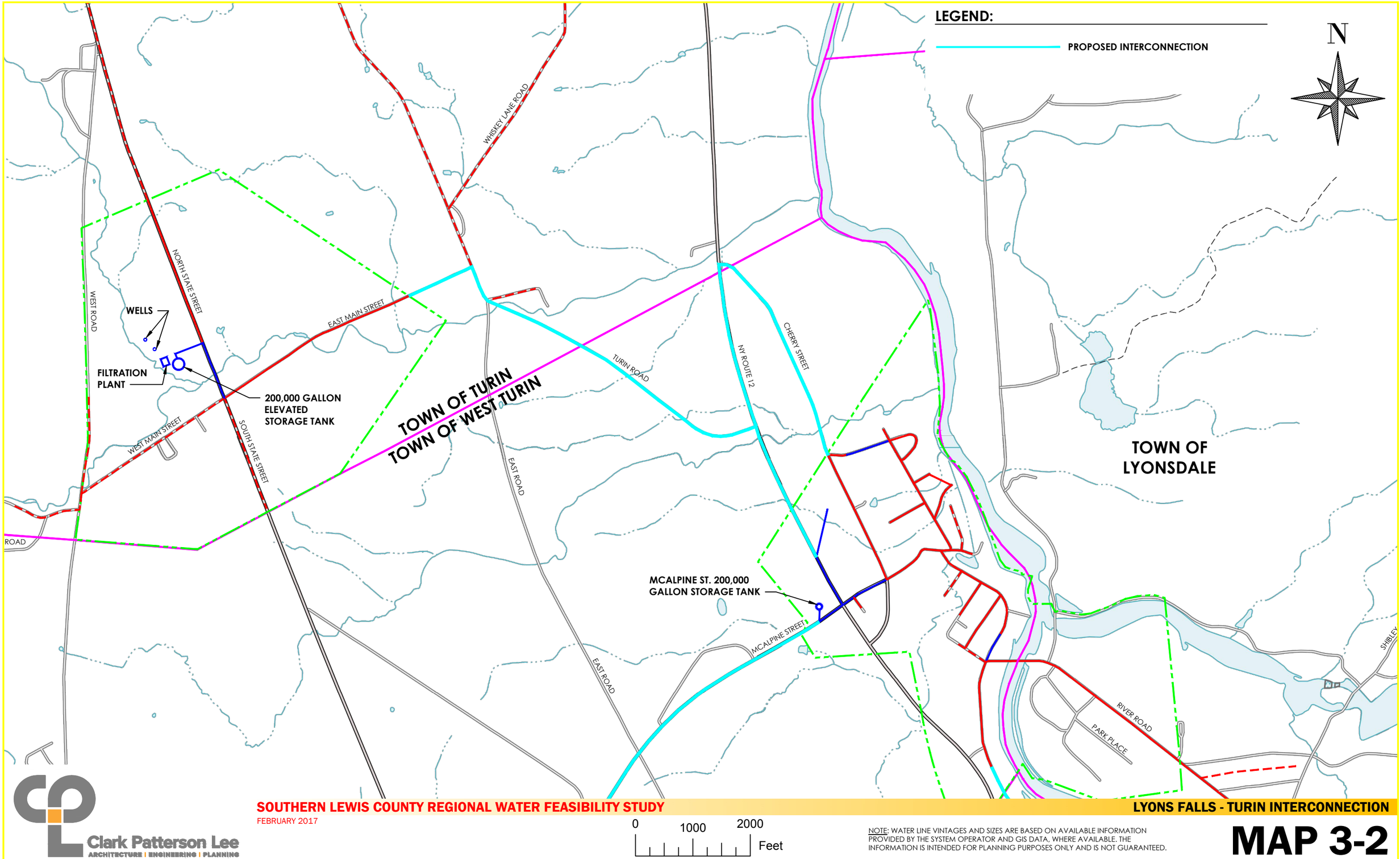
FEBRUARY 2017

LYONS FALLS - PORT LEYDEN INTERCONNECTION

NOTE: WATER LINE VINTAGES AND SIZES ARE BASED ON AVAILABLE INFORMATION PROVIDED BY THE SYSTEM OPERATOR AND GIS DATA, WHERE AVAILABLE. THE INFORMATION IS INTENDED FOR PLANNING PURPOSES ONLY AND IS NOT GUARANTEED.

MAP 3-1



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FEBRUARY 2017

0 1000 2000 Feet

LYONS FALLS - TURIN INTERCONNECTION

NOTE: WATER LINE VINTAGES AND SIZES ARE BASED ON AVAILABLE INFORMATION PROVIDED BY THE SYSTEM OPERATOR AND GIS DATA, WHERE AVAILABLE. THE INFORMATION IS INTENDED FOR PLANNING PURPOSES ONLY AND IS NOT GUARANTEED.

MAP 3-2

MCALPINE ST. 200,000 GALLON STORAGE TANK

MCALPINE STREET

EAST ROAD

NY ROUTE 12D

NY ROUTE 26

RIVER ROAD

PARK PLACE

TOWN OF WEST TURIN
TOWN OF LEYDEN

SMITH SPRINGS

SMITH ROAD

1,000,000 GALLON RESERVOIR

CROTOFOOT HILL ROAD

FILTRATION PLANT

NORTH MAIN STREET

HIGH STREET

JAMES STREET

WEST MAIN STREET

HIGHMARKET ROAD

WEST ROAD

JOHN STREET

N

LEGEND:

