

Round 2
NYS Water Infrastructure Improvement Act
City of Auburn, New York
Water Distribution Improvement Project

Submitted to:
New York State Department of Health
Bureau of Water Supply Protection

Submitted by:



24 South Street
Auburn, New York 13021

April 2016

Prepared by:
City of Auburn
Office of Planning & Economic Development & Office of Engineering Services

City of Auburn, New York

Request for NYS Water Grant & DWSRF FY2017 IUP

Prepared for New York State Environmental Facilities Corporation & Department of Health

Water Distribution Improvement Project Application and Engineering Report

April 12, 2016

Engineering Report Certification

This report has been completed in accordance with the engineering report template provided by the New York State Clean Water State Revolving Fund.

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

Title of Engineering Report: Auburn Water Distribution System Project

Date of Report: April 12, 2016

Professional Engineer's Name: William H. Lupien, Jr., P.E.

Signature: _____

Date: April 15, 2016



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INTRODUCTION

The City of Auburn Office of Engineering Services has completed an engineering assessment for improvements to the City's Water Distribution System, focusing on the high service area of North Street (NYS Route 34) and York Street. The following recommended improvements will replace aging infrastructure, reduce system vulnerabilities causing hazardous health conditions, strengthen the supply redundancy and increase supply capacity in this section of the City. This improvement project is critical to the City's industrial customers such as NUCOR Steel, Auburn Metal Processing, and Hammond & Irving that require water service for operations and also for the health and safety of their employees.

The City is pursuing funding through the NYS Water Grants Program and is proposing to finance the remaining portion of the project through the NYS EFC Drinking Water State Revolving Fund (DWSRF) Program and therefore, this report is structured to meet the required Engineering Report format as outlined in Appendix G- for NYS CWSRF Engineering Report Template. The information in this report is based on firsthand knowledge of the project area, discussions with City Water Department staff and recommendations from the following reports:

- 2009 Capital Improvement Plan, Recommended Projects, Cost Estimates and Schedule
- 2010 DWSRF Preliminary Engineering Report for Water Distribution System Upgrades
- 2013 Water and Wastewater Capital Improvement Plan
- 2015-2019 City Capital Improvement Plan

PROJECT HISTORY

In October 2015 the Auburn City Council adopted the 2015-2019 City Capital Improvement Plan (CIP) which describes and prioritizes the need for capital infrastructure projects throughout the City. The CIP outlines eight (8) water main distribution improvement projects totaling over \$2,039,000 of funding needs, the largest and most significant being the aging water main on York Street and North Street. However, due to decreasing water fund revenues and increasing system maintenance costs the City would not be able to begin to address the critical water main project on York and North Street until fiscal year (FY) 2018.

In November 2015 the City of Auburn was notified by representatives from NUCOR Steel, the largest industrial water user in the City and employer of over 300 workers, located at 25 Quarry Road, with concerns regarding the City's municipal water distribution system in the northern section of the City. Since 2011, the City has had seven (7) interruptions of water service to high system users, including NUCOR Steel, Auburn Metal Processing, LLC and Hammond & Irving, due to breaks on the York Street water main between the intersection of Willey Street and North Street. As a result of the water main breaks, the 6" water main on North Street which serves as the secondary service to this section of

the City is siphoned off and causing negative pressure within the distribution system and backflow problems at area businesses and residences. These occurrences not only halt manufacturing, costing hundreds of thousands of dollars, but present critical health risk to the public as the temporary zero pressure experienced in the system can result in contamination and could cause sections of the water main to collapse do to negative pressure.

On January 19, 2016 the City and NUCOR Steel representatives met to discuss the most recent water main break in December 2015 which resulted in a NUCOR Steel plant shut-down and a production loss estimated at \$300,000. At this time, it became apparent to the City that the proposed water main improvements to the York Street and North Street water mains could not wait until FY 2018. Upgrades to the existing aging and undersized 6” cast iron line must be underway in 2016.

1.0 PROJECT PLANNING AREA

1.1 LOCATION

The photographs of the project planning area and topographic maps of the service area are provided in Figure 1.

1.2 ENVIRONMENTAL RESOURCES PRESENT

The proposed project is within the City of Auburn limits in an area of mixed land uses zoned Commercial/ Residential/ Industrial and split zoned parcels. A review of available mapping indicates that the project area is located within a New York State Office of Parks, Recreation & Historic Preservation (OPRHP) identified archeological sensitive area. Located within the public right-of-way (ROW) the proposed area to be disturbed is a documented area of prior disturbance outlined in the 2008 Cultural Resources Reconnaissance Survey Report completed for NYS DOT, Survey No. 09SR58889. There are three residential properties (185 North St., 175 North St., and 165 North St.) adjacent to the project area that are determined eligible for the National Register, but are not listed. See Appendix B for Environmental Maps.

The City Engineering Department also reviewed available mapping from New York State Department of Environmental Conservation (NYS DEC) regarding NYS freshwater wetlands. The NYS DEC Environmental Mapper Resource did not indicate the presence of NYS freshwater wetlands within the project area. According to the U.S. Fish and Wildlife Service’s (USFWS) list of federally listed endangered and threatened species list, Cayuga County has known or likely presences of Indiana bat, Northern long-eared bat and bog turtles.

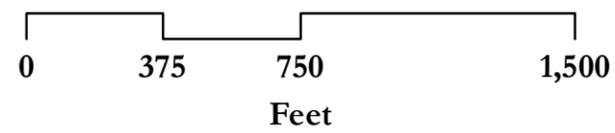
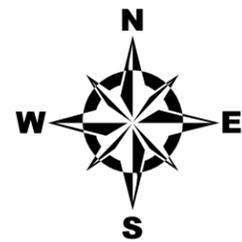
The City of Auburn anticipates obtaining all necessary local, state and federal permits associated with the proposed water main replacement project. The North Street water main replacement will

City of Auburn, New York

Figure 1

North St Water Line Project

●●● Water Line to be replaced



also complement the NYSDOT and their plans to reconstruct this section of the Route 34 corridor. The State has identified and plans to reconstruct this section of roadway within the next 10 years. Permitting associated with this section of water main replacement will be met by means of acquisition of a Highway Work Permit from the Syracuse NYS DOT Regional Office. Plans and specifications associated with asphalt repair and Maintenance and Protection of Traffic will be required for the State's approval. Additionally a spur of the Finger Lakes Railway will need to be transected. The City will prepare plans and submit all necessary railroads crossing documentation required to complete this section of water main replacement. It is anticipated that this section of utility installation will be directionally bored under the existing rail road to minimize impact to the Railway.

The project setting is typical of numerous previous federal and state funded water main distribution replacement projects in the City of Auburn as it relates to the environmental resources present, and the associated permits that will be necessary from the NYS DOT and the Finger Lakes Railway. Potential impacts on environmental and cultural resources as a result of the project would be adequately assessed throughout the completion of the SEQR and SERP process, including full consultation with the NYS Historic Preservation Office (SHPO).

1.3 POPULATION TRENDS

The population of the City of Auburn has seen an 11.7% overall decrease over the last two decades. From 1990 to 2000 the population decreased by 8.6% and further by 3.1% from 2000 to 2010 to an estimated population of 27,687 residents according to the 2010 US Census Data. Since 2010, the City has experienced renewed economic interest and investment in the Central Business District and neighborhoods. As of 2014, the American Community Survey estimates the City's population at 27,019, resulting in a slowing population decrease rate of 2.4%. There are 12,639 housing units within the City.

1.4 COMMUNITY ENGAGEMENT

The City of Auburn Municipal Utilities and Department of Public Works have engaged water users located within the project area either through direct meetings with City staff and management or informal discussions about the need for the project. At the Auburn City Council meeting on March 31, 2016 the City of Auburn Planning Department provided a public presentation about the need for the water main replacement project and the importance of this water main to users in this area of the City. Members of the public were encouraged to attend and speak at "public to be heard" regarding the proposed project which included Gordon Elwell, Environmental Manager for NUCOR steel whom outlined the critical nature of this project and the negative impact the lack of water has had on NUCOR steel production.

2.0 FLOW DATA

The City of Auburn water distribution system is supported by the City owned and operated water filtration plant, two (2) storage reservoirs, and two (2) pumping Stations. The City presently operates both a slow sand filter plant, and a rapid sand filter plant. These facilities, located at the corner of Swift Street and Pulsifer Drive, operate in parallel, although the newer rapid sand filtration plant, constructed in the 1960's, is the primary means by which filtration is accomplished. The slow sand filtration plant was constructed in 1916-17. The plant contains four gravity fed beds with a total capacity of about 7.5 mgd. The beds consist of about 42 inches of sand supported by 12 inches of gravel. The rapid sand filtration plant originally constructed in 1969 consists of three dual-media indoor filters with a combined capacity of approximately 7.25 mgd.

Reservoirs on Franklin Street and Swift Street maintain reserves of 10.25 million gallons (MG) and 3 MG, respectively. It is worth noting the fact that the 3 MG underground reservoir provides storage of finished water at the Plant prior to entering the distribution system, while the 10 MG tank is a ground storage tank which exists at the system highpoint northeast of the City in the Town of Sennett.

Within the project planning area, there are 44 residential, 8 commercial and 3 industrial users according to the City's water meter software billing program- AS400. This section of the City's water distribution system is under high demand with approximately 450,000 gallons per day which is primarily due to the three industrial users in this section of the City- NUCOR Steel, Auburn Metal Processing, and Hammond & Irving. As previously mentioned, when a water main break occurs on the York Street main between Willey Street and North Street, the existing 6" water main on North Street (NYS Route 34) serves as secondary service to NUCOR Steel. The water demand for NUCOR Steel is so high that the steel plant siphons the line off leaving customers along NYS Route 34 without water service. (NOTE: This is the City's primary concern and purpose for the water distribution system replacement project).

3.0 IMPACT ON EXISTING FACILITIES

3.1 LOCATION MAP

The Auburn Water Filtration and Distribution System are under the operation of the City of Auburn Municipal Utilities Department and serve 27,687 residents located within the City of Auburn through nearly 8,800 service connection. Water from the City is also distributed to areas within the Towns of Sennett, Fleming, Throop, Brutus, Montezuma, Springport, and Aurelius as well as the Villages of Port Byron, Cayuga and Weedsport, and the Cayuga County Water Authority and NYS Thruway Authority for a total service area of approximately 45,000 residents

in Cayuga County. The water supply system is comprehensive in nature, covering a broad assortment of water facilities, including the water filtration plant, reservoirs, storage tanks, pumping stations, and 109 miles of water distribution mains. See Figure 2 for a schematic process layout of all existing facilities.

3.2 EXISTING CITY OF AUBURN WATER FACILITIES

3.2.1 Source

The City draws its water from Owasco Lake via a single 30-inch intake line that extends over 1,800 feet into the lake. The intake structure is a submerged concrete crib. The City's allowable withdrawal from Owasco Lake is 15 million gallons per day (mgd), as permitted by Water Resource Application #422 dated October 3, 1963. Owasco Lake is classified by the New York State Department of Environmental Conservation (NYSDEC) as a Class-AA Special water body under 6 NYCRR Part 702.