PROPOSED INTERCONNECTION

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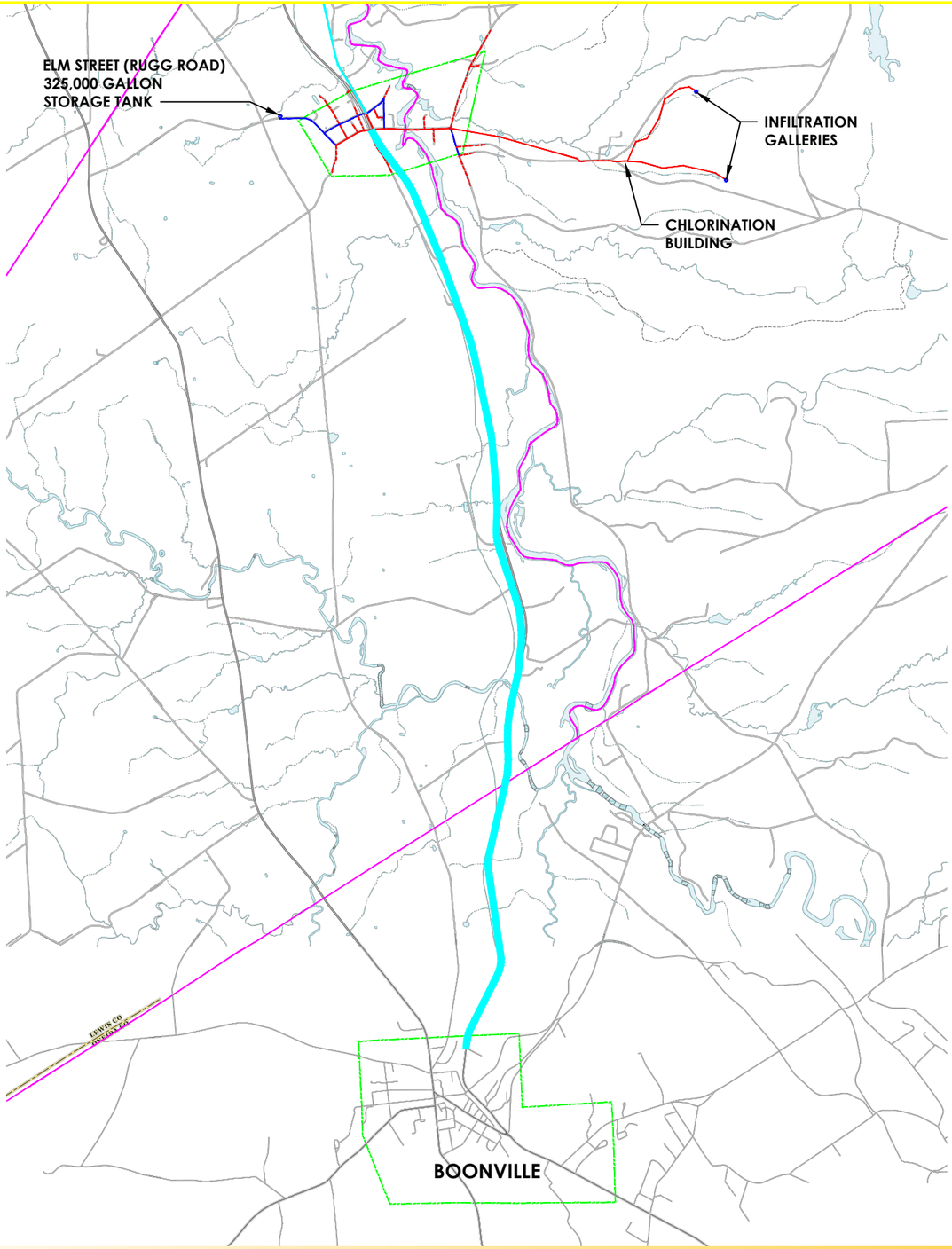
FEBRUARY 2017

LYONS FALLS - CONSTABLEVILLE INTERCONNECTION

0 2500 5000 Feet

NOTE: WATER LINE VINTAGES AND SIZES ARE BASED ON AVAILABLE INFORMATION PROVIDED BY THE SYSTEM OPERATOR AND GIS DATA, WHERE AVAILABLE. THE INFORMATION IS INTENDED FOR PLANNING PURPOSES ONLY AND IS NOT GUARANTEED.

MAP 3-3



N

LEGEND:

PROPOSED INTERCONNECTION

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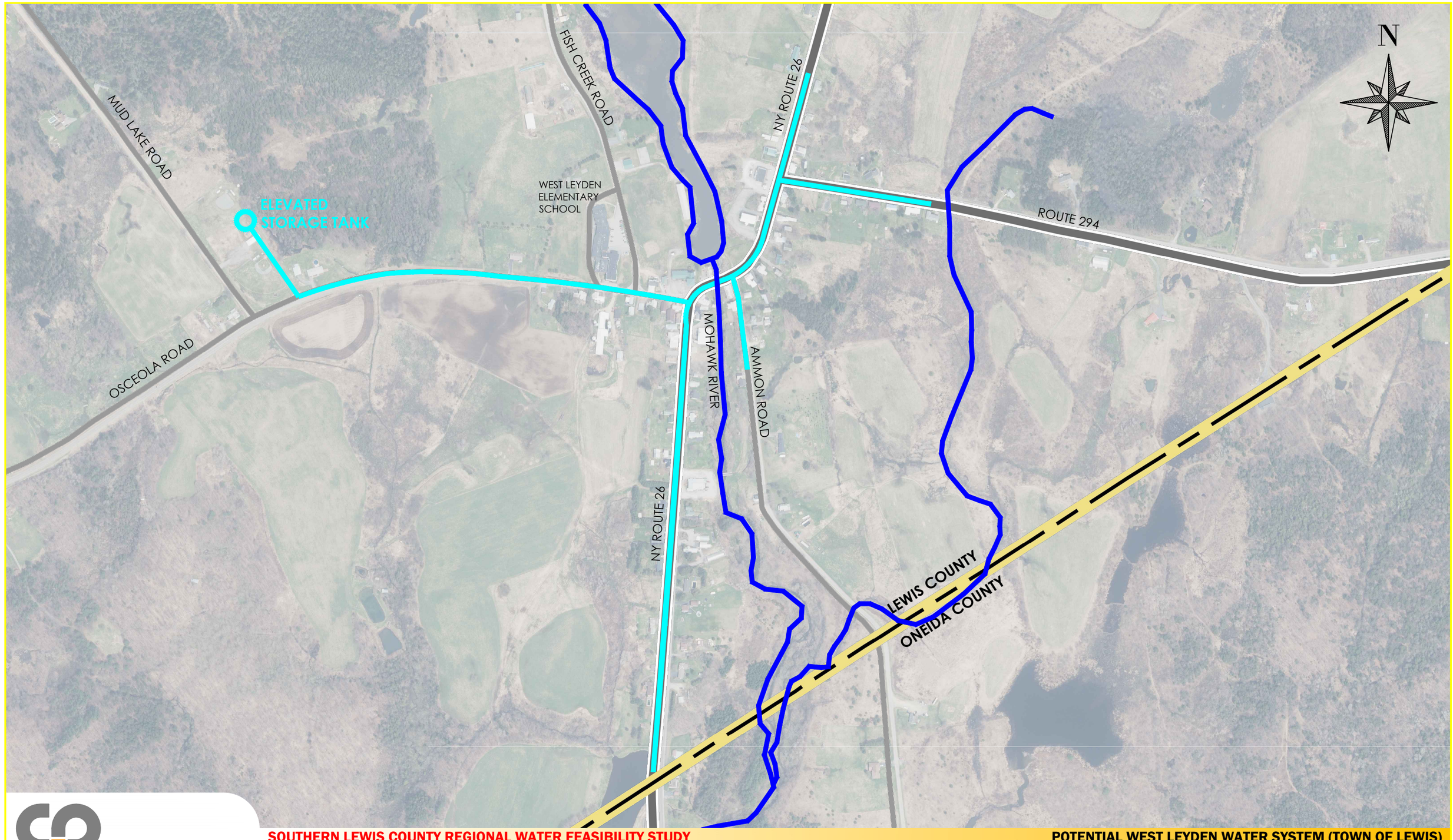
FEBRUARY 2017