3.2.2 Transmission Main

The transmission main from the Upper (raw water) Pumping Station to the Plant on Swift Street consists of approximately 8,800 feet of predominately 24-inch cast-iron pipe; with the first 400 feet of the main being 30-inch diameter pipe installed in 2001. The pipe size is increased to 36-inch at the point where it crosses over the Owasco Lake Outlet adjacent to the State Dam, and is reduced to 30 inches before entering the filtration plant.

3.2.3 Water Filtration Plant

The City operates a water treatment plant, which is located within City bounds at 160 Swift Street, Auburn, NY. Under normal operating conditions, raw water is conveyed to the rapid sand filter plant's raw water underground well before being lifted by the low lift pumps to the coagulation and sedimentation basins. Raw water is dosed with coagulant in the rapid mix chamber before entering the flocculation and coagulation/sedimentation basins. Settled water leaving the coagulation basins is carried to the rapid sand filtration plant. Effluent of the rapid sand filtration process is stored in the clear well. Finished water is drawn from the clear well to the pure well, where it mixes with the effluent from the slow sand filters. Water stored in the pure well is then conveyed to the 3 MG underground filtered water reservoir before traveling by gravity to the Lower Pumping Station where finished water is pumped to distribution.

3.2.4 Pumping Stations

The City operates two pumping stations, the upper Pumping Station and the Lower Pumping Station. The Upper Pumping Station pressurizes raw water withdrawn from Owasco Lake

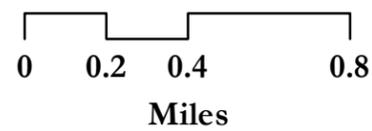
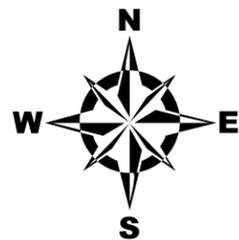
City of Auburn, New York

Figure 2

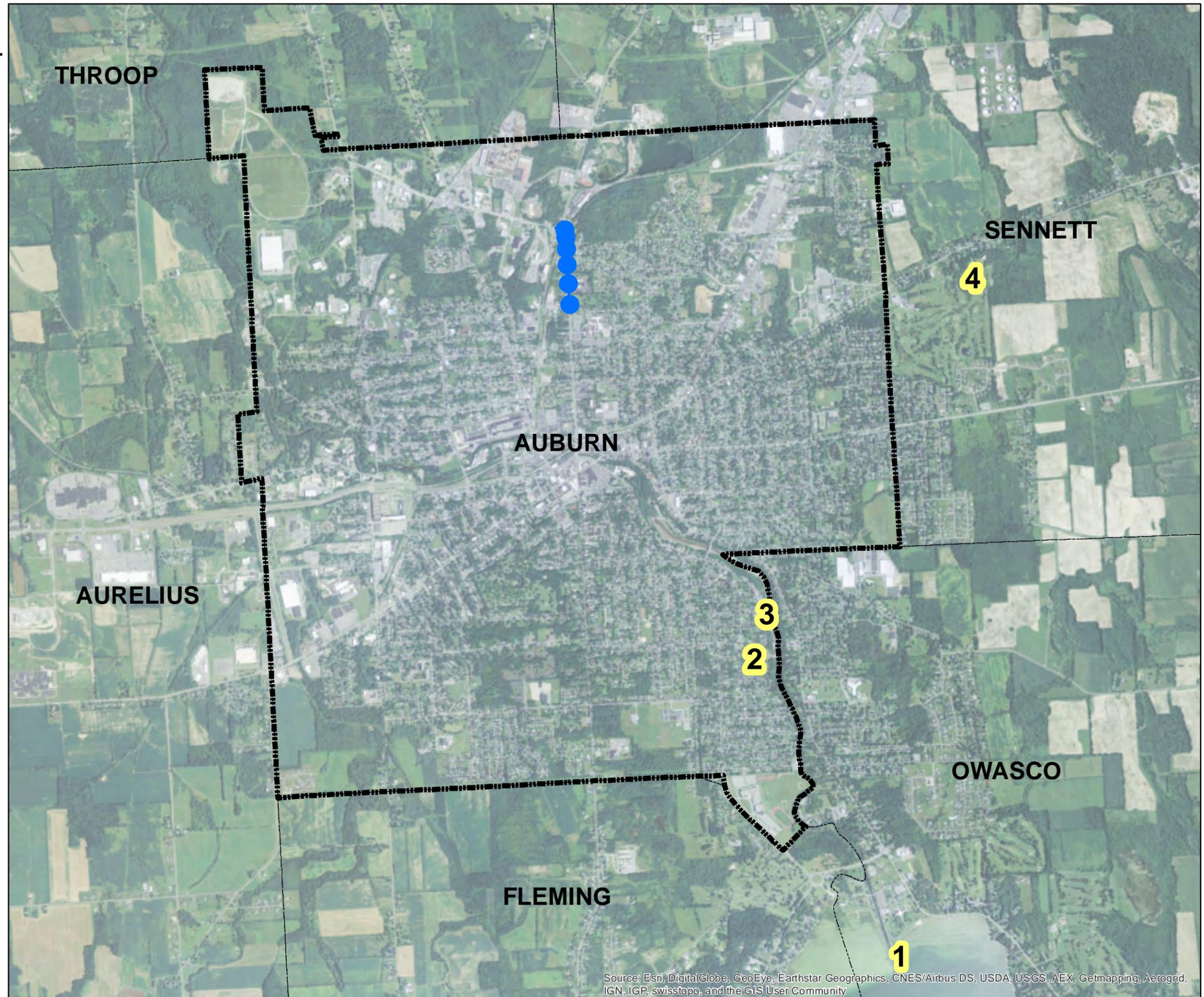
North St Water Line Project

1. Upper Pumping Station
2. Water Filtration Plant
3. Lower Pumping Station
4. Reservoir

●●● Water Line to be replaced



April 11, 2016
Prepared By: City of Auburn
Office of Planning and Economic Development



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

via the 30-inch suction line which passes through a bar screen and enters the Upper Pumping Station. From the underground well located at the Upper Pumping Station, raw water is pumped to the Water Treatment Plant. The Lower Pumping Station pumps the finished drinking water to the entire water distribution system.

3.2.5 Reservoir

Pressure throughout the entire pipeline distribution system is achieved via gravity potential of the City's reservoir on Franklin Street. The water treatment facility is in constant equilibrium, either pumping to fill the reservoir or allowing the reservoir to drain slightly during low peak demand.

3.2.6 Water Distribution System

The City of Auburn Water Distribution System is comprised of nearly 109 miles of transmission and distribution system piping ranging in size from 1 ½ inches to 30 inches in diameter. The City defines the transmission piping as water mains 12 inches in diameter and larger. This piping system primarily conveys drinking water from the Lower Pumping Station to the distribution system. Appendix A provides a map of the City's water distribution system.

The City's transmission mains include pipelines from 12 inches to 30 inches in diameter. Most of the transmission mains are cast iron pipes installed in the early 1900s. The City and wholesale customers' major source of drinking water is supplied by the main from the Franklin Street Reservoir to the 30" mile-long transmission main on Franklin Street.

The City's water distribution system is primarily comprised of the main low service area and a large high service area in the northeastern section of the City. Of the nearly 109 miles of transmission and distribution piping within the City, water mains of 8 inches or less constitute approximately 75% of the total system. Most of the smaller diameter piping is cast or ductile iron and was installed circa 1900. The current guidelines outlined in the Ten State Standards recommend a minimum of 6 inch diameter mains for water distribution systems.

3.2.7 Pressure Zones/ Service Areas

Major pipe line breaks within the system result in temporary flow and pressure reduction in certain zones. Of these low pressure zones, the North Street/York Street area is of most vulnerability. The underlying issue associated with this zone's vulnerability is the high service use of Nucor Steel. As previously stated, when valves are closed from the western feed of Quarry Road, volumetric quantity is compromised due to the small 6" feed from North Street.

Upon review existing mapping of the North Street/York Street area it is noted that much of the original infrastructure found on the December 2, 1914 water distribution system map is what the City currently uses and maintains today. This network of piping feeding from North Street is not only over 100 years in age, it's capacity is greatly compromised at Carpenter Street with pipe diameter reducing from 12" to 6". In the early 1900's, industry such as International Harvester was the primary water user in the area. This industry was fed by the 12" line shown on the record maps ending at Carpenter Street.

Since the early 1900's, however, substantial upgrades have been completed from the 12" main on State Street and the infrastructure was looped by installation of a 12" main from State Street to the existing 6" spur from the North Street intersection with York Street. Additionally a 12" water main was installed around from State Street, to York Street, then easterly to Quarry Road in the early 1980's, providing adequate service and flow to Nucor from the existing 12" water main on State Street. Figure 3 below is of a historical water distribution map that indicates the 12" main upgrades completed in 1914:

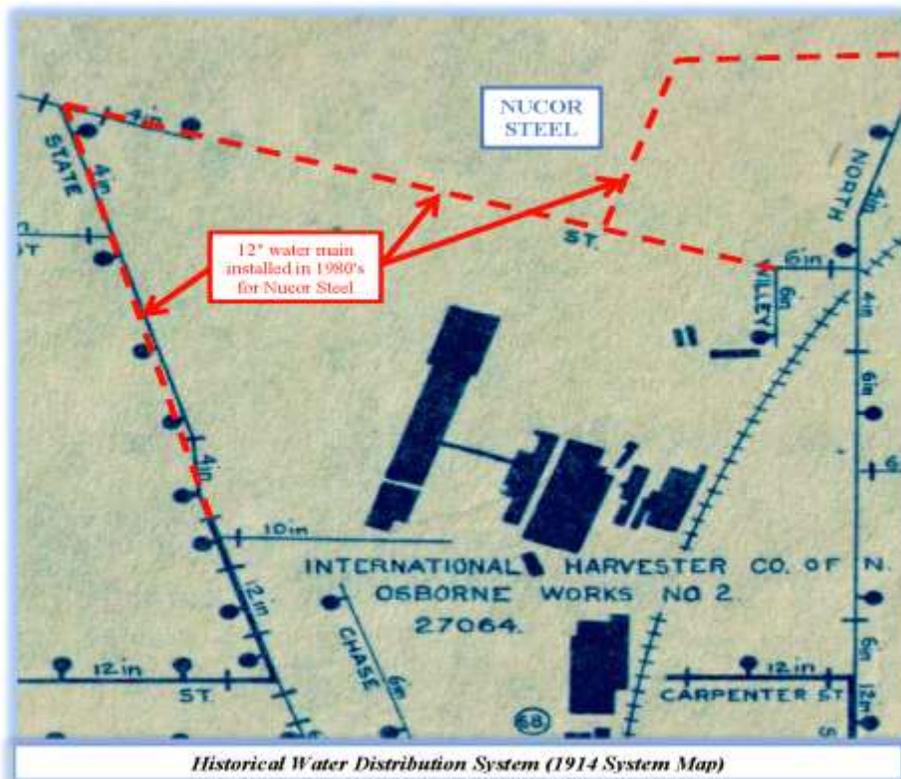


Figure 3. Historical Water Distribution System Map in Northwest Section, 1914.