0 5000 10000 Feet

BOONVILLE SUPPLY EXTENSION

NOTE: WATER LINE VINTAGES AND SIZES ARE BASED ON AVAILABLE INFORMATION PROVIDED BY THE SYSTEM OPERATOR AND GIS DATA, WHERE AVAILABLE. THE INFORMATION IS INTENDED FOR PLANNING PURPOSES ONLY AND IS NOT GUARANTEED.

MAP 3-4



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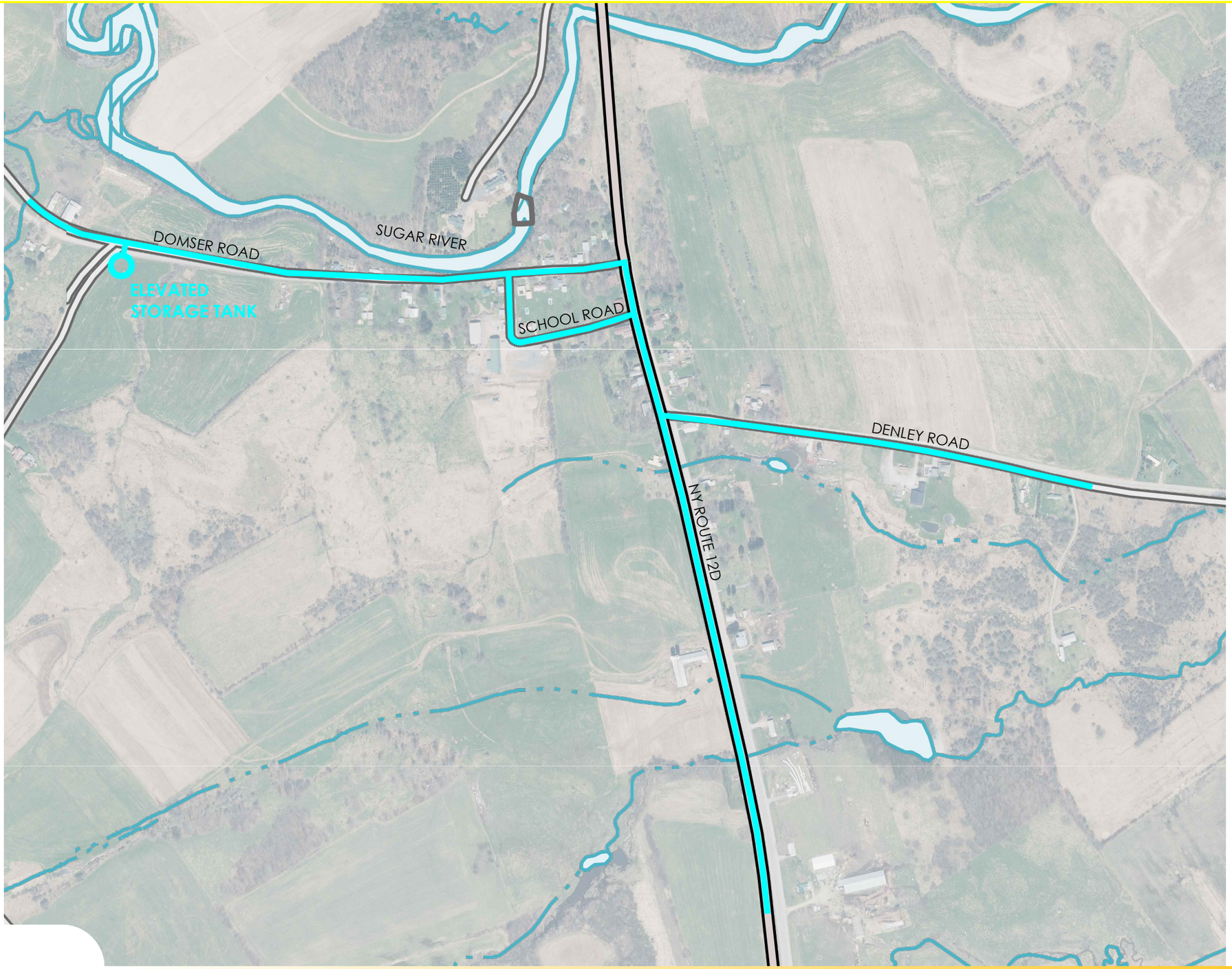
SOUTHERN LEWIS COUNTY REGIONAL WATER FEASIBILITY STUDY