3.3 CONDITION OF AUBURN WATER SYSTEM

Although many recent water main upgrades have been completed by the City, the vast majority of the distribution network was installed in the early 1900’s. The City of Auburn Water Maintenance department responds to over 50 water main leaks each year. The maintenance department replaces on average 35 water valves and 25 hydrants each year. The City has implemented a quarterly quadrant leak detection program allowing the water maintenance department to identify and address 25% of the City’s distribution system leaks each year. This four (4) year cycle has proven effective as the City is now only at an 8.64% system loss in year 2015.

3.4 INTERCONNECTIONS

Cayuga County consists of the City of Auburn, 23 Townships and 9 Villages. The City of Auburn provides almost all of the water treatment and transmission services to the adjacent communities consisting of the Towns of Aurelius, Throop, and Sennett as well as the Cayuga County Water and Sewer Authority (CCWSA). The adjoining Town of Owasco has its own water treatment plant and the Town of Fleming purchases water from the Town of Owasco while some water district customers purchase water from Springport. Local distribution is provided by each of the individual communities to their residents. See Table 1 below:

Participant	Water Service Providers		
	Water Treatment & Supply	Water Transmission (large mains)	Water Distribution (small mains)
Auburn	Auburn	Auburn	Auburn
Aurelius	Auburn	Auburn	Aurelius
Cayuga County Water & Sewer Authority	Auburn	Auburn, CCWSA	CCWSA
Fleming	NA	NA	NA
Owasco	NA	NA	NA
Sennett	Auburn	Auburn	Sennett
Throop	Auburn	Auburn, CCWSA	Throop

Table 1. List of Water Providers and Customers within Cayuga County, 2016.

3.5 FINANCIAL STATUS OF WATER FUND

The City of Auburn has established and operates an enterprise fund to account for revenues derived from charges for water consumption and the application of such revenues toward related operating expenses and revenues derived from benefited assessments used for debt retirements. Table 2 below summarizes the budgeted water expenses from FY 2014 and 2015:

Water Fund FY 2014 & 2015 Budget Summaries		
	FY 2014	FY 2015
Revenues and Other Sources		
Metered Water Sales	\$4,220,000	\$4,200,000
Other Charges and Fees	\$358,000	\$425,000
	<u>\$4,578,000</u>	<u>\$4,625,000</u>
Expenditures and Other Uses		
Administration	\$603,000	\$683,000
Utility Billing	\$218,000	\$245,000
Water Filtration and Pumping Stations	\$1,406,000	\$1,526,000
Transmission and Distribution	\$819,000	\$907,000
Unallocated Employee Benefits	\$109,000	\$118,000
Debt Service	\$928,000	\$932,000
	<u>\$4,083,000</u>	<u>\$4,411,000</u>
Additional to Capital Reserves	\$495,000	\$214,000

Table 2. Revenue and Expense Summaries for City Water Fund, 06/30/2015

The City of Auburn water system has 4 series of outstanding bonds: Series 2012, Series 2013B, Series 2006A and 2009 NYPA WFP Energy Improvement. The Table 3 below summarizes outstanding debt for the water system by issuance.

OUTSTANDING DEBT FOR WATER SUPPLY			
Outstanding Bonds	Issued Amount	Balance	Year Paid in Full
Series 2003A/ Refinance Series 2012	\$780,000	\$187,815	2023
Series 2003F/ Refinance Series 2013B	\$ 2,499,956	\$ 1,230,000	2024
Series 2006A	\$410,000	\$ 252,000	2026
NYPA WFP Energy Imp. 2009	\$585,181	\$428,662	2029
Series 2011	\$193,400	\$135,000	2023
TOTALS	\$ 4,468,537	\$ 2,233,477	

Table 3. Existing Debt for the City Water Fund, 06/30/2015

In addition to the NYS EFC and NYPA funded projects listed above, the City has initiated the following water capital projects that are in design or construction stages outlined in Table 4:

CURRENT WATER CAPITAL PROJECTS- 6/30/2015			
Project Title	Total Project Cost	Grant Funds/ Cash	Est. Debt to Water Funds
WFP and Lower Pumping Station Improvements	\$ 3,400,000	\$1,400,000 Water Fund	\$2,000,000
Walnut Street Culvert Water Line	\$82,490	\$0	\$66,621 Costs to Date
TOTALS	\$ 3,482,490	\$ 1,400,000	\$2,066,621

Table 4. Current Capital Projects in City Water Fund, 06/30/2015

Outlined below is the actual (2015) water system usage using two different measurements: measured water consumption and water production. In 2015 water customers were charged \$2.05 per 100 cubic feet. The minimum monthly charge for water per user is \$6.83.

Usage (Millions Gallons)

	<u>Water Consumption</u>	<u>Water Production</u>
2015	1,293,480,586	1,420,525,000

3.6 WATER/ ENERGY/AUDITS

The City of Auburn conducts an annual leak detection program that located 43 distribution system leaks that were the cause of up to 250,560 gallons of water per day loss of unaccounted water. The City Water Department staff repaired these leaks in a timely fashion. As previously stated, in 2015 and discussed in the 2015 Water Quality Report, the City recently experienced a 8.64% system loss calculated by subtracting the difference in treated water verses actual metered water usage. This system loss/waste has been drastically reduced over the past 10 years as in 2005 the City was at a 45% overall system loss.

4.0 PROJECT DESCRIPTION

Following the 2010 preliminary engineering report for the City of Auburn’s water distribution system, in 2013 the City worked with CRA Infrastructure & Engineering (CRA) to complete a high-level condition assessment of the water distribution system piping, pumping, storage and treatment facilities to determine assets in need of repair, replacement or rehabilitation. As a benchmark for this evaluation, project scoring criteria and a risk-based prioritization model was developed to determine the assets’ likeliness and consequence of failure and order in which capital needs were to be addressed. For the City’s water distribution system, based upon the estimated replacement value of \$152,992,000 and the system’s useful life it was estimated that an annual minimum investment of \$1,540,403 million was required to offset the annual loss of useful life.

As a result of the 2013 water system asset evaluation, the City prioritized distribution system needs and immediately began working towards addressing the top 10 priority water system projects. Included in the top 10 priority projects were improvements to the City's Water Filtration Plant and Lower Pumping Station (currently underway) as well as the need for a system-wide transmission and distribution replacement program. The following project description complements the water distribution system needs within the City's northwest section and high service area and recommended improvements, which will immediately enhance supply reliability and satisfy future water demands for this growing industrial area of the City. These improvements are being presented with the sole purpose of enhancing the safety and supporting the health and well-being of the City's water users.

4.1 Health, Security, and Consequence of Failure

The primary mitigating factor associated with health, security, and consequence of failure is the water quality risk and hazardous conditions experienced when maintenance is performed on the western portion of the York Street 12" water main feed from State Street. When this primary service line is closed for repair activities, the North Street 6" main cannot provide the necessary volume required to operate the NUCOR facility. As a result the demand experienced at NUCOR during routine maintenance of the 12" York/State Street feed has resulted in a negative pressure situation and complete loss of water within the service area of North Street. This hazardous condition not only poses human health risk to the immediate service area, but presents potential for infiltration of ambient material by means of groundwater infiltration or backflow from other users in the area.

For public water suppliers in New York, the New York Department of Health (DOH) has established provisions for water supply, treatment and distribution under Public Health Law, Section 225, SubPart 5-1 for Public Water Systems as well as supports the established 2012 "Recommended Standards for Waterworks of the Great Lakes", (10 State Standards) which are intended to provide guidance to water suppliers and the public concerning public drinking water requirements. The following discusses the criteria for water systems designs as they relate to sizing and system pressure as well as the consequence and likeliness of failure of the North Street (NYS Route 34) and York Street water distribution mains.

4.1.1 System Pressure

Accepted industry standards required that water pressure generally ranges between 60 to 80 pounds per square inch (psi) and fluctuations should be limited to less than 30 psi and a maximum water pressure of 90 to 100 psi. The 10 State Standards recommends that the minimum water pressure should not be less than 20 psi at ground level and

normal working pressure shall be at no less than 35 psi throughout the water distribution system piping and appurtenances. In addition, the National Fire Protection Association (NFPA) require a minimum residual pressure of 20 psi throughout the water distribution system for fire flow demands. It should be noted that during normal system operation, pressure and flow in this service area is acceptable.

In April 2016, the City of Auburn Water Department conducted an inventory of hydrants and documented the static and dynamic psi for each of the hydrants. Of the ten (10) hydrants located within the project area, the static psi ranged from a low of 72 psi to a high of 110 psi and the dynamic psi ranged from a low of 60 psi to 94 psi. While the normal working pressure for the distribution system does fall within the acceptable range, it is important that system pressure is maintained during the water main replacement project so as to not create a low water distribution pressure situation that could become a public health hazard.

4.1.2 Violations/ Boil Water

In May 2015 the Cayuga County Department of Health issued a Boil Water Order due to a water main break at the intersection of North Street and Genesee Street. The Boil Water Order was in effect for over two (2) days due to the severity of the main break and several critical valves being inoperable. This is another example of the aged and inadequate distribution infrastructure currently in place and the vulnerability of the system. See Appendix B for the Boil Water Notice from the CCDOH.

4.1.3 Main Sizing/ Service

The 10 State Standards specifies under Section 8.2 System Design that “The minimum size of water main which provides for fire protection and serving fire hydrants shall be six-inch diameter. Larger size mains will be required if necessary to allow the withdrawal of the required fire flow while maintaining the minimum residual pressure.” The high industrial water volume use and the aging infrastructure warrant the need to replace the existing 6” line with a larger diameter pipe to create redundancy and meet the safety needs of the City businesses and residents. Upgrading the system to a 12” supply from North Street to York Street will not only increase pressure to the service area, but will provide adequate volume should isolation be required for routine maintenance on either side of NUCOR Steel. Additional capacity in this zone will also support the City’s goals in maintaining existing relationships with business as well as promote economic development in this area of the City.

4.2 Aging Infrastructure

A 2012 Cost of Service Analysis of the City of Auburn Water System determined that approximately 43% of the City's transmission and distribution system provides service to regional/ wholesale customers and 57% to City of Auburn users. The majority of the City of Auburn's distribution system is more than 100 years old and many mains are showing severe deterioration. The 2013 water system asset evaluation report recommends an annual investment of \$1,540,403 to ensure service levels are maintained over time. With this rate of investment at 1 to 2 percent of water lines, it would take the City of Auburn 50 to 100 years to replace its distribution system. This rate of investment for such a critical asset to the water system is grossly inadequate. The 2013 report provided a risk score of 22.8 points out of 80 points due to the high consequence for water main failures related to negative financial impacts, public relations, service level impacts and human resources required. Likelihood for failure of system distribution mains received high risk scores for high maintenance requirements and poor physical condition of mains. Below is the description related to the project area.