FEBRUARY 2017

0 500 1000 Feet

POTENTIAL WEST LEYDEN WATER SYSTEM (TOWN OF LEWIS)

MAP 4-1



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FEBRUARY 2017

0 500 1000 Feet

POTENTIAL TALCOTTVILLE WATER SYSTEM (TOWN OF LEYDEN)

MAP 4-2

APPENDIX E

CHARACTER AREA PLAN MAP

FROM COMPREHENSIVE PLAN

Lewis County
NEW YORK

Map 13 — *July 2009*

Character Area Plan

Map Scales	Main Map	Inset Maps
11 x 17 Sheet	1 inch = 4 miles	1 inch = 1.25 miles
36 x 56 Plot	1 inch = 1.25 miles	1 inch = 2,000 feet

LEWIS COUNTY
TOWNS
ADIRONDACK PARK BLUE LINE
Interstates
State Roads
County Roads
Local Roads
Active RR

Character Areas
- Farmland
- Forest
- Lakefront Living
- Rural Living
- Village Living
- Village Transition
- Village Center
- Industry
- Fort Drum
- Hamlets & Crossroads
- Riparian Buffers*

*Consists of a 100-foot buffer on either side of a creek, river, lake, or pond.

New York State — LEWIS COUNTY

Castorland — DENMARK — Castorland

Croghan & Beaver Falls — CROGHAN — Croghan — Beaver Falls — NEW BREMEN

Harrisville — DIANA — Harrisville — PITCAIRN

Lowville — Lowville

ANTWERP — FOWLER — PITCAIRN — FINE

St. Lawrence County

Fort Drum

Herkimer County

Jefferson County

PAMELIA — LE RAY — WILNA — RUTLAND — CHAMPION — WATERTOWN — City of Watertown

RODMAN — PINCKNEY — HARRISBURG — LOWVILLE — DENMARK — CROGHAN — NEW BREMEN — PARK — WEBB — WATSON — ADIRONDACK — GREIG — WORTH — MONTAGUE — MARTINSBURG — TURIN — WEST TURIN — LYONSDALE — LEYDEN — OSCEOLA — LEWIS — REDFIELD — FORESTPORT — BOONVILLE — FLORENCE — ANNSVILLE — AVA

Oswego County

Oneida County

Copenhagen — DENMARK — Copenhagen

Martinsburg — MARTINSBURG — Martinsburg

Glendale, Glenfield & Otter Creek — MARTINSBURG — GREIG — TURIN

Constableville — WEST TURIN — Constableville

Turin — TURIN — WEST TURIN

Lyons Falls & Port Leyden — WEST TURIN — LYONSDALE — LEYDEN

Map designed by:

Bergmann associates
Architects • Engineers • Planners
www.bergmannpc.com
585.232.5135
28 East Main Street / Rochester, New York 14614

APPENDIX F

COST ESTIMATES

VILLAGE OF LYONS FALLS - VILLAGE OF PORT LEYDEN INTERCONNECTION
OPINION OF PROBABLE COST

ITEM	DESCRIPTION	UNIT	ESTIMATED QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL
1	12" Diameter PVC Water Main	LF	10,000	$ 50	$ 500,000
2	Pressure Reducing / Pump Station	LS	1	$ 300,000	$ 300,000
3	12" Gate Valve	EA	18	$ 3,000	$ 54,000
4	Short Side Water Service	EA	51	$ 1,800	$ 91,800
5	Long Side Water Service	EA	51	$ 2,500	$ 127,500
6	Hydrant Assemblies	EA	23	$ 4,200	$ 96,600
7	Maintenance and Protection of Traffic	LS	1	$ 35,097	$ 35,097
8	Mobilization	LS	1	$ 35,097	$ 35,097

SUBTOTAL =	$ 1,240,094
CONTINGENCY (20%) =	$ 248,019
LEGAL, ENGINEERING, & ADMINISTRATION (25%) =	$ 310,024
TOTAL =	$ 1,799,000
USDA Grant (45% up to $500,000) =	$ 500,000
Net Local Project Cost =	$ 1,299,000
Estimated Debt Service at 2.75% for 38yrs =	$ 55,530
Approximate Number of EDU's =	109.0

VILLAGE OF LYONS FALLS - VILLAGE OF TURIN INTERCONNECTION
OPINION OF PROBABLE COST

ITEM	DESCRIPTION	UNIT	ESTIMATED QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL
1	12" Diameter PVC Water Main	LF	17,000	$ 50	$ 850,000
2	Pressure Reducing / Pump Station	LS	1	$ 300,000	$ 300,000
3	12" Gate Valve	EA	24	$ 3,000	$ 72,000
4	Short Side Water Service	EA	18	$ 1,800	$ 32,400
5	Long Side Water Service	EA	18	$ 2,500	$ 45,000
6	Hydrant Assemblies	EA	24	$ 4,200	$ 100,800
7	Maintenance and Protection of Traffic	LS	1	$ 42,006	$ 42,006
8	Mobilization	LS	1	$ 42,006	$ 42,006

SUBTOTAL =	$ 1,484,212
CONTINGENCY (20%) =	$ 296,842
LEGAL, ENGINEERING, & ADMINISTRATION (25%) =	$ 371,053
TOTAL =	$ 2,153,000
USDA Grant (45% up to $500,000) =	$ 500,000
Net Local Project Cost =	$ 1,653,000
Estimated Debt Service at 2.75% for 38yrs =	$ 70,662
Approximate Number of EDU's =	43.0

VILLAGE OF LYONS FALLS - VILLAGE OF CONSTABLEVILLE INTERCONNECTION
OPINION OF PROBABLE COST

ITEM	DESCRIPTION	UNIT	ESTIMATED QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL
1	12" Diameter PVC Water Main	LF	25,000	$ 50	$ 1,250,000
2	Pressure Reducing / Pump Station	LS	1	$ 400,000	$ 400,000
3	12" Gate Valve	EA	20	$ 3,000	$ 60,000
4	Short Side Water Service	EA	12	$ 1,800	$ 21,600
5	Long Side Water Service	EA	13	$ 2,500	$ 32,500
6	Hydrant Assemblies	EA	24	$ 4,200	$ 100,800
7	Maintenance and Protection of Traffic	LS	1	$ 74,596	$ 74,596
8	Mobilization	LS	1	$ 74,596	$ 74,596

SUBTOTAL =	$ 2,014,092
CONTINGENCY (20%) =	$ 402,818
LEGAL, ENGINEERING, & ADMINISTRATION (25%) =	$ 503,523
TOTAL =	$ 2,921,000
USDA Grant (45% up to $500,000) =	$ 500,000
Net Local Project Cost =	$ 2,421,000
Estimated Debt Service at 2.75% for 38yrs =	$ 103,493
Approximate Number of EDU's =	30.0

VILLAGE OF BOONVILLE
SUPPLY EXTENSION
OPINION OF PROBABLE COST

ITEM	DESCRIPTION	UNIT	ESTIMATED QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL
1	12" Diameter PVC Water Main	LF	39,600	$ 50	$ 1,980,000
2	Pressure Reducing Station	LS	1	$ 300,000	$ 300,000
3	12" Gate Valve	EA	15	$ 3,000	$ 45,000
4	Hydrant Assemblies	EA	24	$ 4,200	$ 100,800
5	Maintenance and Protection of Traffic	LS	1	$ 97,032	$ 97,032
6	Mobilization	LS	1	$ 97,032	$ 97,032

SUBTOTAL =	$ 2,619,864
CONTINGENCY (20%) =	$ 523,973
LEGAL, ENGINEERING, & ADMINISTRATION (25%) =	$ 654,966
TOTAL =	$ 3,799,000
USDA Grant (45% up to $500,000) =	$ 500,000
Net Local Project Cost =	$ 3,299,000
Estimated Debt Service at 2.75% for 38yrs =	$ 141,025

WEST LEYDEN, NY (TOWN OF LEWIS) NEW WATER SYSTEM
OPINION OF PROBABLE COST

ITEM	DESCRIPTION	UNIT	ESTIMATED QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL
1	Elevated storage tank	GAL	100,000	$ 5	$ 500,000
2	Supply Well	LS	2	$ 25,000	$ 50,000
3	Chlorination Building	LS	1	$ 75,000	$ 75,000
4	8" Diameter PVC Water Main	LF	8,350	$ 30	$ 250,500
5	8" Gate Valve	EA	15	$ 1,500	$ 22,500
6	Short Side Water Service	EA	36	$ 1,800	$ 64,800
7	Long Side Water Service	EA	36	$ 2,500	$ 90,000
8	Hydrant Assemblies	EA	15	$ 4,200	$ 63,000
9	Directional Drilling 8" HDPE	LF	200	$ 100	$ 20,000
10	Maintenance and Protection of Traffic	LS	1	$ 34,074	$ 34,074
11	Mobilization	LS	1	$ 34,074	$ 34,074

SUBTOTAL =	$	1,203,948
CONTINGENCY (20%) =	$	240,790
LEGAL, ENGINEERING, & ADMINISTRATION (25%) =	$	300,987
TOTAL =	$	1,746,000
USDA Grant (45% up to $500,000) =	$	500,000
Net Local Project Cost =	$	1,246,000
Estimated Debt Service at 2.75% for 38yrs =	$	53,264
Approximate Number of EDU's =		79.0
ANNUAL DEBT SERVICE PER UNIT	**$**	**674**
ANNUAL WATER COST ($5.00/1,000 gallons, 60,000 gallons/year)	**$**	**300**
TOTAL ANNUAL UNIT COST	**$**	**974**

TALCOTTVILLE, NY (TOWN OF LEYDEN) NEW WATER SYSTEM
OPINION OF PROBABLE COST

ITEM	DESCRIPTION	UNIT	ESTIMATED QUANTITY	ESTIMATED UNIT PRICE	ESTIMATED TOTAL
1	Elevated storage tank	GAL	100,000	$ 5	$ 500,000
2	Supply Wells	LS	2	$ 25,000	$ 50,000
3	Chlorination Building	LS	1	$ 75,000	$ 75,000
4	8" Diameter PVC Water Main	LF	9,200	$ 30	$ 276,000
5	8" Gate Valve	EA	15	$ 1,500	$ 22,500
6	Short Side Water Service	EA	24	$ 1,800	$ 43,200
7	Long Side Water Service	EA	24	$ 2,500	$ 60,000
8	Hydrant Assemblies	EA	15	$ 4,200	$ 63,000
9	Maintenance and Protection of Traffic	LS	1	$ 32,691	$ 32,691
10	Mobilization	LS	1	$ 32,691	$ 32,691

SUBTOTAL =	$	1,155,082
CONTINGENCY (20%) =	$	231,016
LEGAL, ENGINEERING, & ADMINISTRATION (25%) =	$	288,771
TOTAL =	$	1,675,000
USDA Grant (45% up to $500,000) =	$	500,000
Net Local Project Cost =	$	1,175,000
Estimated Debt Service at 2.75% for 38yrs =	$	50,229
Approximate Number of EDU's =		54.0
ANNUAL DEBT SERVICE PER UNIT	**$**	**930**
ANNUAL WATER COST ($5.00/1,000 gallons, 60,000 gallons/year)	**$**	**300**
TOTAL ANNUAL UNIT COST	**$**	**1,230**

APPENDIX G

WATER RESOURCES AGENCY CREATION RESOLUTION

(GENESEE COUNTY EXAMPLE)