4.2.1 York Street & North Street Aging Infrastructure

Through a NYS DOT Locally Administered Federal Aid Project (LAFAP) the City of Auburn was able to replace and upgrade the water distribution main on York Street from N. Division Street to State Street. However, the most vulnerable section of the City's northern section of water distribution system was just outside of this project area. The existing 300 linear foot section of 6" cast iron water main on York Street from Willey Street east to North Street is a constant maintenance issue for City water maintenance department. Since 2011, this section of water main has had seven (7) breaks-

- 10/17/2011- main break at 84 York Street
- 12/14/2011- main break at 41 York Street
- 1/9/2012- main break at 30 York Street
- 4/3/2013- main break at 44 York Street
- 10/17/2013- main break at 88 York Street
- 11/29/2013- main break at 40 York Street
- 12/19/2015- main break west of 44 York Street

4.2.2 System Reliability/ Dependency Issues

In December 2015, a significant rupture occurred in the York Street water main between Willey Street and North Street. City employees worked to secure repair clamps around the pipe to stop the loss of water, which avoided a total system shutdown, however NUCOR Steel was under a curtailment of water use due to the noticeable drop in water pressure. NUCOR Steel is the City's largest water user averaging 435,437 MGD. At this time in December when there is primary water loss on York Street, the 6"

main on North Street provides secondary service to the Steel plant. The 6" main is grossly undersized to handle the high water usage in the North Street area. Therefore, NUCOR Steel was forced to curtail production which resulted in an estimated loss of (\$300,000) revenue.

4.2.3 Lack of Control/ Automation of Operational Efficiency

There are two (2) system valves along the York Street water line and two (2) system valves along the North Street water line that are responsible for controlling interoperability with intersecting side street distribution lines. However, the last seven (7) main breaks on York Street have been midblock, and the water main needed to be shut down for emergency repair. To avoid the emergency shut down, the installation of two (2) additional 12" valves along York Street will be completed.

4.3 Reasonable Growth

The project area has experience minor development growth relating to new residential units being added at the Brister Mills Housing Complex and governmental services at the Cayuga County Mental Health Facility. There has also been some commercial growth and demand in users from the water mains in the project area from the expansion of Blair Longo Construction Company and non-profit services in the area such as the relocation of the Cayuga Seneca Community Action Agency to York Street. Additionally, NUCOR Steel is in the preliminary stages of developing a facility expansion project however without further development details, for the purposes of this report, the City of Auburn would suggest a conservative development growth rate of 2% for users from this water distribution main.

5.0 DRAWING/SITE PLAN

The City of Auburn Department of Engineering Services has reviewed the current infrastructure surrounding the North Street/York Street Service Area and has developed a preliminary mitigation plan to provide system reliability, increase volumetric capacity, and ease maintenance operations in the future. As illustrated below, the City is proposing to install a new 12" water main from Carpenter Street to the intersection of York Street. At the intersection the new main will connect to the existing 6" main that continues north along North Street. In addition a new 12" water main will be installed westerly along York Street until meeting up with the existing 12" main on York Street. All existing services along this section will be abandoned from the existing 6" main and connected to the new 12" line. New valves, hydrants, and copper water services to the edge of the ROW will be provided. Additionally, the City proposes to install two (2) new 12" gate valves on either side of the existing Quarry Road 12" main. This will provide complete control over the direction of flow to Nucor Steel while maintaining the necessary volume required keeping the facility in operation. Abandonment of the northern 6" line along York Street is also proposed to minimize valving and elimination of

redundant service mains in this area. The aforementioned strategy complements the health, sanitation, and security goals noted in section 4 while promoting a maintainable system in this service area.

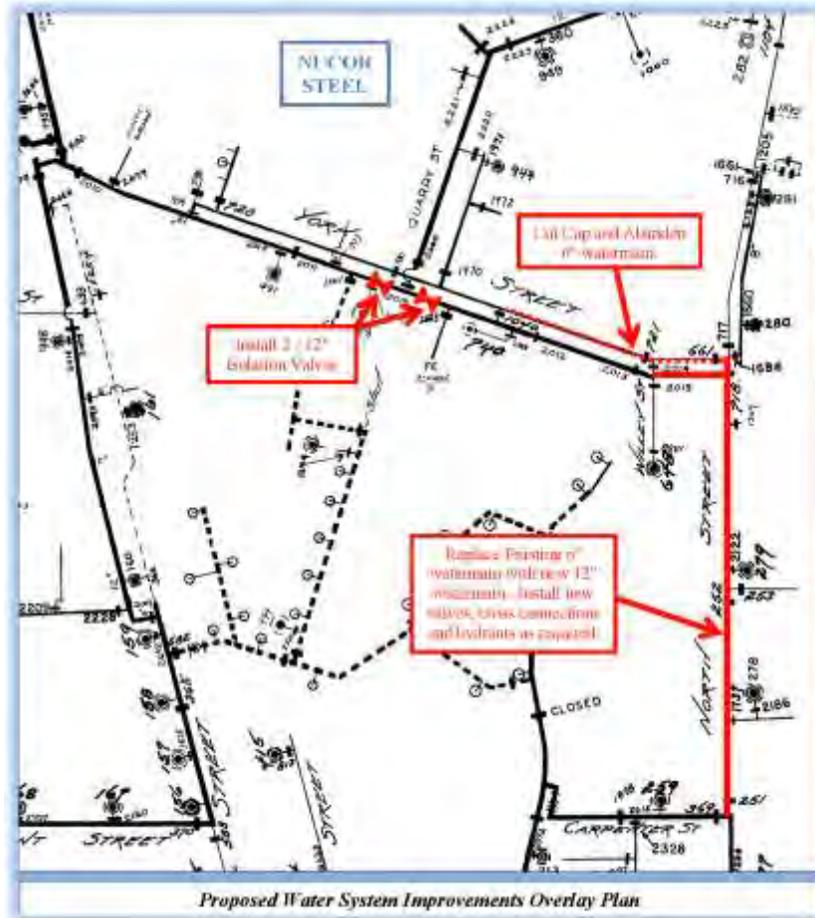


Figure 4. Schematic Site Plan of the project and alignment of proposed water mains, 2016.

6.0 SITE INFORMATION

The proposed water main replacement project will be completed mainly in the pavement limits of North Street and York Street ROW. The York Street replacement from Willey Street east to the intersection of North Street there is an increase of 5.5 percent gradient change. Heading from the intersection of North Street and York Street, south to the south terminus of the project limits near Carpenter Street there is approximately a 2 percent gradient change, with a total increase in grade change of about 40 feet in elevation from Willey St to the southern project limit. Using soil survey mapping and existing boring logs from previous geotechnical reports in the near area subsurface conditions can be interpreted. Asphalt cores on York Street show about 6 to 9 inches of composite asphalt design mixes. In recent years York Street and North Street have had asphalt overlays and may

not be represented in this asphalt thickness. The existing soil condition ranges 0.5 feet to 1.5 feet of compact to very compact fill subbase materials. 1.5 feet to 4 or 8 feet of gray – brown, Silt, and or some fine to course sand, some or trace fine to course gravel, with trace boulders. Shallow groundwater was not observed in the existing boring locations. Soil maps show the project area as Cazenovia Silt to Benson Loam. The boring logs also indicate a trend of the existing rock formation as being limestone nearest Quarry Road to Shale near Willey Road with the shallow bed rock being observed. Nearest Quarry Road bedrock was recorded as auger refusal at 8.5 feet. Nearest Willey Road the boring terminated at 6.2 feet because of auger refusal. No visible surface rock outcroppings were observed although shallow bedrock has been observed historically on other projects in the area. There is limited data from existing subsurface investigations; more borings will need to be done as part of the design process. Cayuga County flood hazard maps don't not show the project area in a flood plan or flood way. Reference Soil Boring Location, Soil Classification, and Topographic Mapping is provided in Appendix C of this report.

7.0 ENGINEERING CRITERIA

As discussed in the Project Description, the City of Auburn has identified fire flow and service disruptions due to aging infrastructure in the North Street high service area, which could significant impact the City's ability to supply water to our largest water customers including NUCOR Steel, Hammond & Irving and government and educational facilities including the Cayuga County Mental Health Facility and E. John Gavras Center. After performing the needs and capital assessments, the system improvements were evaluated to provide adequate water supply to this project area.

Below are potential alternatives to addressing water supply concerns while also citing advantages, disadvantages, and potential costs to each option. There is a "No Action" option while also investigating two improvement scenarios to increase redundancy, improve water quality and for providing the required fire protection for the North Street high service area.

7.1 Alternative #1- No Action

The "No Action" alternative was evaluated and under this option the City would just continue operations as usual with no capital improvements to the project area. The advantages to the "No Action" option would include the City avoiding any new capital financial burden to an already burdened municipal Water Fund and this option would avoid any impact to the environment. The associated disadvantages to maintain current system operations are that there would be no improved distribution system in the North Street high service area. Therefore high usage customers such as NUCOR, Auburn Metal Processing, and Hammond & Irving would still have the potential for suspended service and limited fire protection due to the aging water system.

7.2 Alternative #2- Replacement of Existing Water Mains (Selected Alternative)

This alternative would propose to replace the water mains in the North Street high service area to address the current lack of redundancy and system pressure losses during a main break. These improvements would enhance the reliability of the water supply and bring this section of City water main into compliance with the “10 State Standards”. The new main would replace the existing smaller distribution mains on the following streets:

- York Street (Willey Street to North Street)- approximately 300 feet
 - Existing 6” cast iron main to 12” ductile iron
- North Street (Carpenter Street to York Street) –approximately 1,900 feet
 - Existing 6” cast iron main to 12” ductile iron

Alternative 2 would also replace and install the necessary valves, service transfers and laterals and hydrants within the project area. By installing these new water mains, the City will increase the North Street high service area distribution system capacity and provide reliable redundancy for the industrial users such as NUCOR Steel, Auburn Metal Processing, and Hammond & Irving.

The advantages to constructing new high capacity water mains will provide the City and its water customers with the following benefits:

- Replace aging and under-sized water main infrastructure;
- Improve fire supply and protection in the northern section of the City;
- Provide reliable redundancy in the North Street high service area in case of an emergency (ie. breaks along Quarry Road) and the ability to maintain supply to Industrial, Government and Education users;
- Reduce system health vulnerabilities associated with no/low pressure situations during maintenance operations.

The disadvantages associated with water main construction is the difficulty of project completion along NYS designated truck routes such as North Street (NYS Route 34), and working alongside the rail line owned and operated by the Finger Lakes Railway. This alternative only increases the reliability in the new water mains and would not provide for increased demands associated with future interconnection to the Cayuga County water supply system north of the City line.

The total estimated costs for Alternative 2 and the proposed capital improvements are listed in Table 5. The cost estimate completed for Alternative 2 is based upon the low bidder from a May 2014 bid on the City’s South Street Water Main improvement project. The South Street Water Main project contained similar scope of work which included working in a NYS DOT Highway, installation of a 12” ductile iron water line (incl. of excavation, gravel and backfill) and

restoration of asphalt pavement. The City Engineering Department updated the costs to get a Spring 2017 construction cost. A construction contingency of 10% was included.

Table 5- Alternative 2 Construction Costs

Description	Total Estimated Cost
2,500 linear feet- Water Main Installation	\$736,610
Soft Costs (30%)	\$215,849
Contingency (10%)	\$73,661
Total	\$1,026,120

7.3 Alternative 3- Installation of Service Connection with Cayuga County Water & Sewer Authority

This alternative would include all the same piping improvements as discussed in Alternative 2, but proposes to replace additional existing water mains on North Street from York Street north to Potter Road at which an interconnection with the Cayuga County Water & Sewer Authority (CCWSA) could be completed allowing for system looping and much needed redundancy within Cayuga County. With this option, the City would replace the existing smaller distribution mains on the following street:

- North Street (Carpenter Street to City Line)- approximately 4,250 feet
 - Existing 6” cast iron main to 12” ductile iron
- York Street (Willey Street to North Street)- approximately 300 feet
 - Existing 6” cast iron main to 12” ductile iron
- North Street (City Line to Potter Road) –approximately 900 feet
 - Existing 1 ½” cast iron main to 12” ductile iron

Alternative 3 would also replace and install the necessary valves, service transfers and laterals and hydrants within the project area. By installing these new water mains, the City will be adding redundancy to the water distribution system and support for fire flows for the CCWSA. Currently, the only supply connection to the CCWSA at the City line is made on State Street (NYS Route 38). Should there be an emergency on State Street, the entire northern end of Cayuga County would experience a disruption in water service.

The advantages to constructing new water mains, it will provide the City and its water customers with the following benefits:

- Provide a new direct feed to the CCWSA service on North Street;
- Replace aging and under-sized water main infrastructure;

- Improve fire supply and protection in the northern section of the City;
- Reduce system health vulnerabilities associated with no/low pressure situations during maintenance operations;
- Additional water main improvements will enhance and reinforce emergency supply so that the CCWSA can more reliably supply the northern end of Cayuga County now and in the future with drinking water.

The disadvantages associated with the additional water main construction is the difficulty of project completion along NYS designated truck routes such as North Street (NYS Route 34) and project coordination and cooperation with a second water supplier.

The total estimated costs for Alternative 3 and the proposed capital improvements are listed in Table 6.

Table 6- Alternative 3 Construction Costs

Description	Total Estimated Cost
5,450 linear feet- Water Main Installation	\$1,605,809
Soft Costs (30%)	\$481,743
Contingency (10%)	\$160,581
Total	\$2,248,141

8.0 ALTERNATIVE SELECTION

In reviewing the alternatives described above, many factors were analyzed to reach a recommended alternative. These factors include the life cycle costs, smart growth evaluation, environmental and community interests. These factors are outlined in further detail below:

8.1 Life Cycle Cost Analysis

A life cycle cost analysis was completed to compare the present and future costs for the project alternatives, in compliance with NYS DOH DWSRF funding regulations and the NYS CWSRF Engineering Report Template. This analysis for water distribution systems took into account the following:

- 1) Conversion of project costs to a common point in time (present day);
- 2) A 30-year planning period was selected to assess the three (3) Alternatives;
- 3) The current 30-year “real” discount rate taken from Appendix C of OMB circular A-94 is at an interest rate of 1.5%.
- 4) Net Present Value (NPV) is calculated as the summation of all present day costs (project implementation costs) and anticipated future costs (Operations & Maintenance costs O&M) or profits from a project (salvage value) over the planning period.

Below is the Life Cycle Cost Analysis for each of the alternatives.

Alternative 1- No Action

As the “No Construction” alternative, the costs associated with Alternative 1 are the O&M costs as well as in-kind future replacement costs due to the age and frequency of which main breaks occur within the project area. The present value of the current City Water Department O&M values for the entire City’s water distribution system maintenance costs are approximately \$959,182 per year. The North Street high service area water distribution project represents 0.05 percent of the City’s distribution system; thus approximately \$4,796 annually. At an interest rate of 1.5% and calculated over a 30 year time period equals approximately \$182,736. If the No Construction alternative is selected, these O&M costs are conservatively low since O&M costs have been increasing over time.

Also taking into consideration the frequency of main breaks over the last five years (7 breaks since 2011), it is probable to include an in-kind future replacement of the existing 6” water main within the next decade. In 2014, the City received a bid for replacement of 6” ductile iron water pipe (incl. of excavation/ backfill/ gravel & valves) at \$199.00/ linear foot. Should the 2,500 linear feet of water line be replaced in-kind over the next ten years- this would be a cost of \$621,875.

In addition to the O&M costs and replacement in-kind of the water main, there are real costs related to loss revenues and production by the City’s industrial water users that have been negatively impacted by the emergency water main breaks. For illustration purposes, the most recent water main break on York Street in December 2015 impacted steel production levels at the NUCOR steel plant. The facility was without water for several hours which resulted in a production and labor loss of approximately (\$300,000). Going back to 2011, there has been seven (7) breaks in the water main on York Street all of which resulting in water loss at the NUCOR Steel facility, which averages out to be .7 breaks each year. Should the City have to wait until FY 2018 to begin this replacement project and based on the average number of main breaks, it is projected that the NUCOR Steel plant could have additional loss revenue in excess of (\$500,000).

Net Present Value for Alternative 1 is: \$1,304,611

Alternative 2- Replacement of Existing Water Main (North S (Selected Alternative)

The current engineering, construction and financing costs associated with Alternative 2 capital improvements are estimated at \$1,045,000. For the purposes of this Alternative, the O&M costs are assumed to remain constant at the \$4,796 annually for this section of the water distribution

system. Based on the 1.5% interest rate, the present value of the annual O&M over a 30-year period is approximately \$182,736. There are no new water customers projected to be added as part of this replacement project therefore the salvage value is projected to be \$0.00.

It is anticipated that with the installation of new water mains, the distribution system will require less maintenance by City of Auburn Water Department Staff thereby slightly reducing O&M costs in the system. In addition, the project will allow City to isolate future water main breaks, thereby allowing for uninterrupted water service to Industrial users such as NUCOR and Hammond & Irving.

Net Present Value of Alternative 2 is: \$1,227,736

Alternative 3 Replace

For Alternative 3, the engineering, construction and financing costs were estimated to be approximately \$2,248,141. Similar to the cost analysis with Alternative 2 and utilizing a 1.5% interest rate over a 30 year period, the present value of the annual O&M costs would be: \$182,736. There is no salvage value in Alternative 3.

Net Present Value of Alternative 3 is: \$2,430,877.

8.2 Smart Growth

In August 2010, NYS signed into law the Smart Growth Public Infrastructure Policy Act which is intended to minimize the unnecessary cost of sprawl development through sensible, planned growth that integrates economic development and job creation with community quality of life while preserving the surrounding built environment. The law also requires NYS infrastructure agencies, such as NYS EFC to ensure public infrastructure project are using the ten (10) Smart Growth criteria specified in the law. The City of Auburn has made significant efforts in utilizing Smart Growth tools to carry out projects at the local level which has included: compact design development, historic preservation, brownfield re-development, vacant property re-use, affordable housing, multi-modal transportation, and stake-holder driven planning processes.

Below is Table 7 which ranks each Alternative as it compares to the NYS Smart Growth criteria. For ranking purposes, the alternative that ranked the highest received a score of a 1; second a 2; and third a 3.

Smart Growth Criteria	Description	Alternative 1	Alternative 2	Alternative 3
Use of Existing Infrastructure	Similar to a Fix it First policy	1	2	3
Location in Municipal Centers	Development in existing or new centers of activity- Main Street	2	2	2
Infill Development	Redevelopment on vacant land	NA	NA	NA
Protection of Natural Resources	Preserving, protecting and enhancing natural resources	3	1	2
Diverse Housing Opportunities	Density, mixed uses, diverse housing near employment	NA	NA	NA
Transportation Choices	Reducing car-dependency, walkable communities	NA	NA	NA
Inter-governmental coordination	Regional/ State/ Local coordination	3	2	1
Community based planning	Inclusive, bottom up planning	3	1	2
Building and Zoning Codes	Codes that promote smart growth	NA	NA	NA
Sustainable Development	Projects that utilize existing resources	2	1	3
Total		14	9	13

Table 7. Smart Growth Analysis of Project Alternatives, 2016.

8.3 Non-Monetary Factors

Through this water distribution system project, the City of Auburn’s main objective is to improve the health and safety of its water system users and customers by correcting the deficiencies within the North Street high service area. By making these capital improvements, the water system customers will also receive the added benefits of increased system reliability, enhanced water quality, increased supply reliability for industrial system users such as NUCOR Steel, Auburn Metal Processing and Hammond & Irving.

While Alternative 2 and 3 would provide long term system improvements, Alternative 2 is the most sustainable consideration that addresses the water distribution system problems, while utilizing the least resources which would include City staff time and materials. This option would also have the least amount of disruption to the community and neighbors during construction thereby limiting objections to the project. Alternative 1 does not meet the needs of the community for the long-term as it does not address the issues of aging infrastructure, lack of

sufficient water supply and it does not promote improved health and safety for the North Street high service area customers.

8.4 Preliminary Project Info & Evaluation of Alternatives

Following the completion of the alternatives analysis, there were three (3) alternatives presented and evaluated based upon economics, smart-growth and social criteria. The alternative that ranked the highest received a score of a 1; second a 2; and third a 3. The Table 8 below provides a summary of the rankings:

Design Alternative	Life Cycle Analysis	Smart Growth Analysis	Non-Monetary Factors	Total
No. 1- No Action	1	3	3	7
No. 2- Water Main Project	2	1	1	3
No. 3- Water Main Expansion Project	3	2	2	7

Table 8. Evaluation of Project Alternatives, 2016.

8.5 Project Schedule

Projects of this nature typically take 2 years to complete, depending on the size and complexity of the service area. Should a NYS Water Grant be awarded for this project, the City has scheduled improvements to occur during the 2017 construction season. To the extent that is feasible and practical, all water service will remain online for the duration of the water main replacement project, such that only when the 12” valves on York Street bypass pumping system will be operational at this time.

8.6 Permitting Requirements & Project Sustainability

As described in the Project Financing section above, the City of Auburn would be seeking NYS EFC DWSRF financial assistance in addition to a NYS Water Grant and is required to comply with the State Environmental Review Process (SERP). Under SERP, the water distribution system replacement project will be subject to the New York State Environmental Quality Review Act (SEQR). In consultation with City Bond and SEQR counsel (Bond, Schoeneck & King), it has been determined that the project is a Type II Action. Therefore, no further action under SEQR is necessary.