RESOLUTION NO. 495 GENESEE COUNTY WATER RESOURCES AGENCY - CREATION OF

Legislator Rudolph offered the following resolution:

WHEREAS, The Genesee County Legislature did, by Resolution No. 181 of the Year 1997, create a Water Supply Task Force for the purpose of assisting the County Legislature in the planning of future water improvements for the County of Genesee, and

WHEREAS, The Task Force has completed its duties as set forth in said Resolution and has recommended to the County Legislature that a more formal body now be created to continue the function of assisting the County Legislature in the implementation of water improvements for the County, and

WHEREAS, Section 251 of the County Law specifically authorizes the creation of a County agency with power and duties as allowed by Article 5-A of the County Law and as determined and delegated by the County Legislature, and

WHEREAS, The Genesee County Legislature has reviewed the accomplishments and recommendations of the Water Supply Task Force and concurs with the recommendation of the creation of a county agency for these purposes. Now, therefore, Be it

RESOLVED, That the Genesee County Legislature does, pursuant to Section 251 of the County Law, create the Genesee County Water Resources Agency with the powers and duties as hereinafter set forth, and Be it further

RESOLVED, That the Genesee County Water Resources Agency shall consist of nine (9) members, each appointed for terms of three (3) years by the Genesee County Legislature with the initial terms of some members of the Agency for a shorter duration so as to achieve a staggering of terms. All members of the Agency shall be residents of the County of Genesee, and no more than three County Legislators may be members of the Agency at any time, and Be it further

RESOLVED, That the Genesee County Water Resources Agency shall have the following power and duties effective January 1, 1999:

1. To assemble data relating to the water resources available to the County, both within and without its boundaries.
2. To assist in the planning and design of coordinated water resource and transmission projects within the county of Genesee and make recommendations in connection with such projects.
3. To recommend and assist in the development of intermunicipal agreements and grant applications for water supply and transmission pursuant to Article 5-G of the General Municipal Law.
4. To contract for engineering and related technical services within the annual budgetary appropriation provided to the Agency by the County and if requested, to provide said services to municipalities within the County pursuant to contract with said municipalities.
5. To contract for other necessary services to carry out its functions within the annual

budgetary appropriation provided to the Agency by the County subject to the provisions of Article 5-A of the General Municipal law and the audit requirements of the County Legislature.

6. To serve as the administrative head or body of any county water district that may hereinafter be created.

7. To coordinate the implementation of any county water resource or transmission project or district with comprehensive planning and land use regulation and consistent with any intermunicipal agreements entered into by other municipalities in Genesee County pursuant to Article 5-J of the General Municipal Law.

8. To have such other powers and duties as may from time to time be lawfully conferred upon the Agency by the County Legislature. It is expressively provided, however, that nothing contained herein shall be construed as modifying, transferring or abolishing any power, duty or authority of the County Legislature, any county department or elected or appointed official, and Be it further

RESOLVED, That the Agency shall prepare an annual report of its activities in the form required by the County Legislature not later than October 1st of each year.

Legislator Ruffino seconded the resolution which was adopted by 128 votes.

State of New York
County of Genesee SS.

I hereby certify that the foregoing is a true and correct transcript of a resolution duly adopted by the Genesee County Legislature on the 9th of December 1998
Dated, Batavia, N.Y.

December 10th 1998

Kathleen Gaerte
Clerk of the Genesee County Legislature

Martin Culik
Bob Costanzo
Jim Vincent (MG

APPENDIX H

INTERMUNICIPAL SHARED SERVICES AGREEMENT

(GARDEAU WATER DISTRICT EXAMPLE)

INTERMUNICIPAL SHARED SERVICES AGREEMENT
Gardeau Water District

THIS AGREEMENT, made and entered into the ___ day of _____ 2011, between the Village of Perry, County of Wyoming, State of New York, hereinafter referred to as "VILLAGE" and Gardeau Water District, a municipal district, Town of Castile, Wyoming County, State of New York, hereinafter referred to as "TOWN WATER DISTRICT".

WITNESSETH:

WHEREAS, the VILLAGE maintains and operates a water treatment plant and a water supply system sufficient to supply its inhabitants and has surplus water to supply the TOWN WATER DISTRICT; and

WHEREAS, the TOWN WATER DISTRICT has heretofore constructed its own distribution system but has no water supply; and

WHEREAS, the VILLAGE is capable of providing water in excess of its current demands; and

WHEREAS, the VILLAGE and TOWN WATER DISTRICT desires to enter into a contract for the purchase and use of water; and

WHEREAS, this Agreement constitutes the complete understanding of the parties.

NOW THEREFORE, in consideration of the agreements and covenants contained herein and in payment of the rates hereinafter set forth, it is

AGREED by the parties hereto that the VILLAGE will supply water from its water supply to the residents and businesses of the TOWN WATER DISTRICT upon the following terms and conditions:

SECTION I. DURATION OF CONTRACT

1. The term of this Agreement shall commence upon signing and will remain in effect until December 31, 2013.

2. This Agreement will automatically be renewed for an additional year term unless either party, within ninety (90) days of the expiration of the term, has notified the other party, in writing, of its desire to discontinue or modify the terms of this Agreement. In such fashion, the Agreement will continue to be renewed for additional year terms for a maximum of forty (40) years after the initial effective date of the Agreement.

3. A letter requesting modification signed by the Mayor of the VILLAGE or the Supervisor of the TOWN WATER DISTRICT, as the case may be, and mailed to the office of the Clerk of the other party, will satisfy the notification requirement of this paragraph and will terminate the existing Agreement.

SECTION II. WATER SUPPLY

1. The VILLAGE shall during the terms of this Agreement use reasonable care and diligence in maintaining a constant supply of potable water to the mains of the TOWN WATER DISTRICT, not to exceed one million (1,000,000) gallons per month.

2. VILLAGE assumes no liability to furnish TOWN WATER DISTRICT with an adequate supply of water at all times or to guarantee the purity and potability thereof; but it will endeavor to serve TOWN WATER DISTRICT with the same quality as it supplies to users of water in the VILLAGE.

3. The TOWN WATER DISTRICT shall take all action reasonable, within fiscal and operational constraints, to limit use of water and fix any leaks within a

reasonable timeframe. In addition, the TOWN WATER DISTRICT shall submit to the VILLAGE a written conservation plan in accordance with the New York State Department of Environmental Conservation Manual.

SECTION III. WATER LIMITATION OR RESTRICTION

1. The VILLAGE may limit or restrict the flow of water to TOWN WATER DISTRICT at any time if, in the opinion of the Village Board, such action is reasonable for the protection of the water supply within VILLAGE.
2. Any such limitation or restriction of the flow of water to TOWN WATER DISTRICT must not reduce the necessary pressure and flow required by hydrants or other fire prevention devices within TOWN WATER DISTRICT unless the same reduction is required within VILLAGE.
3. The VILLAGE makes no guarantee as to the pressure, quantity or continuity of service and shall not be held liable for loss or damage from a pressure deficiency or failure in the supply of water, whether caused by shutting off the water in case of an accident or for alterations, extensions, connections or repairs. In the event of an emergency or other necessity, the VILLAGE shall have the right to shut off or reduce the flow of water for such periods as reasonably necessary. In all cases other than emergencies, the VILLAGE shall give the TOWN WATER DISTRICT written notice at least forty-eight (48) hours prior to any shut off or flow reduction. The VILLAGE shall restore service and make water available as soon as it can reasonable do so.

SECTION IV. WATER RATES

1. The TOWN WATER DISTRICT shall pay to the VILLAGE for said water as follows:

RESIDENTIAL:

$4.40 per thousand gallons plus $30.00 base rate per quarter per district customer.

AGRICULTURAL/DAIRY:

Base Rate	$30.00 per quarter
0 to 150,000 gallons	$4.12 per thousand gallons
151,000 to 500,000 gallons	$3.75 per thousand gallons
501,000 gallons	$3.46 per thousand gallons

2. Water charges will be based on three (3) months' consumption.

3. Payment dates are January, April, July, and October.

4. Payment of any invoice for water usage provided by VILLAGE under this contract is due thirty (30) days after it is rendered to TOWN WATER DISTRICT. Thereafter, a penalty of ten percent (10%) for late payment will be included. The penalty for non-payment is the same as the penalty for users within the VILLAGE.

5. Right to increase water rates is reserved upon a ninety (90) day written notice.

6. Any rate increase/decrease shall null and void any previous rate per one thousand (1,000) or base rate charge.

SECTION V. MASTER METER (if required)

1. Water consumption may be metered by the VILLAGE on an acceptable master meter to be owned and maintained by the VILLAGE.

2. If for any period of time the meter is out of repair or not in use, the retail meters in the TOWN WATER DISTRICT will be the basis for the amount to be charged to the TOWN WATER DISTRICT. If a master meter is used, all water passing through the master meter will be charged to TOWN WATER DISTRICT, whether used or not, regardless of cause.

3. Any work on TOWN WATER DISTRICT performed by other than VILLAGE, must be completed under the supervision of the VILLAGE Superintendent of Public Works or with his approval. The work performed and materials used are subject to inspection by the Town Highway Superintendnet or his designee. A violation of this subparagraph will cause this contract to become null and void.

4. The master meters owned by the TOWN WATER DISTRICT and/or VILLAGE will be maintained within the accuracy limits as specified for repair of meters in the then latest revision of the AWWA standards for testing cold water meters, Series C-700. Either party shall have the right to test at its own expense the meter's accuracy at any reasonable time. If a test shows that a meter has stopped registering or is improperly registering, the VILLAGE will estimate consumption based upon actual consumption during the same period of previous years or such other method as may be reasonable and agreed upon by both parties.

SECTION VI. ADDITIONAL USERS WITHIN WATER DISTRICT

1. No water line or main in TOWN WATER DISTRICT may be enlarged or extended; no connection may be made nor construction begun; nor, may any fire protection hydrants or devices be connected to said main without first obtaining

the approval of the VILLAGE. Connection without such approval renders this contract null and void.

2. TOWN WATER DISTRICT must make application to VILLAGE for the approval of any services or additional users of water no later than fifteen (15) days prior to the time that such new service is to be installed or said user is to acquire the use of water in the TOWN WATER DISTRICT. This approval will not be unreasonably withheld; however, the VILLAGE may require estimated usage figures and/or an Environmental Impact Statement before acting on such application. In the event that such connection should be made without approval, this contract will become null and void.

SECTION VII. ANNEXATION

In the event that TOWN WATER DISTRICT or any part thereof, is annexed into VILLAGE, the properties situate within the annexed portion of TOWN WATER DISTRICT will no longer be bound by this Agreement and will be treated as any other consumer of water within VILLAGE.

SECTION VIII. WATER DISTRICT BOUNDARIES

Attached hereto and made a part hereof as **Schedule A** is the Wyoming County Tax Map for the VILLAGE showing the location of TOWN WATER DISTRICT and the parties agree that the boundaries as depicted on said map are accurate and constitute the limits of TOWN WATER DISTRICT. These boundaries may be altered only upon the consent of both parties and no application for service may be made for any properties not wholly located within the boundaries of TOWN WATER DISTRICT.

SECTION IX. AGREED UPON SERVICES

The Town of Castile agrees to retain the services of the VILLAGE to perform certain operations for the water system of the TOWN WATER DISTRICT in the manner following:

1. That the VILLAGE shall read the TOWN WATER DISTRICT water meters quarterly and report reading to the Town Clerk.

2. That the VILLAGE will maintain, repair and replace as may be required water meters located in the residence parcels of the TOWN WATER DISTRICT. The TOWN WATER DISTRICT will pay for the meter only. Meters can be new or refurbished. The VILLAGE will pay for the labor costs.