The City has prepared and submitted an application to the New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP) to begin the Section 106 review of the project. A project number has been assigned and is undergoing review- 16PR02255: Auburn

Water Distribution System Project. In addition, the City of Auburn will need to file a Highway Work permit with NYS Department of Transportation for authorization to construction in a State Right-of-Way and coordinate with Finger Lakes Railway for directional boring under rail lines. A listing of required permits and anticipation completion dates is below:

- SEQR – April 2016
- Bond Ordinance Approval- April 2016
- NYSOPRHP preliminary review- April 2015
- NYS OPRHP approval- August 2016
- NYS DOH plan approval- January 2017
- NYS DOT Highway Work Permit Approval- March 2017
- Finger Lakes Railway Approval- April 2017

8.7 Engineers Project Cost Estimate

The project cost for Alternative 2- Replacement of the Water Mains in the North Street high service area is estimated at \$1,045,000 inclusive of design, engineering, construction, construction inspection, legal, administrative costs and financing the balance of the project debt with the NYS EFC DWSRF program. A summary of these estimated costs are included below in Table 9. Debt service payments would be shared among all EDUs within the City of Auburn.

North & York Street Water Main Replacement 12-Inch Diameter Carpenter Street to York/ Willey Street					
Item	Description	Quantity	Unit	Unit Price	Total
1	Pavement Saw Cutting	5,000	LF	\$3	\$15,000
2	12-inch DI CL 52 Water Main (Incl. excavation, gravel, backfill)	2,500	LF	\$135	\$337,500
3	12" Tapping Sleeve & Valve	1	EA	\$7,000	\$7,000
4	12-inch Gate Valves	5	EA	\$2,200	\$11,000
5	Hydrant, Tee & Valve	2	EA	\$3,000	\$6,000
6	Transfer of Service	20	EA	\$3,000	\$60,000
7	Abandonment of Existing Mains	2,500	LF	\$25	\$62,500
8	Asphalt Pavement Restoration	600	Ton	\$100	\$60,000
9	Sidewalk/ Curb Restoration	20	EA	\$500	\$10,000
10	Work Zone Traffic Control	1	LS	\$50,000	\$50,000
				Subtotal	\$619,000
11	Bedrock & Boring	1	LS		\$92,850
12	Mobilization (4%)	1	LS		\$24,760
				Construction Costs	\$736,610
				Contingency (10%)	\$73,661
				Estimated Construction Cost	\$810,271
				Estimated Engineering Cost (15%)	\$110,492
				Estimated Inspection Cost (11%)	\$81,027
				Bonding/ Issuance Costs (City)	\$14,922
				Fiscal Advisors	\$9,408
				Subtotal	\$1,026,120
				Issuance with EFC	\$18,881
				Total Estimated Cost	\$1,045,000

Table 9. Engineer’s Project Cost Estimate, 2016.

8.8 Project Financing

The City of Auburn, NY is submitting this Engineering Report in conjunction with an application to the NYS Department of Health (DOH) for strong consideration of a NYS Water Grant. It is the City's intention to finance the balance of the project costs with NYS Environmental Facilities Corporation as a Hardship community. The NYS EFC and DOH have provided guidance on a municipality's ability to meet "Hardship Criteria". Based upon the 2013 American Community Survey (ACS) Median Household Income (MHI) data, the households in the City of Auburn is \$38,399. Referencing NYS EFC's Hardship Policy as published in the 2016 Intended Use Plan (IUP), municipalities must be less than 80% of the statewide 2013 MHI of \$46,402. Since the City of Auburn MHI is only 66% of the 2013 Statewide MHI of \$58,002, the City meets the hardship criteria.

Financing for the proposed project will be pursued primarily through NYS Environmental Facilities Corporation. The project is anticipated to score high enough to be above the funding line for NYSEFC and therefore qualifying for hardship financing. A project that is above the funding line and qualifies for hardship financing is eligible to receive up to 60% of total eligible project costs and a 30 year loan at 0% interest. With the assumption that the project would receive \$627,000 in NYS Water Grant funding assistance, the remaining \$418,000 would be financed through NYS EFC hardship financing for 30 years at 0% interest. The estimated annual levelized debt service payment would be \$13,933. Operation and Maintenance costs would continue to be accrued by all users within the City of Auburn.

9.0 ENVIRONMENTAL REVIEW

The proposed scope of work will offer minimal environmental impacts. All proposed improvements will be completed within the municipal ROW, much of which is a paved surface. All work will be completed in accordance with local, state, and federal regulations. Final project impacts will have no negative effect on water quality, water supply, and noise levels. It is anticipated that human health risk will be mitigated by the proposed scope of work as the improvements decrease risk associated with contamination and low pressure within the distribution system. As work is anticipated to be completed within the municipal street ROW, no impacts on wetlands, floodplains, and environmental sensitive areas are expected.

10.0 SUMMARY

In summary, the proposed project consists of water distribution system improvements replacing existing water mains within the North Street high service area. The primary goal of providing system redundancy while increasing volumetric capacity will be achieved as a result of the project.

Alternative 2 is supported above as the most economical approach to alleviate unnecessary industrial shutdowns associated with system maintenance.

11.0 CONCLUSIONS, RECOMMENDATIONS, AND CERTIFICATION

Upon review of project life cycle cost analysis, smart growth analysis, and non-monetary factors is has been determined that Alternative 2 is best supported for implementation. If project funds are available due to favorable construction bids or the acquisition of additional grant funding, the project would replace additional water main, valves and hydrants as outlined in Alternative 3. Improvements relating to an interconnection for system redundancy and looping with the Cayuga County Water & Sewer Authority are not included in the project at this time. The proposed improvements do; however, consider the regional needs of the communities that receive wholesale service from the City of Auburn water system. It is recommended that this report is presented to the NYS Department of Health and NYS Environmental Facilities Corporation for review and funding consideration.

If this project is approved by the NYSDOH and funding is available thru the NYSEFC the City of Auburn will expedite this critical improvement project. The City is well versed in administering projects associated with EFC and will work diligently to meet or exceed all provisions in accordance with Davis Bacon Wage Rates, Buy American Steel, and MWBE. It can be further noted that this project will not only meet the Buy American Steel regulations but will complement this strategy as we work with our local Steel Manufacture to provide safe and reliable water to improve their manufacturing process and continue to allow NUCOR to meet their global manufacturing goals.

APPENDIX A

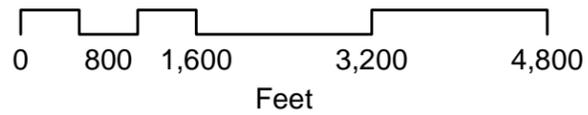
City of Auburn, New York

Water Distribution System

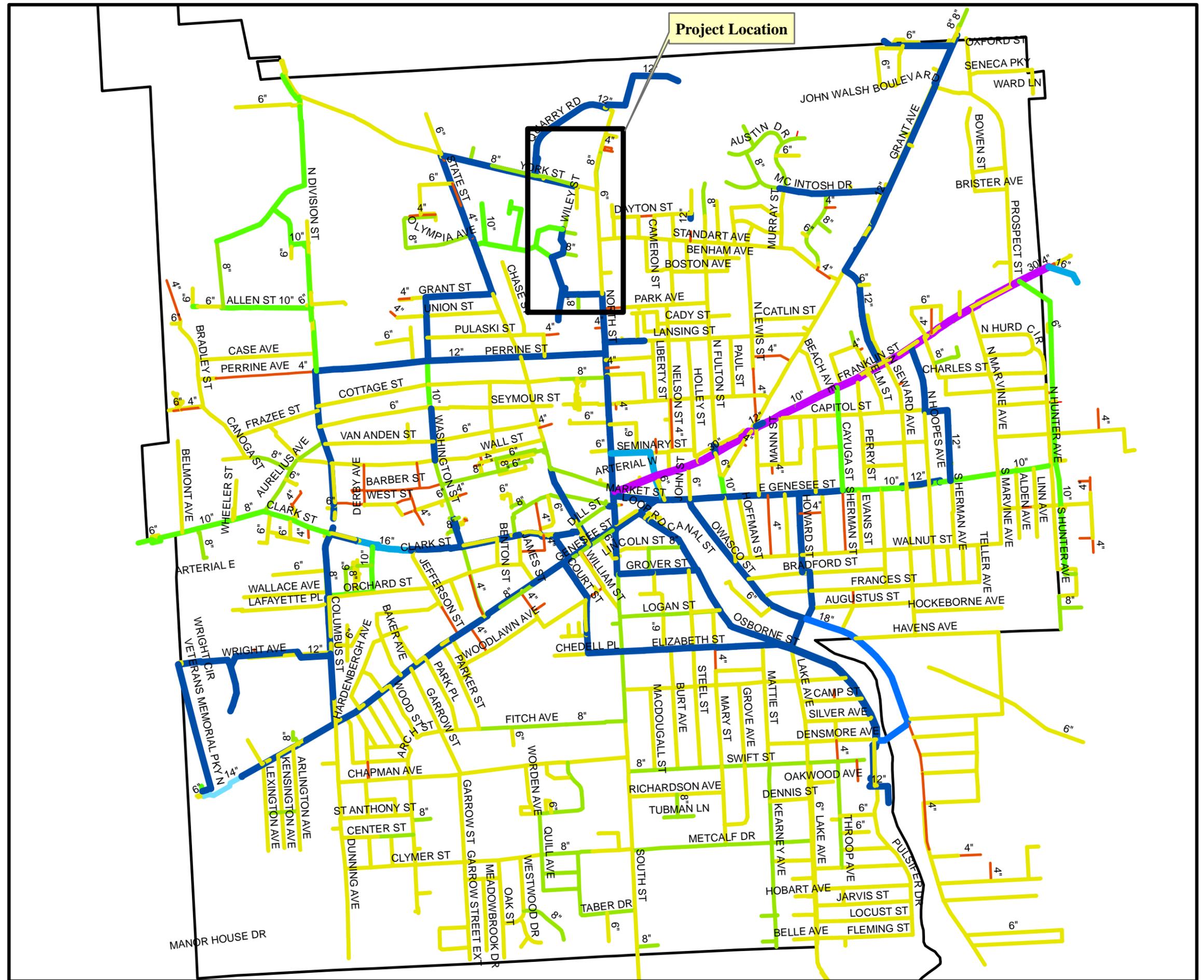
Legend

Water Mains

Diameter



April 14, 2016
Prepared By: City of Auburn
Department of Engineering Services



APPENDIX B



Cayuga County Health Department

Kathleen D. Cuddy, MPH—Public Health Director
Eileen A. O'Connor, P.E.—Environmental Health Director

April 12, 2016

Mr. Michael Montysko, PE.
Chief of Design, Bureau of Water Supply Protection
NYS DOH
Empire State Plaza
Corning Tower Rm. 1135
Albany, NY 12237

RE: City of Auburn Grant Application
NYS Water Grant Program

Dear Mr. Montysko:

This letter is in support of the City of Auburn's application to the NYS Water Grant Program to replace deteriorating water lines in order to continue to provide reliable service to its customers.