3. The Superintendent of Public Works will be responsible for flushing hydrants, changing meters, monitoring the system, securing water samples from various locations in accordance with New York State Department of Health and Wyoming County Health Department. The costs of flushing hydrants, changing meters, monitoring the system, securing water samples are included within the cost of said Agreement.

4. The VILLAGE will perform all current Health Department testing, including but not limited to, collection of samples for testing; the cost of the test from third parties which will be billed directly to the TOWN WATER DISTRICT. Any additional testing required for maintenance reasons or Health Department requirements will also be borne by the TOWN WATER DISTRICT.

5. Hydrant upkeep, mowing and snow removal for access to hydrants is the responsibility of the TOWN WATER DISTRICT.

6. Any repairs or maintenance of the curb boxes and mains located in the TOWN WATER DISTRICT are the responsibility of the TOWN WATER DISTRICT. The VILLAGE will make any requested repairs to same at cost of time and material.

SECTION X. ADDITIONAL CHARGES FOR LABOR AND EQUIPMENT (associated with water main breaks)

1. In the event that there is a water emergency in the TOWN WATER DISTRICT, the VILLAGE agrees to notify the TOWN WATER DISTRICT immediately. Upon said notice, the TOWN WATER DISTRICT shall advise the VILLAGE Superintendent of Public Works, within one (1) hour of said notification, of one of the following:

   a. The VILLAGE should respond to said water emergency; or

   b. The TOWN WATER DISTRICT shall secure its own labor and respond to said water emergency.

2. The VILLAGE response to said water emergency will be billed for both for labor and equipment in accordance with the Village of Perry Equipment Rate Schedule attached hereto as **Schedule B**.

3. VILLAGE will invoice on a monthly basis the TOWN WATER DISTRICT for any additional charges hereunder. Payment shall be remitted by the TOWN WATER DISTRICT to the VILLAGE within 30-days of receipt thereof.

SECTION XI. SERVICE FEES AND PAYMENT THEREOF

The service fees and payment thereof for this Agreement (Gardeau Water District) are included in the INTERMUNICIPAL SHARED SERVICES AGREEMENT between the Village of Perry and the Silver Lake Sewer District contained in Section IV – Costs of Operation of Collection System, other than the additional charges for labor and equipment

as outlined in Section X hereinabove. Said Agreements are executed in conjunction with each other. The three (3) Intermunicipal Shared Services Agreements (Silver Lake Sewer District; Silver Lake Institute Water District; and Gardeau Water District) are interrelated and function in conjunction with each other and one cannot be entered into without the other two.

SECTION XII. DEFAULT AND NOTICE PROVISIONS

If the VILLAGE shall fail or neglect for twenty (20) days to remedy a failure to comply with the provisions of this Agreement, after written demand to do to, this Agreement shall be voidable at the option of the TOWN WATER DISTRICT upon written notice to the VILLAGE. This Agreement may be cancelled by either party giving forty-five (45) days written notice of cancellation. Should any written notice be required by one party to the other pursuant to the terms of this Agreement, such notice shall be sent to the following entities at the addresses set forth below by certified, return receipt mail:

VILLAGE

Village of Perry, 46 North Main Street, Perry, New York 14530

TOWN WATER DISTRICT

Town of Castile, 53 North Main Street, Castile, New York 14427

SECTION XIII. AUTHORITY FOR EXECUTION

The Mayor has executed this Agreement pursuant to a resolution adopted by the Village Board of the Village of Perry at a meeting thereof held on the ___ day of _____ 2011. Howard Wood, Mayor, whose signature appears hereafter, is duly authorized and empowered to execute this instrument and enter into such an Agreement on behalf of the Village. This instrument shall be executed in quadruplicate. At least one (1) copy shall be

permanently filed, after execution thereof, in the office of the Village Clerk of the Village of Perry.

The Supervisor has executed this Agreement pursuant to a resolution adopted by the Town Board of the Town of Castile at a meeting thereof held on the ___ day of _____ 2011. E. Joseph Gozelski Supervisor, whose signature appears hereafter, is duly authorized and empowered to execute this instrument and enter into such an Agreement on behalf of the Town. This instrument shall be executed in quadruplicate. At least one (1) copy shall be permanently filed, after execution thereof, in the office of the Town Clerk of the Town of Castile.

$$$$Signature Page to Follow$$$$

IN WITNESS WHEREOF, the parties hereto, and a duly authorized officer of each municipality has set their hands and seals this ___ day of _____, 2011.

VILLAGE OF PERRY

(SEAL)

By: _____
HOWARD WOOD, MAYOR

Attest: _____
GAIL VOSBURG, CLERK

TOWN OF CASTILE

(SEAL)

By: _____
E. JOSEPH GOZELSKI SUPERVISOR

Attest: _____
VICKIE DRAPER, CLERK

STATE OF NEW YORK)
) **SS**:
COUNTY OF WYOMING)

On this _____ day of _____ 2011 before me, the subscriber, personally appeared **HOWARD WOOD** who, being by me duly sworn, deposes and says: That he is the Mayor of the Village of Perry (the "VILLAGE"), the municipal subdivision of the State of New York named in and which executed the above and within instrument; that he knows the seal of said VILLAGE and that the seal affixed to said instrument is the seal of the VILLAGE of Perry; that it was so affixed by the order of the Village Board of the Village of Perry, and that he signed his name thereto by like order.

_____
Notary Public
Wyoming County New York
My Commission Expires: ____-_____-_____

STATE OF NEW YORK)
) **SS**:
COUNTY OF WYOMING)

On this _____ day of _____ 2011 before me, the subscriber, personally appeared **E. JOSEPH GOZELSKI** who, being by me duly sworn, deposes and says: That he is the Supervisor of the Town of Castile (the "Town"), the municipal subdivision of the State of New York named in and which executed the above and within instrument; that he knows the seal of said Town and that the seal affixed to said instrument is the seal of the Town of Castile; that it was so affixed by the order of the Town Board of the Town of Castile, and that he signed his name thereto by like order.

_____
Notary Public
Wyoming County New York
My Commission Expires: ____-_____-_____