The City of Auburn provides potable drinking water for nearly 45,000 users in Cayuga County. Much of the City's water distribution system dates back to the early 1900s and is now in a deteriorated condition and requires replacement.

The City has experienced several water main problems over the last several years, some resulting in wide spread boil water orders impacting thousands of people. Water line breaks this past winter have resulted in the interruption of water service to businesses along York Street including NUCOR Steel, a major employer in Cayuga County. Adequate and reliable water service is essential for NUCOR and the City does not want to jeopardize the future of this important industry.

The City of Auburn has outlined in their 2015-2019 Capital Improvement Plan (CIP) much of the water main replacement projects that are essential to keep industry and businesses within the City and to provide necessary services to Auburn Memorial Hospital, Auburn Correctional Facility, and numerous nursing and adult homes.

In closing, the Cayuga County Health Department supports the City's application and we thank you for your careful consideration.

Sincerely,

A handwritten signature in cursive script, appearing to read "Eileen A. O'Connor".

Eileen A. O'Connor
Environmental Health Division



BAR MILL - AUBURN

Nucor Steel Auburn, Inc.

April 13, 2016

Mr. Michael Montysko, P.E.
Chief of Design, Bureau of Water Supply Protection
NYS Department of Health
Empire State Plaza
Corning Tower Rm. 1135
Albany, NY 12237

Re: NYS Water Grant Program & Financing Application
Drinking Water State Revolving Fund
City of Auburn, Cayuga County, New York
Upgrade to Distribution System Project- #15546

Dear Mr. Montysko:

Nucor Steel Auburn, Inc. (Nucor) has been an integral part of the Auburn community since the facility was built in 1974 as Auburn Steel Company. Nucor's acquisition of the mill in 2001 prevented the permanent closure of the plant. Nucor is the largest user of municipal water provided by the City of Auburn, with annual consumption of around 127 million gallons. However, as a member of the Leadership Tier of the NY Department of Environmental Conservation's Environmental Leaders program, Nucor is dedicated to investing the capital and human resources necessary to reduce our impact on the environment, and we have invested \$10 million in the last three years alone to upgrade our water systems and ensure our efficient use of this valuable resource.

Unfortunately, Nucor has not experienced consistent water supply for some time. The aging water infrastructure on York Street has caused a number of failures that require our water supply to divert to insufficient 6-inch water mains, which requires our facility to immediately shut down. The distribution mains have had ten failures since 2013 resulting in service disruptions to the plant as well as several other businesses and residences. The most recent shut down cost Nucor over \$300,000 and put our team in a potentially dangerous situation.

Nucor has been informed that the City of Auburn intends to apply for funding assistance to address the water distribution main problem along NYS Route 34 (North Street) and a portion of York Street. This Water Distribution Improvement Project consists of improvements to the NYS Route 34 & York Street water mains- an existing 2,500 ft. long, 6" diameter 115-year old cast iron pipe that provides potable water to 3,365 City of Auburn residents as well as supplying water to Nucor's operations. Replacement of the distribution mains will result in a more reliable supply to the plant. Nucor strongly supports this capital improvement project, and is willing to lend our support to the City to see this project completed.

If you have any questions or require additional information related to Nucor's water needs, please feel free to contact me at (315) 258-4239.

Sincerely,

Gordon Elwell
Environmental Manager

Cc.: Christina Selvek, City of Auburn

Nucor Steel Auburn, Inc., PO Box 2008, 25 Quarry Road, Auburn, New York 13021
Phone: 315/253-4561 Fax: 315/253-8441 Toll Free: 800/424-1494 www.nucorauburn.com

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Cayuga County Health Department
8 Dill Street
Auburn, NY 13021

For Immediate Release: Monday May 25, 2015

Contact: Eileen O'Connor
Director of Environmental Health
Phone (315) 253-1560
Fax: (315) 253-1165

Boil Water Order

A water main break on Genesee St in the City of Auburn has resulted in a loss of water pressure which may allow disease causing organisms to enter the water system. The Cayuga County Health Department has therefore issued a Boil Water Order for residences and businesses ONLY in the following areas within the City of Auburn: Genesee St. between State St. and Loop Road and North St. between City Hall and the Fire House.

The Health Department advises that persons in the affected area not drink the water without boiling it first. Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water certified by sale by the NYS Department of Health. Boiled or bottled water should be used for drinking, making ice, washing dishes, brushing teeth, and food preparation until further notice.

Once the water main has been repaired, the City will take samples to confirm that there is no contamination in the distribution system. It is anticipated that the Boil Water Order will be in effect until at least Wednesday. The Health Department will notify persons within the area defined above when they no longer need to boil their water.

People with questions may contact the City of Auburn water department at 315-253-8754 or the Cayuga County Health Department at 315-253-1560.

Boil water order lifted in Auburn



By [Julie McMahon | jmcMahon@syracuse.com](#)

[Email the author](#) | [Follow on Twitter](#)

on May 27, 2015 at 4:31 PM

AUBURN, N.Y. -- A [boil water order issued on Monday](#) has been lifted for the city of Auburn, Cayuga County Health Department officials said.

Residents in parts of Auburn, between State Street and Loop Road and North Street between city hall and the firehouse, were directed to boil their water for one minute after a Memorial Day water main break caused some concerns, county officials said.

The water main break resulted in loss of water pressure, which in turn could have allowed disease-carrying organisms into the water system, the health department said.

After the break was repaired, officials collected water samples and determined no harmful bacteria was present, officials said.

Water service has been restored to the area, and residents are directed to use water without boiling, the department said.

Contact Julie McMahon anytime: [Email](#) | [Twitter](#) | 315-412-1992

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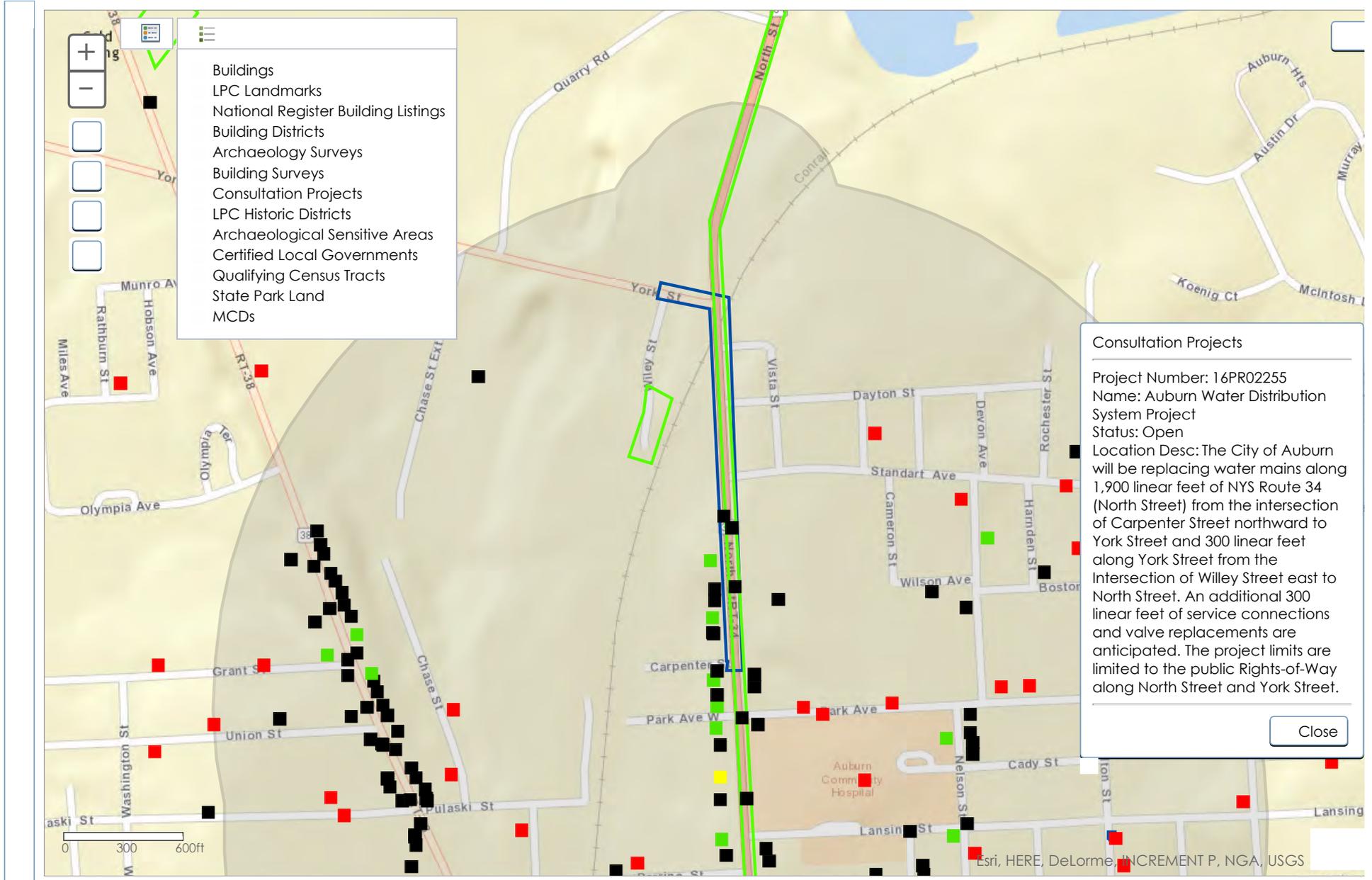
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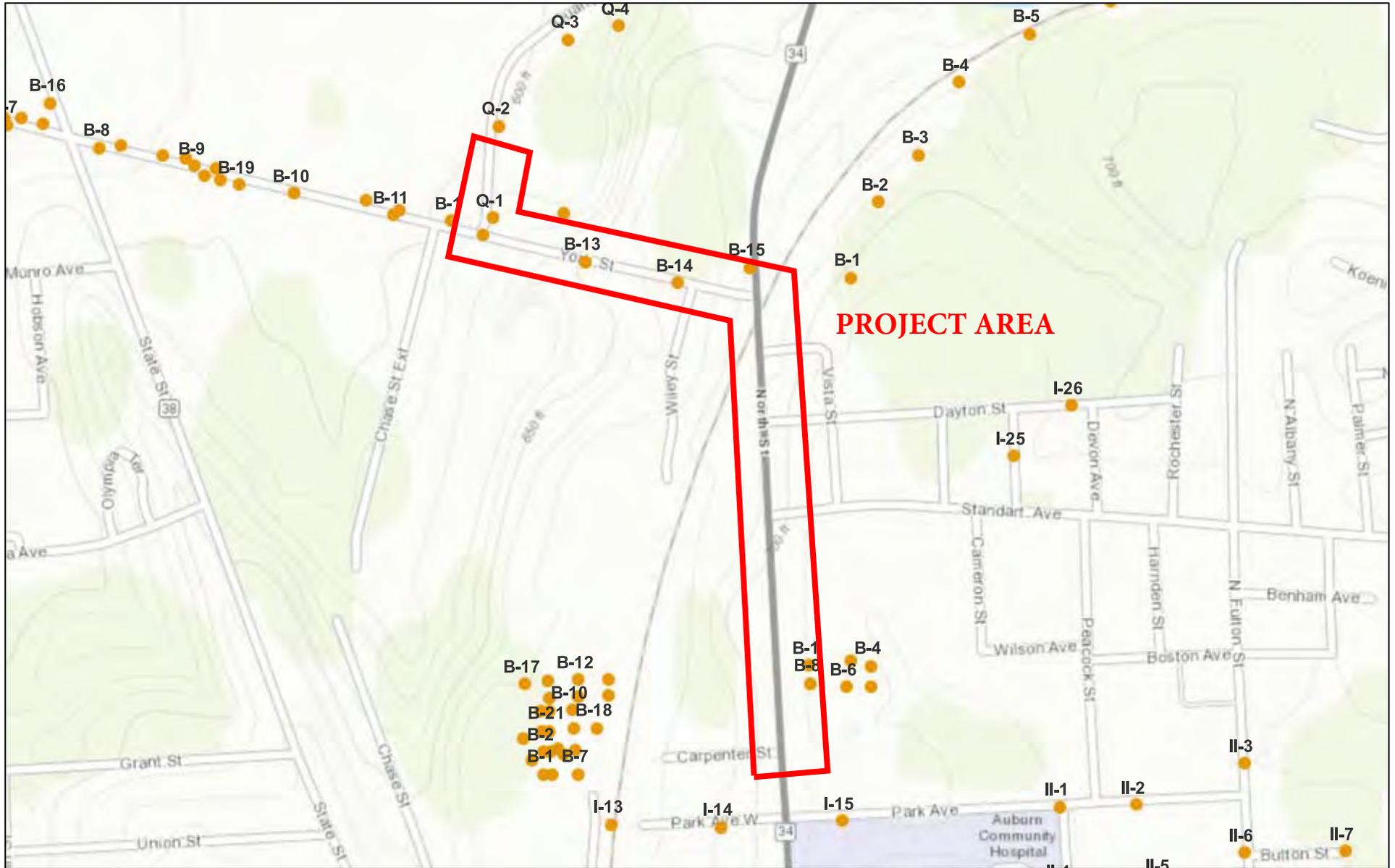
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APPENDIX C

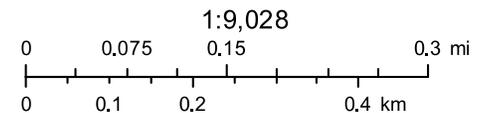


North Street Water Main Soil Boring Locations



April 13, 2016

● Soil Boring Hole

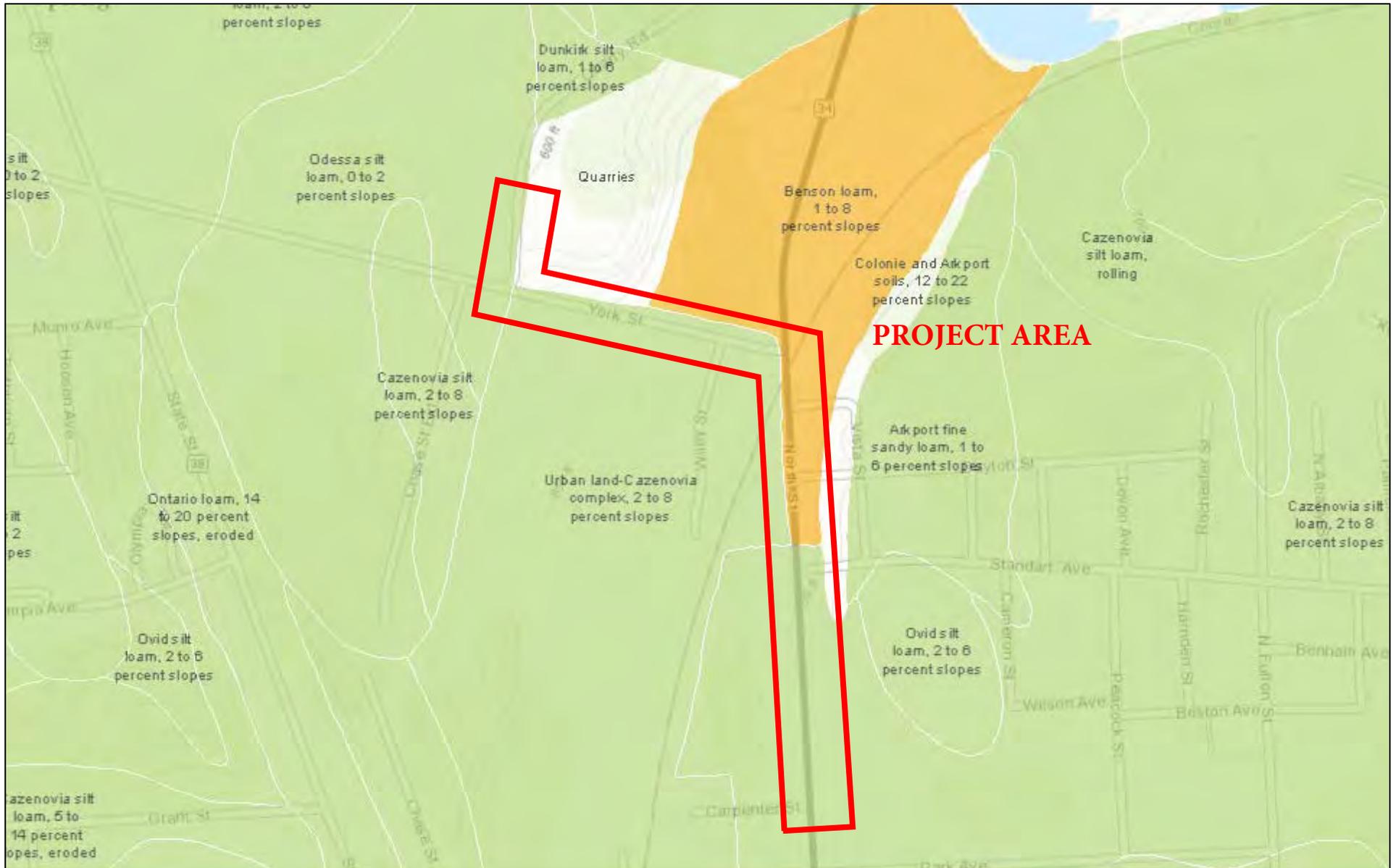


Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey,

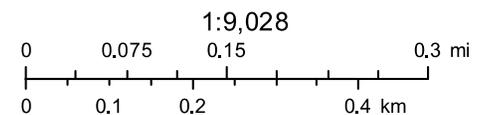
Web AppBuilder for ArcGIS

Ontario Base Map, Ontario MNR, Province of Ontario, Esri, HERE, DeLorme, INCREMENT P, Intermap, USGS, METI/NASA, EPA, USDA |

North Street Water Main Project Soil Conditions

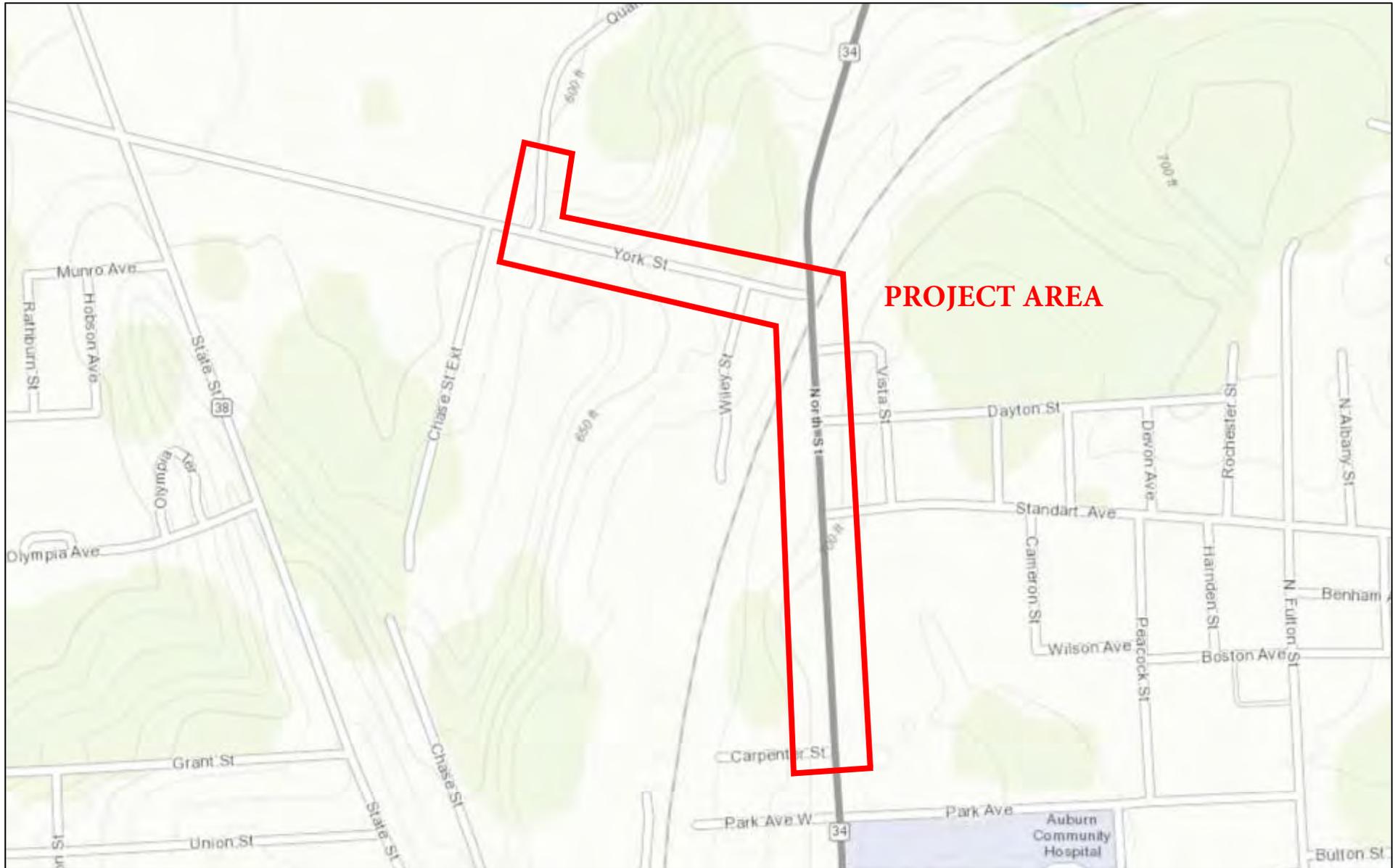


April 13, 2016



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey,

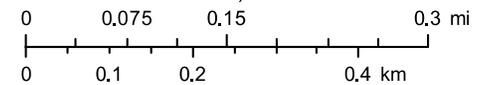
North Street Water Main Project Topographic Map



April 14, 2016

 CityBoundary

1:9,028



Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey,