Preliminary Engineering Report

for

Wellsburg Municipal Water Study

Village of Wellsburg, Chemung County, New York

February 2021
Revised July 2023

HUNT 2678-009

HUNT ENGINEERS | ARCHITECTS | SURVEYORS
Prepared by:
Hunt Engineers, Architects, Land Surveyors & Landscape Architect DPC
Airport Corporate Park
100 Hunt Center
Horseheads, NY 14845-1019
Phone (607) 358-1000, Fax (607) 358-1800

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I. EXECUTIVE SUMMARY

The Village of Wellsburg, Chemung County, New York consists of a water district that serves approximately 490 people, according the 2020 Census. The water system, which was originally constructed at the turn of the century, was supplied by local groundwater sources. Several wells were constructed throughout the history of the system, most of them falling into disuse as a primary water supply due to turbidity, iron, and manganese issues. After struggling with these water quality issues, the Village began purchasing water from the Elmira Water Board (Town of Elmira) in the late 1990s to early 2000s.

A significant portion of the purchased water is lost to leaks within the distribution network. The calculated amount of unaccounted for water is 30%. A soft, old asbestos cement pipe along Old Main Street has been a major contributor to these leaks. This as well as an old ductile iron watermain along Front Street. Both are likely deteriorating from aggressive soils.

Additionally, this small water system has over 660,000 gallons of storage across three aging water tanks which have required several repairs in recent years. Excess storage is also unnecessarily contributing to water age, which is known to cause an increase in Total Trihalomethane (TTHM) concentration. Finally, the system does not have any emergency water supply of its own. The Village is entirely dependent on Elmira for its daily and emergency water needs and will not be able to provide the minimum required water quantity for basic health and sanitation in the event that the supply line from Elmira becomes damaged or must otherwise be taken offline.

The proposed solution is to:

- decommission the Front Street tank, and replace the Cowell Road and Comfort Hill Road tanks with new glass-lined bolted steel tanks,
- replace pipes that experience frequent leaks or are otherwise structurally deteriorated, and
- establish a new groundwater supply source for emergencies, ideally beginning with investigation of an existing on-site well.

The cost of the proposed alternative is approximately $6,346,236. This has a financial impact of $579.93 per equivalent dwelling unit (EDU, a customer whose water usage behavior mimics that of a single-family residence) per year. It is also recommended a short-lived asset reserve be established where each EDU contributes $14.73 annually. The average current water rate of an EDU is $121.44, meaning the overall water system will cost $716.10 per EDU annually once improved.

II. PROJECT BACKGROUND AND HISTORY

The Village of Wellsburg is located in the southeast part of the Town of Ashland in Chemung County. The Village owns and operates a municipal water supply system serving approximately 580 people through 209 service connections. The Village currently purchases its water from the Elmira Water Board in the Town of Elmira, and the water distribution system consists of three water tanks and approximately five miles of watermains ranging from 4 to 10 inches. The system experiences significant leakage, resulting in high operation costs due to wastage. The site location

map is given in Figure 1 of Appendix A, and the water system layout is shown in Figure 2 of Appendix A.

The purpose of this study is to identify potential improvements to the Village of Wellsburg water system, including quantifying the extent of leakage in the water system, inspecting the water storage tanks, assessing the feasibility of decommissioning a storage tank, water modeling to assess the adequacy of available fire flows and system pressures, and exploring the feasibility of establishing an emergency groundwater supply.

This report is funded through the NYS OCR Community Development Block Grant Community Planning Grant, through the 201 Consolidated Funding Application. The report has been prepared in accordance with the NYS EFC Engineering Report Outline for NYS Assisted Drinking Water Projects and the United States Department of Agriculture Rural Utilities Service's Bulletin 1780-2.

A. SITE INFORMATION AND PROJECT PLANNING

1. Location

The Village of Wellsburg is located along New York State Route 427, east of the Town of Elmira from which the Village purchases its water. Strong and reliable municipal services are required to allow for the establishment of businesses and commercial users along the SR-427 corridor, and improvements to the Village's water system represent the first step towards this end.

The project is focused on the Village of Wellsburg Water District, NYS Public Water Supply ID: NY0701010. Refer to Appendix A, Figure 1 for a Project Location Map.

2. Geologic Conditions

According to the United States Department of Agriculture Natural Resource Conservations Service's Web Soil Survey, the predominant soil types within the project limits are as follows: Chenango channery silt loam (CeB - 42%), Volusia channery silt loam (VoC, VoD - 21%), Lordstown and Arnot very rocky soils (LoE, LoF - 10%), Tioga silt loam (Tg, Th - 10%), and Papakating silt loam (Pg - 5%). No other soil makes up greater than 5% of the project area. See Appendix B, Figure 1 for a soils map.

The Volusia channery, Mardin channery, Unadilla, and Tioga silt loams are highly corrosive to steel. These occur predominantly along the northern (Front Street) and western (Berwick Turnpike) sections of the site. Valois gravelly loam, Mardin channery silt loam, and Pope soils are also corrosive to concrete, though are less prevalent throughout the site.

The majority of the project area is well drained, with the exception of the Volusia channery silt loam (somewhat poorly drained) and the Papakating silt loam (very poorly drained). Depth to ground water varies from 0 to >200 cm. The Chenango channery silt loam has an annual average water table depth of 152 cm.

3. Surface Water Features

Bentley Creek and its tributaries (NYSDEC PWL ID: 0501-0026) cross the project area as shown in Appendix B, Figure 2. This waterbody is a Class C Stream, the best usage of which is fishing. Class C Streams are also suitable for fish, shellfish, and wildlife propagation and survival as well as primary and secondary contact recreation, although other factors may limit the use for these purposes. Bentley Creek has no known impact that would compromise its intended use.

4. Environmental Resources Present

a. *Agricultural Districts*

Review of the Agricultural District Mapping shows the Wellsburg Water District is adjacent to portions of Agricultural District 1 (see Figure 3 in Appendix B), and the corresponding tax parcels associated with those districts are summarized in Table 1. Note that the Water District infrastructure lies within the roadway right of way, and therefore does not overlap with these parcels.

Table 1: Adjacent Agricultural District Parcels

Tax Parcel	Address	Acreage	Property Class
131.00-1-9	Berwick Turnpike	13.5	Residential Vacant Land
131.00-1-4	289 Berwick Turnpike	59.9	Rural Residential
131.06-1-13	Front Street	13.2	Ceiling Railroad
121.00-1-56	Lower Maple Avenue	21.4	Field Crops

b. *Wetlands*

The United States Fish and Wildlife Service National Wetlands Inventory database was reviewed for federally regulated wetlands within the project limits. As shown in Figure 2 of Appendix B, Palustrine and Riverine wetlands exist within and adjacent to the project area. The Palustrine system consists of nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all wetlands that occur in tidal areas with low salinity due to ocean-derived salt. The Palustrine wetlands in the area are made up of freshwater forested/shrub wetlands and freshwater emergent wetlands. Riverine wetlands are those that are generally associated with deep water habitats contained within a channel.

The distribution system was constructed primarily in roadway rights of way and not within any federally regulated wetlands. Also, the water storage tank sites are not located within any federally regulated wetlands.

c. *Endangered or Threatened Species*

Review of the NYSDEC Environmental Resources mapping, which incorporates the New York Natural Heritage Program information, shows there are a number of rare species in the area (Figure 4, Appendix B).

The United States Fish and Wildlife Service's Information for Planning and Conservation (IPaC) database indicates that the northern long-eared bat is a threatened species that may occur in the project area. This species hibernates in caves during the winter and then migrates to wooded areas during the summer. The northern long-eared bat will roost underneath bark, in cavities or in crevices of both live and dead trees. The project area also consists of habitat for five migratory birds. The project is unlikely to impact these endangered species and potential impacts can be mitigated through ensuring that the species habitat is not destroyed. The IPaC report is given in **Appendix B**.

5. **Archeological Sensitivity**

The Christ Episcopal Church (Figure 5, Appendix B) is a historic landmark that occurs within the project site listed in the National Register of Historic Places. There are currently no improvements proposed within this area. If improvements are to occur close to this site, the Office of Parks, Recreation, and Historic Preservation must be further consulted.

6. **Critical Environmental Area**

Review of the NYSDEC designated Critical Environmental Areas (CEA) shows there are no Critical Environmental Areas within the project area. To be considered a CEA, an area must have exceptional or unique character with respect to one or more of the following: benefit or threat to human health; a natural setting; agricultural, social, cultural, historic, archaeological, recreational, or educational values; or an inherent ecological, geological, or hydrological sensitivity to change that may be adversely affected by any change. The potential impact of any Type I or Unlisted Action on the environmental characteristics of the CEA must be evaluated for significance pursuant to Section 617.7 of SEQR.

7. **Environmental Justice Areas**

The NYS DEC has identified a Potential Environmental Justice Area (PEJA) within the existing Water District boundary. As established in DEC Commissioner Policy 29 on Environmental Justice and Permitting, PEJA areas are identified as areas with higher-than-average populations of minority groups or higher than average household incomes below the federal poverty level.

The improvement of the water system will protect water quality, improve safety, and serve all residents in the Village of Wellsburg Water System.

Please refer to Appendix B for Environmental Justice area mapping.

8. **Floodplain Considerations**

As shown in Figure 6 of Appendix B, the National Flood Insurance Program's Flood Insurance Rate Map (FIRM) for Wellsburg, the eastern and western areas of the Village are located outside of the 500-year flood zone (Zone C). The central axis of the Village is

located within areas of the 100-year flood zone (Zone A). There is a thin transition area on either side of the Zone A lands classified as Zone B, where floods with a frequency between the 100-year and 500-year floods occur. The 2022 Recommended Standards for Waterworks (RSWW) recommends that water supply well sites shall be protected to at least the 100-year flood elevation or maximum flood or record. Please refer to Appendix B for FEMA/FIRM mapping.

B. OWNERSHIP AND SERVICE AREA

The Wellsburg water system is village-owned, and the water district boundaries are the same as the village boundaries. The water system layout is shown in Figure 2, Appendix A. The system serves approximately 490 people through 209 service connections. The Village purchases its water from the adjacent Town of Elmira water system. The water operators are Mike Steck and Patrick Steck, both of whom have a Class C license.

Watermains are located within the public rights-of-way. Water is conveyed from Elmira east to the Village of Wellsburg via a 10" main. The supply is metered at a pump station with two booster pumps located along SR-427 pumping in the range of 220-270 gpm, depending upon conditions. There are six out of district users in single family residences in the state of Pennsylvania that are served by the system.

The Village is primarily composed of single- and multifamily residences with some commercial enterprises, and agricultural lands. The district also serves a mobile home park.

1. Population Trends and Growth

The Village of Wellsburg currently has a population of 490 per the 2020 Census and Median Household Income of $63,750, (2021 American Community Survey (ACS) 5-Year Population Estimate). In 2000, the population was 631, and in 2010 the population was 580 (2010 & 2000 Census). The population declined from 631 in 2000 to 490 in 2020, representing a 22.3% decline over 20 years, or an annual rate of decline of 1.1%

Table 2: Population data for the Village of Wellsburg

Year	Population
2000	631
2010	580
2020	490
2025	463 (projected)
2030	436 (projected)
2035	409 (projected)
2040	382 (projected)
2045	355 (projected)

The Village of Wellsburg median household income (MH) is $63,750 (2021 ACS 5-Year Estimates), which is below the New York State MHI of $74,314.

Table 3: Median Household Income per 2020 US Census

Place	Median Household Income (2021 ACS 5-Year Estimates)
Village of Wellsburg	$63,750
Chemung County	$60,210
New York State	$74,314

2. **Historical and Projected Water Use**

a. ***Water Production***

The Village of Wellsburg supplied the Chemung County Health Department Environmental Health Services Water System Operation Reports. The average and peak monthly water production given in those reports is summarized in Table 4. The average daily production was found to be approximately 76,738 gallons per day. The peak production over this time period was 459,950 gallons, which is uncharacteristically high compared to the usage in other months. Therefore, for the purposes of this study, the peak production is considered to be 247,550 gallons based on the next highest peak production, observed in December.

Table 4: Water Production in Gallons

Month	Average Daily	Peak Day
January	86,576	218,350
February	77,180	124,050
March	71,790	117,100
April	75,915	134,600
May	70,840	123,500
June	75,348	459,950
July	71,911	168,700
August	73,235	116,850
September	70,345	215,950
October	74,289	115,320
November	83,120	128,400
December	90,311	247,550
Annual Average Daily Production		76,738
Annual Total		28,009,491
Peak Day Production		459,950
Design Peak Day Production		247,550

b. *Water Demand*

Table 5: Monthly Consumption in Gallons

Month	Average Monthly
January	2,095,360
February	1,887,266
March	1,533,671
April	1,575,597
May	1,786,896
June	1,341,417
July	1,149,590
August	1,846,204
September	1,708,550
October	1,574,089
November	1,501,822
December	1,659,478
Average Daily Demand	53,863
Annual Total	19,659,940

c. *Equivalent Dwelling Units*

The Equivalent Dwelling Unit (EDU) is a metric that relates all water system usage to a multiple of that of the typical single-family residence. The Ten State Standards recommend designs account for 100 gallons of water usage per capita per day. According to the 2020 Census, the average household size in Wellsburg was 3.14. Therefore, the typical single-family household would require a theoretical 314 gallons per day. The actual consumption across 154 single-family households was 19,560 gallons, or 127 gallons per household (EDU) per day. Using this value as the basis of a single EDU's usage, Wellsburg has a total of 425 EDUs as summarized in Table 6.

Table 6: Village of Wellsburg EDUs by Type of Use

User Type	Users	Average Daily Consumption (gallons)	EDUs
Single-Family Residences	154	19,560	154
Multifamily Residences	17	2,893	23
Industrial	1	46	0.5
Commercial	14	30,154	237.5
Organization	7	999	8
Other	3	211	2
Unused/Inactive	13	--	0
Total	209	53,863	425
Usage Per EDU (GPD)[1]			127

1. Gallons per day

d. *Unaccounted for Water*

Unaccounted for water is water lost via breaks and leaks, or via maintenance activities such as hydrant flushing. Unaccounted for water may also occur due to inaccurate meter readings. Note that the Village's water meters were last replaced in 2009, which means they are approaching the end of their useful life.

According to the New York State Department of Environmental Conservation (NSYDEC) 1989 Water Conservation Manual, utilities should strive for no more than 10 to 15 percent of unaccounted water within a water system. While calculation of unaccounted for water contains numerous variables, estimates can be made using the following equation:

*Percent Unaccounted Water = 100% * (Withdrawal – Consumption)/Withdrawal*
= 100%(28,009,491-19,659,940)/28,009,491*
= 30%

Using the values from the water production records and metered billing records, the percentage of unaccounted water is estimated to be 30%, which is well above the range of 10 to 15 percent as suggested by the NYSDEC's *Water Conservation Manual* as typical for water utilities.

e. *Projected Values*

Because the population of Wellsburg is projected to decrease, the water consumption given is the likely upper limit of water needs for the Village, unless new developments cause the population trends reverse. Assuming leaks are addressed, the water production should be reduced by a minimum of 15% to 23,808,068 gallons annually, representing the likely upper limit of any future production needs.

f. *Nearest Public Water Systems*

The nearest public water system is in the Town of Elmira and is the Village's sole source of water.

3. Community Engagement

The Village of Wellsburg held a public hearing for the water study summarized in this report on July 10, 2019. There was no opposition toward CDBG grant application to fund a water study at that time. Another public hearing was held on January 13, 2021. There were no comments provided by the public.

C. EXISTING FACILITIES

1. Description and History

The waterworks for the Village of Wellsburg were originally constructed in 1894 and consisted of a mile of cast iron main. The water source was comprised of four 8-inch wells 28 to 30 feet deep advanced in the southern part of the village. Storage was provided by an open earth reservoir on a hill rising along the eastern part of the Village.

The distribution system expanded over time, and several pipes were abandoned and replaced over the years. The current pipes in the system were installed between the 1960s and 1990s. The district eventually came to be served by groundwater supply wells that tapped into a shallow unconfined sand and gravel aquifer in the northern part of the Village between Front Street and the Chemung River. Available records suggest that eight wells were advanced in the Village in the history of the water supply system. The wells suffered several issues including high turbidity, inability to undergo proper development due to damaged construction, migration of fines into the formation, and presence of iron and manganese. The wells were no longer used by the 1990s, when the community began purchasing water from the Elmira Water Board. Water is currently conveyed from the Elmira water system via 10" pipe to a Village-owned pumping and metering station. Additional chlorine is added here, and then water is distributed through a network of 4" to 10" ductile iron, cast iron, and asbestos cement mains.

The first water storage tank was installed in 1964, at which time the reservoir was presumably put out of use. There are now a total of three welded steel tanks providing over 660,000 gallons of storage. A summary of the water system assets is given in Table 7. A map of the water system is given in Figure 2 of Appendix A.

Table 7: Water District Assets

Asset	Description	Location
Comfort Hill Tank, built 1964	203,000-gallon welded steel tank	Comfort Hill Road Tax Parcel 131.00-1-12
Cowell Hill Tank, Built 1973	250,000-gallon welded steel tank	Cowell Hill Road Tax Parcel 131.06-3-9
Front Street Tank, Built 1966	209,000-gallon welded steel tank	Front Street Tax Parcel 131.10-2-34.2
Water Metering and Pump Station	Two 7.5 hp booster pumps, chlorine pumps	Coldbrook Club Road Tax Parcel 121.00-1-54
Distribution System	Six miles of 4" to 10" main constructed of asbestos cement, ductile iron, and cast iron pipe	Front Street, Berwick Turnpike, Old Main Street, Main Street, Terrace Street, Cowell Hill Road, Comfort Hill Road, Doty Hill Road, 6th Street, 5th Street, East and West 4th Street, and Church Street

2. Condition of Existing Facilities/Shortcomings

a. *Adequacy of Current Facilities*

Distribution System Leaks

The distribution system has suffered from a history of water losses due to leakages, resulting in high costs to the community. A leak detection study was conducted on March 30 and 31 of 2020, following a leak repair near the mobile home park, to identify potential sources of additional water loss in the distribution system. A 7,500

gallon per day (GPD) leak was found in the proximity of 233 West Fifth Street. The results of the study are included in Appendix C.

There is a section of new ductile iron water main running along Front Street from Berwick Turnpike to Main Street which has experienced four breaks so far. It is also 8.5' deep, making it difficult to access. Additionally, there is a section of asbestos cement pipe running from Comfort Hill Road under the creek to Sixth Street which is soft and will likely contribute to leaks in the future.

Storage Tank Condition

Inspecting and maintaining three water storage tanks totaling over 660,000 gallons in volume a significant undertaking for a relatively small water system and may not be necessary to meet the minimum storage requirements. The *AWWA Manual for Selecting and Sizing Water-Storage Tanks* recommends sizing of tanks based on peak demand, fire flow, and optimal water quality, noting that most water supply sources are best operated on a 24-hour production basis and produce a quantity of water in 24 hours that is equal to the 24-hour demand.

The required storage capacity of the total proposed system is calculated as follows:

$$\begin{aligned} &Water\ Storage\ Capacity\ (Gallons) \\ &\quad = Average\ Daily\ Demand + Fire\ Protection\ Volume \\ &\quad + Pump\ Equalization \\ &\quad - Supply\ from\ Sources\ with\ Back\ Up\ Power \end{aligned}$$

The average daily demand is 53,863 gallons, as given in Table 5. The community's fire protection volume, or the highest needed fire flow in the community as determined by the ISO, is 2,250 gallons per minute as given in Table 8. Over two hours, the required fire flow volume is 270,000 gallons.

Pump equalization volume ranges from 10 to 30% of the average daily demand by design. Utilizing 20%, the needed pump equalization volume is 10,773 gallons.

The source of supply from backup power is not applicable in the case of this water system, where water is supplied from another water district. Therefore, the minimum required system storage capacity is calculated to be:

Water Storage Capacity = 53,863 gallons + 270,000 gallons + 10,773 gallons – 0 gallons
Water Storage Capacity = 334,636 gallons

The existing system provides 662,000 gallons of storage capacity, far exceeding the minimum requirements. Excess storage leads to low turnover, which can contribute to increased concentration of regulated disinfection byproducts and ice formation which can damage the structural integrity of the tanks. Turnover is calculated as

shown below and is equal to 8.1% for the current system. The United States Environmental Protection Agency (EPA) Finished Water Storage Facilities paper (August 15, 2002) recommends turnover of 15 to 20%.

Tank Turnover = (average daily demand)/(total storage)
Tank Turnover = 53,863/662,000 = 8.1%

It is proposed that the Front Street tank be decommissioned due to difficulty in accessing the tank by road, leaving 453,000 gallons of remaining storage. The turnover after tank decommission would be slightly improved at 53,863/453,000=11.9%.

In recent years, there have been several leaks in each tank, thus requiring repairs by the Village including installation of wooden plugs and welding of repair patches on to the tanks. The tanks, which were inspected in April of 2020, were found to be experiencing corrosion and steel fatigue. The tank inspection reports are provided in Appendix D. Tanks that are to remain in service must either undergo full rehabilitation or be replaced.

Water Meters

As mentioned previously, the water meters were last replaced 12 years ago. Industry standard indicates that a water meter that is greater than 20 years old or has measured greater than one million gallons of water, has exceeded its useful life. Accurate metering is critical for appropriate revenue recovery as well as for identifying leaks promptly within a system. The NYSDEC Water Conservation Manual has documented 50 percent (%) of water meters having ages of 19-29 years are inaccurate and have a minimum registrable flow of 1.25 gpm. It is noted that this pertains to disc and turbine meters, which is the type utilized by the Village.

System Pressure and Fire Flow

Hunt created a recent water model of the current system and found that system pressures are sufficient for end-users during all conditions of flow, except for one location very close to the Comfort Hill Road tank which measured 19.82 psi. More detail on the results of the water model is given in Appendix E. The Ten States Standards requires a minimum of 20 psi water pressure at all points in the system during all conditions of flow. As mentioned previously, the fire flow needs of the community are met.

Information provided by the Insurance Services Office (ISO) indicates the highest needed fire flow is 2,250-gpm. Flow test data show that the water system can provide fire flow more than the requirements (summarized in Table 8) while maintaining the requisite 20 pounds per square inch (psi) of residual pressure in the system, per Ten States Standards.

Table 8: ISO Flow Test Data and Fire Flow Availability

Flow Test Location	Flow (gallons per minute) at 20 PSI	
	Needed	Available
Main St, opposite Front St	2,250	3,400
Cowell Hill Rd & Terrace St	2,250	5,000
Main St, 1st hydrant north of Doty Hill Rd	1,500	6,100*
Berwick Tpke, 3rd hydrant north of Comfort Hill Rd	750	1,400

*The available fire flow provided by the ISO at this location is uncharacteristically high and does not agree with the water modeling conducted as part of this study. Water modeling data is provided in Appendix E.

b. *Source Capacity*

The project area falls within the Chemung River Watershed, in the Lower Chemung River Basin. As described in Section A, Chemung River tributaries (Bentley Creek) run through the project area.

The Village's water source, from the Town of Elmira, is a blend of river, lake, and groundwater. At present, the Village is entirely dependent on Elmira for its water supply, including in emergency situations.

c. *Water Quality*

There were no violations of water quality in the Elmira water system in 2022 according to the Elmira Water Board's annual water quality report. Water received from Elmira is re-chlorinated at the Wellsburg booster pump station. No violations of water quality were reported for the Wellsburg water system in the 2022 Annual Water Quality Report.

Review of the Environmental Protection Agency Safe Drinking Water Information System (SDWIS) conducted on 3/19/2020 identified no health-based violations within the water system in the last ten years. One monitoring and reporting violation was reported, indicating that the system failed to collect some or all required samples in a timely manner. In July of 2014, the system was in violation due to the number of samples required for Total Trihalomethanes (TTHM) analysis not meeting the minimum requirements. The system achieved compliance two months later.

The Chemung County Department of Health did not find the system to be out of compliance in the last ten years of inspections. It generally appears the Village will be able to meet treatment and monitoring objectives.

d. *Waste Management and Permits*

The waste generated in the system is minimal since the water arrives at the Village treated. Waste associated with regular system maintenance (e.g. hydrant flushing)

can be handled without adverse impact to the environment. There are no withdrawal permits associated with the Wellsburg water supply system.

e. *Sustainability for Continued Use*

Leaks within the system have historically cost the community tens of thousands of dollars a year. High costs may pose a barrier to long-term operation of the system. Replacing old, soft asbestos cement pipe along with the pipeline along Front Street will reduce leaks and reduce operation costs.

Excess storage capacity in the community imposes an undue operational and maintenance burden on the water system. Additionally, excess storage increases water age, which is associated with increased disinfection byproducts in the system, and reduces turnover, which increases ice buildup and structural deterioration.

f. *Financial Status*

Open Book New York was utilized to find the Village's annual water budget from 2018-2022 Water sales typically have exceeded water expenditures by more than $90,000. The historical water budgets for the last five full fiscal years are given in Table 9.

Customers are billed monthly. The billing structure includes a flat rate based on the size of the installed water meter. Residential meters cost $38 monthly, while the largest meters cost $152 monthly. The one exception is the connection that serves the mobile home park. The monthly cost of this connection is $2,812. All customers are charged an additional 0.18 cents per gallon for water used.

Table 9: Village of Wellsburg Historical Water Budgets

Water Budget	2022	2021	2020	2019	2018
FX2140 Metered Water Sales	**$156,426**	**$160,397**	**$156,806**	**$171,990**	**$168,252**
FX83504 Common Water Supply, Contr Expend	$26,969	$40,219	$40,971	$35,319	$31,693
FX83204 Source Supply Pwr & Pump, Contr Expend	$15,677	$24,533	$16,504	$12,660	$10,264
FX83202 Source Supply Pwr & Pump, Equip & Cap Out	$1,666	$3,903	$15,090	$530	$4,358
FX83201 Source Supply Pwr & Pump, Pers Serv	$14,235	$14,474	$15,026	$17,401	$15,327
FX83104 Water Administration, Contr Expend	$1,441	$1,943	$1,718	$1,592	$1,220
FX83101 Water Administration, Pers Serv	$12,252	$11,996	$11,991	$11,445	$10,920

FX83304 Water Purification, Contr Expend	$0	$590	$323	$658	$585
Total Expenditures	**$72,239**	**$97,659**	**$101,624**	**$79,603**	**$74,367**
Surplus	**$84,186**	**$62,738**	**$55,182**	**$92,386**	**$93,885**

g. *Energy Consumption*

As summarized in Table 10, costs associated with energy usage in the water system have accounted for 38% to 46% of overall water expenditures in the last 5 years.

Table 10: Water System Energy Cost Fraction

Power and Pump Costs	$31,578	$42,910	$46,620	$30,590	$29,948
Percent of Water Expenditures	44%	44%	46%	38%	40%

The water system is pumping at least 15% more water than is required, leading to unnecessary energy consumption. Strategic pipe replacements and water meter replacements, as described in Section III.C, will help reduce leaks and associated pumping of the leaked water.

Removing a redundant water storage tank will reduce overall maintenance requirements and associated energy expenditures.

D. NEED FOR THE PROJECT

1. Aging Infrastructure

System pressure is slightly out of compliance very close to the Comfort Hill Road tank, while the minimum 20 psi of required pressure is met throughout the remainder of the system. There are no other identifiable features that are out of compliance with accepted standards. It is expected that the existing system can accommodate the future population since it is expected to decline. However, the cost of the inefficiently operating system will then increase per capita, and so aging infrastructure must urgently be addressed. The issues the system is facing, in order of importance, are listed below. The developed alternatives – replacing pipes that contribute to leaks, modifying storage to reduce maintenance and improve system pressure, and establishing a backup water supply – will improve system efficiency, simplify operation and maintenance, increase resilience, and reduce the cost of running the system overall.

<u>Distribution System Water Loss</u>

30% unaccounted for water is excessive and water loss through leaks may cause reduction in pipe pressure and subsequent contamination of the water network or momentary loss of ability to provide minimum fire flows. The frequency and quantity of leaks within the system has caused the water supply to be costly and unreliable.

Modified Storage for Efficiency and Improved Pressure

Excess storage within the water system places unnecessary operation and maintenance burden on the community. The aging water tanks are costly to rehabilitate and repair. Excess storage results in low turnover, which leads to increased water age and ice formation. In addition to other factors such as re-chlorination, surface water source quality, and lengthy distribution and transmission mains, as the water age increases due to excess storage time, water quality deteriorates due to the formation of TTHMs. According to the ADWQ Reports for 2022 for the Elmira Water Board and the Village of Wellsburg, the Elmira system had a quarterly sample range of 33-62 ug/l, while the Village of Wellsburg had a quarterly sample range of 36-72 ug/l for TTHMs.

Loss of Source Capacity

The Village of Wellsburg is wholly dependent on Elmira for its water source, and it has no recourse if this water supply becomes unavailable. Having a water supply well within the Village will reduce operational costs, increase resilience to broader system failures, and will reduce the Village's dependence on outside water sources.

2. **Reasonable Growth**

As shown in Section B.1, the Village of Wellsburg is not anticipated to experience future growth, the trend is instead for the Village population to decline. The Village is encouraged to consider this trend as it plans for the future and for future rate setting.

3. **Water, Energy, Waste Considerations**

The project will reduce water losses thereby saving pumping energy.

4. **Suitability for Continued Use**

The Wellsburg water system will be improved by the project and will continue to be suitable for use as a public water system.

5. **Storm and Flood Resiliency**

The existing storage tanks are outside the 500 year flood plain.

6. **Compliance with Regulations and Accepted Standards**

No notices of, consent orders, judicial orders, or EPA orders have been issued to the system. Compliance with current design standards is investigated in the above sections.

7. **Capacity Development**

Please refer to the Capacity Development Program form in Appendix G.

III. PROJECT ALTERNATIVE ANALYSIS

The project alternative analyses are separated into three solutions: distribution system leak reduction, water storage improvements, and backup water supply through an on-site groundwater well. All alternatives are compared against the "do nothing" alternative below to set a baseline for comparison.

A. ALTERNATIVE 1 – DO NOTHING

1. Water Storage Improvements

Excess storage in the Village will lead to deterioration in water quality and an increase in ice formation as a result of poor turnover. Increased water age is associated with excess storage and can lead to buildup of disinfection byproducts in the system. Furthermore, water storage tanks are expensive to maintain, requiring labor-intensive cleanings and repairs. The existing water storage tanks have suffered from leaks and are deteriorating due to corrosion. Maintaining an extra storage tank thrusts an unnecessary cost upon the community; therefore, doing nothing to improve the water storage in the system is not recommended. Note that proactively upgrading the water storage infrastructure also provides the opportunity to improve system pressures by installing new tanks at a higher elevation.

2. Leak Reduction

Last year Wellsburg lost approximately $4,500 to $11,500 worth of purchased water due to leaks in the distribution system. This does not account for expenditures made to detect and repair the leaks. This is an unsustainable about of money to lose over the 20- to 50-year lifetime of the system. The cost of leaks per person will increase as the population decreases and will become more difficult for individuals to afford. Therefore, doing nothing to reduce leaks is not a viable option.

3. Backup Source Capacity

The Village's sole source of water comes from the Town of Elmira. While Elmira has the requisite backup supply to serve its customers in the case of an emergency, should anything happen to the conveyance infrastructure between Elmira and the Wellsburg booster pump station, the Village will not be able to distribute water beyond what is available in the storage tanks. A backup water supply will increase the resilience of the system, reduce Wellsburg's dependence on the neighboring Town, and make system operation more cost effective.

B. ALTERNATIVE 2 - WATER STORAGE IMPROVEMENTS

As detailed in the inspection reports in Appendix D, each of the water storage tanks is experiencing at least some corrosion of the exposed steel surfaces due to blistering and loss of adhesion of the tank coating. At most, one tank may be decommissioned while still maintaining the minimum storage requirements. The Village prefers to decommission the Front Street tank. A two-tank water model was developed, as described in Appendix E, to predict pressures and fire flows in this scenario. The model shows that the minimum pressure and fire flow requirements can be met throughout the community as long as the minimum water level in tank at the Cowell Street site is elevated by approximately 10 feet, and that of the Comfort Hill site is elevated by approximately 5 feet. This can be achieved by either building a new tank on higher ground or by having a taller tank that can accommodate additional stored volume below the minimum water level. Additional details on the hydraulic conditions of this improvement are provided in Appendix E.

The remaining two tanks can either be rehabilitated or replaced with new glass-lined bolted steel tanks which do not require recoating every 20 years. The expected cost of new glass-lined bolted steel water tanks minus the cost of concrete foundations and with 240,000 gallons of storage capacity is $400,000 each. The cost of maintenance of this type of tank consists of 10-year anode replacements and resealing every 20 years, in addition to general maintenance. Over a 50-year period, the total cost of tank maintenance is expected to be nearly $57,000 in today's dollars, giving a total life cycle cost of $457,000.

Alternatively, rehabilitation of the existing tanks would involve recoating of the interior and exterior surfaces every twenty years in addition to the anode replacements and general maintenance. The cost of rehabilitating a single 240,000-gallon storage capacity welded steel tank over 50 years is estimated to be $390,000. The life cycle analysis for both scenarios is provided in Appendix F. While rehabilitation appears to be approximately $67,000 cheaper than purchasing and maintaining a new bolted steel tank, recall that the Comfort Hill tank was built in 1964 and the Cowell Hill tank was built in 1973. Both are at or nearing the end of their useful life, and tank replacement cannot likely be escaped within the 50-year analysis period. Therefore, the most cost-effective, maintenance-friendly option is to replace both tanks with new ones.

Note that the new turnover for the proposed system is 53,863/(240,000*2)=11.2%. It is likely more cost effective to have larger tanks with excess storage to achieve required system pressure than it is to construct elevated tanks with a smaller storage capacity. Therefore, a mixing system is proposed for the two operational tanks to mitigate the effects of low turnover.

The total cost of decommissioning the three existing tanks and installing new glass-lined bolted steel tanks with new solar powered mixers is approximately $296,000. Itemized estimates are given in Table 11.

Table 11: Alternative 2 - Water Storage Improvement Cost

ITEM	QUANTITY	UNIT	UNIT PRICE	SUBTOTAL
Mobilization (5%)	1	LS	$86,450	$86,450
Maintenance & Protection of Traffic (0.5%)	1	LS	$8,645	$8,645
Bonds & Insurance (2%)	1	LS	$34,580	$34,580
Clearing & Grubbing	2	LS	$37,500	$75,000
Water Tank Decomissioning	3	EA	$75,000	$225,000
Glass-fused Bolted Steel Tank (250,000 gal)	2	EA	$480,000	$960,000
SCADA & Controls - Cowell Hill Rd.Tank	1	LS	$73,000	$73,000
SCADA & Controls - Comfort Hill Rd. Tank	1	LS	$73,000	$73,000
Watermain & Fittings	2	EA	$25,000	$50,000

Connect to Existing	2	EA	$9,000	$18,000
Tank Drain Piping	2	EA	$17,500	$35,000
Tank Mixing System - (Solar Bee)	2	EA	$45,000	$90,000
Tank Disinfection & Testing	2	EA	$5,000	$10,000
Site Restoration	2	LS	$60,000	$120,000
CONSTRUCTION SUBTOTAL				**$1,858,675.00**
Contingency	30%			**$557,602.50**
PROJECT SUBTOTAL				**$2,416,277.50**
Administrative	3%			**$72,488.33**
Legal	3%			**$72,488.33**
Engineering/Construction Observation	18%			**$434,929.95**
TOTAL ESTIMATED COST				**$2,996,184.10**

The Village owns property adjacent to the Cowell Hill tank parcel that can be used for new tank construction. It is likely that the Village-owned parcel containing the Comfort Hill tank has enough space for a new installation.

Decommissioning an unnecessary tank is a "green" solution in that it reduces the maintenance requirements of the water system, which involve energy-intensive recoating and rehabilitation.

C. ALTERNATIVE 3 - WATER METER AND WATERMAIN REPLACEMENT

There are two pipelines that have had consistent difficulties with leakages and breaks:

- Asbestos cement watermain along Old Main Street from Comfort Hill Road to Sixth Street, and
- New ductile iron pipe along Front Street from Berwick Turnpike to Main Street.

The water model has determined that the pipe sizes are suitable in both the current scenario and with the Front Street tank removed from the system. Therefore, these pipes will be replaced with new ductile iron main of the same size. The Front Street main should be sleeved with polyethylene warp to protect against aggressive soils.

The goal of the pipe replacement is to reduce water lost in the system, which is an improvement that inherently is conservative of environmental resources. Another key feature of auditing the system for water loss includes installation of new water meters. This is essential because the current water meters are approaching the end of their useful life and are likely providing inaccurate data. Reliable metering is essential for leak repair and billing. The total cost of water meter replacement is approximately $314,000 and that of the watermain replacement is approximately $1,819,000. Itemized estimates are given in Table 12 and Table 13 respectively.

Table 12: Alternative 3 - Water Meter Costs

ITEM	QUANTITY	UNIT	UNIT PRICE	SUBTOTAL
Mobilization (5%)	1	LS	$9,109	$9,109
Bonds & Insurance (2%)	1	LS	$3,644	$3,644
Furnish 5/8" x 3/4" Neptune T-10 Meter, E-Coder Gallon	209	EA	$154.00	$32,186.00
Furnish Neptune R900 RF End Point Unit, Wall Mount V4	209	EA	$133.00	$27,797.00
Furnish Neptune R900 Belt Clip Transceiver	1	EA	$3,750.00	$3,750.00
Furnish Neptune R900 Gateway V4 Data Collector	1	EA	$30,000.00	$30,000.00
Neptune 360 Advance Set Up Fee	1	EA	$6,892.00	$6,892.00
Neptune 360 Advance Module Annual SaaS Subscription	1	EA	$3,225.00	$3,225.00
Furnish New Windows 10 Laptop	1	EA	$1,250.00	$1,250.00
Installation of water meters and wall mount interface for services	209	EA	$350.00	$73,150.00
3/4" Gate Valves (installed)	52	EA	$75.00	$3,918.75
CONSTRUCTION SUBTOTAL				**$194,921.75**
Contingency	30%			**$58,476.53**
PROJECT SUBTOTAL				**$253,398.28**
Administrative	3%			**$7,601.95**
Legal	3%			**$7,601.95**
Engineering/Construction Observation	18%			**$45,611.69**
TOTAL ESTIMATED COST				**$314,213.86**

Table 13: Alternative 3 - Watermain Replacement Cost

ITEM	QUANTITY	UNIT	UNIT PRICE	SUBTOTAL
Mobilization (5%)	1	LS	$51,284	$51,284
Maintenance & Protection of Traffic (3%)	1	LS	$30,771	$30,771
Bonds & Insurance (2%)	1	LS	$20,514	$20,514
Clearing & Grubbing	1	LS	$10,000	$10,000
Directional Drill Crossing	842	LF	$175	$147,350
Asbestos Cement Pipe Removal in DOT ROW	1175	LF	$120	$141,000
8" Ductile Iron Watermain	1873	LF	$115	$215,395
C105 Polyethylene Encasement - 8" DIP	1540	LF	$6	$9,240
Service Connections	20	EA	$2,000	$40,000
8" Connection to Existing Watermain	4	EA	$9,000	$36,000
8-inch Gate Valves & Box	9	EA	$3,000	$27,000
Fire Hydrants	5	EA	$9,500	$47,500
Stream Crossing Meter Pit	2	EA	$4,500	$9,000
Asphalt Repair	1249	SY	$120	$149,880
Sidewalk Restoration	7492	SF	$22	$164,824
Lawn Restoration	1124	SY	$12	$13,488
Misc. Restoration (Mailbox/Planters)	1	LS	$15,000	$15,000
CONSTRUCTION SUBTOTAL				**$1,128,246.00**
Contingency	30%			**$338,473.80**
PROJECT SUBTOTAL				**$1,466,719.80**
Administrative	3%			**$44,001.59**
Legal	3%			**$44,001.59**
Engineering/Construction Observation	18%			**$264,009.56**
TOTAL ESTIMATED COST				**$1,818,732.55**

D. ALTERNATIVE 4 - BACKUP GROUNDWATER SOURCE DEVELOPMENT

Wellsburg had undertaken a decade-long effort to find a well of suitable quality and quantity. Eight wells have been advanced in the Village of Wellsburg, and only Well 6, which is located in the parking lot of the fire hall, was found to be viable. It was believed that Well 4 would have good quality and quantity of water, but due to well screen damage during installation, it was unable to be properly developed. Abandonment records for Well 4 have not been

found, so it is presumed that it is still accessible. Well 6 is believed to have run at 90 gpm, but generally the wells experienced increased turbidity when pumped at rates higher than 50 gpm. Regarding quality, each of the wells was either found to have iron and manganese or was deemed to be under the influence of surface water.

If the rehabilitation and testing of Wells 4 and 6 is not successful, the best location for further exploration would be on the Village property bounded by Bentley Creek to the west, Front Street to the south, and the Chemung River on the east.

The cost of developing a backup groundwater source is approximately $1,531,000. This is a worst-case scenario cost, which includes the cost of attempted rehabilitation of Wells 4 and 6. Itemized estimates are given in 14. Note that the cost of polyphosphate pumps is included to aid in iron and manganese sequestration, but a more robust removal system will be required if the well(s) is to be used on a regular basis.

Table 14: Backup Source Development Cost

ITEM	QUANTITY	UNIT	UNIT PRICE	SUBTOTAL
Mobilization (5%)	1	LS	$49,748	$49,748
Maintenance & Protection of Traffic (0.5%)	1	LS	$4,975	$4,975
Bonds & Insurance (2%)	1	LS	$19,899	$19,899
Well Development	1	LS	$70,000	$70,000
72-Hour Pump Test, Sampling, and Reporting	1	LS	$25,000	$25,000
Pitless Unit, Pump & Column Piping	1	EA	$50,000	$50,000
Generator & Transfer Switch	1	EA	$60,000	$60,000
Clearing and Grubbing	1	EA	$20,000	$20,000
Pump House	750	SF	$450	$337,500
Electric Service	1	LS	$30,000	$30,000
Interior Electric & HVAC	1	LS	$50,000	$50,000
SCADA Controls	2	EA	$25,000	$50,000
Chlorine pumps	2	EA	$3,250	$6,500
Polyphosphate pumps	2	EA	$2,250	$4,500
Chlorine contact pipe (30' of 24" DI pipe)	30	LF	$315	$9,450
6" Ductile Iron Conveyance Pipe	1200	LF	$100	$120,000
Directional Drill Crossing	120	LF	$300	$36,000
Connect to Existing	2	EA	$8,000	$16,000
Site Restoration	2	LS	$55,000	$110,000
Land Acquisition	1	LS	$100,000	$100,000
CONSTRUCTION SUBTOTAL				**$949,950.00**
Contingency	30%			**$284,985.00**
PROJECT SUBTOTAL				**$1,234,935.00**
Administrative	3%			**$37,048.05**
Legal	3%			**$37,048.05**
Engineering/Construction Observation	18%			**$222,288.30**
TOTAL ESTIMATED COST				**$1,531,319.40**

E. Practical Considerations

None of the proposed alternatives will have any impact on average or peak design flows. The proposed groundwater source will likely only be suitable for emergencies. If the new well proves suitable for repeated use, it would not be used to increase system capacity, but rather to replace the expensive purchased water.

Repairing and preventing leaks will help ensure that the system pressure maintains the minimum standard under all operating conditions and that the minimum ISO fire flows can be met with the Front Street Tank taken offline. The new well will not impact distribution system pressure.

Land acquisition will not likely be required for tank replacement or for new well construction. If pipelines must cross outside of Village-owned property, easements will be required.

The proposed solutions will reduce water waste and reduce energy expenditures, preserving environmental resources.

It is expected the proposed alternatives are constructable given site constraints. There should be enough Village-owned land to place the new tanks at the required elevation without requiring long lengths of new pipeline. Tank replacements are occurring on the two most accessible tank sites.

If an existing well is rehabilitated for emergency purposes, the water withdrawal permit may need to be renewed. If a new well is constructed, a new water withdrawal permit must be obtained.

IV. PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

The complete project as proposed includes:

- Decommissioning of all existing water tanks,
- Installation of two new glass-lined bolted steel water tanks to replace the Cowell Road and Comfort Hill Road tanks,
- Installation of new ductile iron pipe along Front Street with protective lining to replace existing main, and
- Replacement of asbestos cement pipe along Old Main Street.

Note that water meter replacement will become important in approximately eight years, but it is not an immediate need and is not included in the recommended alternative. This solution increases efficiency, reduces instantaneous pressure and fire protection loss, minimizes waste in the system, reduces costs, and increases emergency-preparedness.

The total capital cost of the project is approximately $6,346,236, which is the sum of totals given in Table 11, Table 13, and Table 14.

The capacity development form is included in Appendix I.

A. Financial Impact Per EDU

Debt service is greatly dependent upon the rate of return and average interest rate utilized. Common municipal funding consists of return periods of approximately 30 years with

varying interest rates. Assuming a 4.5% interest rate, the estimated project debt service is calculated as follows:

$$\text{Annual Payment} = \text{Present Worth} / [((1 + \text{interest rate})^{\#\text{ of years}} - 1) / (\text{interest rate} * (1 + \text{interest rate})^{\#\text{ of years}})]$$

$$\text{Annual Payment} = \$6{,}346{,}236 / [((1 + 0.045)^{30} - 1) / (0.045 * (1 + 0.045)^{30})]$$

$$\text{Annual Payment} = \$389{,}605.22$$

$$\text{Annual Debt Service per EDU} = \frac{\text{Annual Payment}}{\text{Total EDUs}}$$

$$\text{Annual Debt Service per EDU} = \frac{\$389{,}605.22}{425}$$

$$\text{Annual Debt Service per EDU} = \$916.72 \text{ per year}$$

The debt service on a monthly water bill would be:

$$\text{Debt Service per monthly bill} = \frac{\$917.62}{12}$$

$$\text{Debt Service per Billing Cycle} = \$76.39$$

1. **Operation & Maintenance Costs**

Operation and maintenance costs are based on the day-to-day requirements to keep the system operational. These items include the following:

- Pumping costs,
- Chemicals for disinfection,
- Billing,
- Meter data collection,
- Well maintenance,
- General maintenance, and
- Routine tank rehabilitation.

The cost of maintaining an emergency backup well is expected to be minimal. The well will need to be exercised from time to time; however, water produced from the well will likely be cheaper than water purchased from Elmira. The cost of chemicals is also expected to be negligible given the infrequent use of the new well. Therefore, the cost of pumping, chemicals, well maintenance, and general maintenance are not expected to increase overall operation costs. Similarly, billing expenses are not expected to change.

Meter data collection software may cost up to $4,000 per year. If the Village does not already subscribe to such a service, the additional cost would be $4,000/425 = $9.42 per EDU per year. More importantly, the cost of leak reduction and accompanying accurate metering will reduce overall operation costs.

As described in Section B, the cost of routine tank rehabilitation over a 50-year period is expected to decrease by more than $300,000 with the installation glass-fused bolted steel tanks.

2. Short-Lived Asset Reserve

In addition to capital and operational costs, it is critical that the Village set aside enough funds to replace short-lived assets at the end of their useful life. Availability of funds for these replacements is critical to the provision of uninterrupted service of water. Table includes a list of short-lived assets for the water system with their expected useful life. Based on the assets within the system, it is recommended that an annual deposit of $6,261 be placed into the short-lived asset reserve, or $14.73 per EDU per year. Note, the annual reserve cost per year is calculated based on a 4% reserve growth rate.

Table 15: Short-Lived Asset Reserve Requirement

Short-Lived Asset	Expected Replacement Cost (Present Value)	Anticipated Useful Life (Yrs)	Suggested Annual Reserve ($/Yr)
Well Pump (2)	20,000	15	$1,799
Pump VFD (2)	25,000	10	$3,082
Chlorine Pumps (2)	6,200	15	$558
Polyphosphate Pumps (2)	4,000	15	$360
Tank Anodes	3,750	10	$462
Total	51,750	--	$6,261
Total per EDU			$14.73

3. Total Financial Impact per EDU

The total financial impact per EDU is the sum of the capital debt service, operation and maintenance, and short-lived asset reserve. Assuming that the operation and maintenance costs will not increase (but rather are likely to decrease), the approximate annual increase in system cost per EDU is $916.72+$14.73=$931.45.

The approximate existing system cost per EDU is $38 + 127 gallons/day * 365 days/year * $0.0018/gallon = $121.44. Therefore, the approximate total annual cost per EDU is $1052.99. This annual impact is approximately 1.7% of the Village's 2020 MHI of $63,750.

B. Probable Funding Sources

1. USDA Rural Development (RD)

The Village of Wellsburg is eligible for RD funding and based on their Median Household Income and would qualify for the intermediate interest rate loan. The Village could qualify for grant funds as the report from the Health Department outlines violations, health, or safety risks that the project will address.

2. Community Development Block Grant (CDBG)

The Village has a low-moderate income of 58.41% per the current Office of Community Renewal eligible areas and meets the eligibility requirements. The NYS Office of Community Renewal CDBG Grant allows for up to $1,000,000 in grant funds or up to $1,250,000 with co-funding and does not require a match. CDBG funds must be expended within two years of grant award, so should be applied for near the end of the financing process.

3. Water Infrastructure Improvement Act (WIIA)

The NYS Environmental Facilities Corporation offers the WIIA grant and requires Completed PER, Community Bonding, SEQR, SHPO. Priority is given to projects that result in the greatest water quality improvement or reduction in risk to public health and are positioned to advance to construction. The grant offers 60% of net eligible project costs up to $3,000,000 for water projects.

4. Drinking Water State Revolving Loan Fund (DWSRF)

The Village may be eligible for a reduced interest rate loan and grant through the Environmental Facilities Corporation (EFC). In order to qualify the Village must list the project on the Intended Use Plan (IUP) that is developed annually to rank and score all water projects seeking funds during a given fiscal year. The score is largely based on the project's ability to address water quality/ health and safety issues as noted by DOH.

5. Public Market Financing

Once a bond resolution is adopted, the Village may market a bond for project costs; however, the rates and terms may make the project unaffordable for residents.

G. Anticipated Schedule

The anticipated project schedule is as follows:

SEQR: Complete
Bond Resolution: Complete
Funding/Financing Solicitation: July 2023 – July 2024
Project Design & Specifications: January 2024 – May 2024
Regulatory Review: May 2024 – October 2024
Bidding: November 2024 – December 2024
Award/Notice to Proceed: January 2024 – February 2025
Construction: April 2025 – June 2026
Funding Closeout: August 2026

V. Maps and Figures

A map of the proposed water system improvements can be found in Appendix G of this report.

VI. Capacity Development Form

The Capacity Development Form can be founf in Appendix I.

VII. Smart Growth

A completed Smart Growth form can be found in Appendix J of this report.

VIII. Engineering Report Certification

Engineering Report Certification can be found in Appendix K.

APPENDIX A
Project Location Mapping

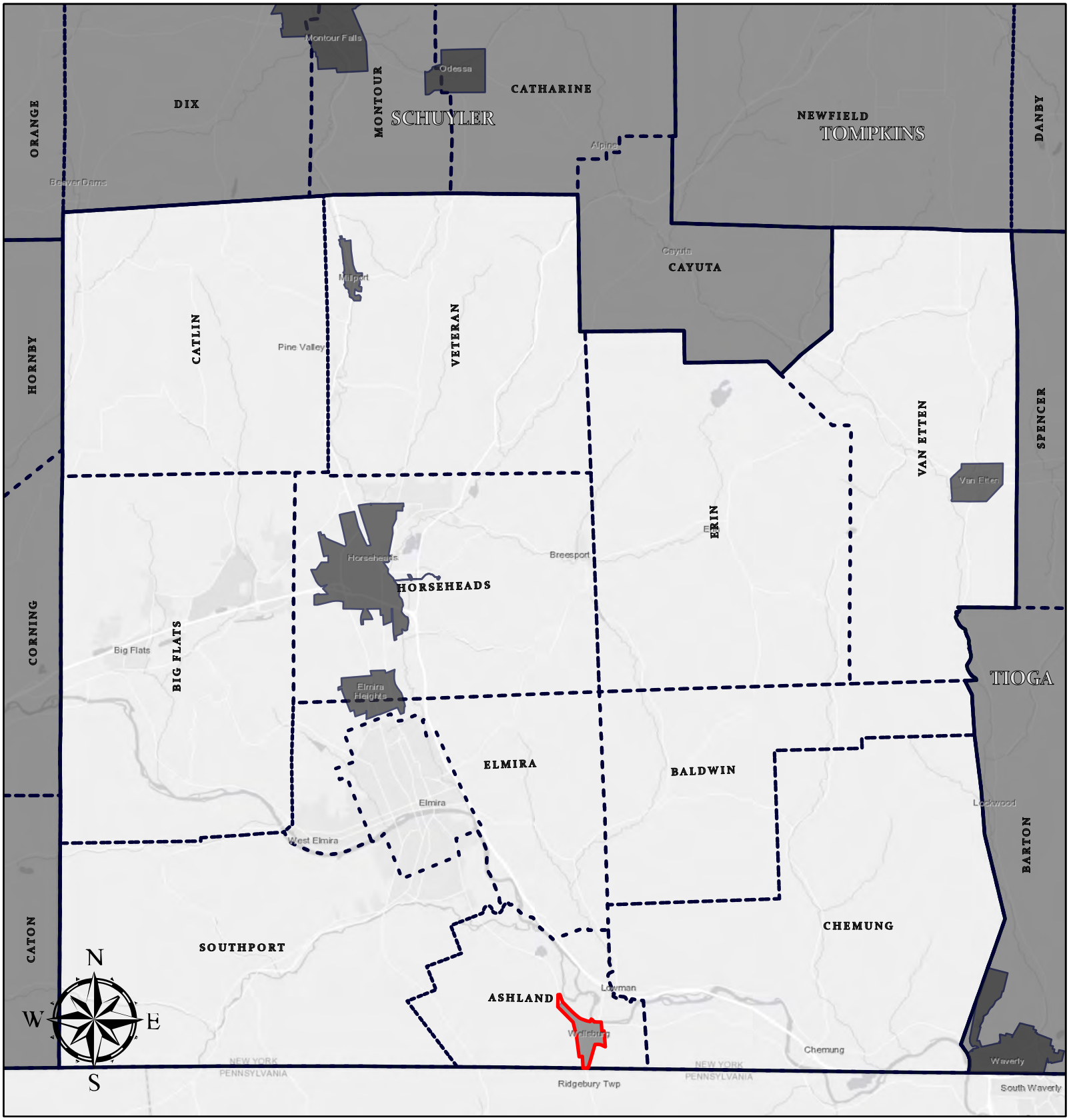

Figure 1. Project Location Map

WELLSBURG MUNICIPAL WATER STUDY

VILLAGE OF WELLSBURG

CHEMUNG COUNTY, NEW YORK

1

2678.009

Site Area

Village

Town

Chemung County

Surrounding Counties

0 2 4 Miles

HUNT ENGINEERS | ARCHITECTS | SURVEYORS

APPENDIX B
Environmental Resources

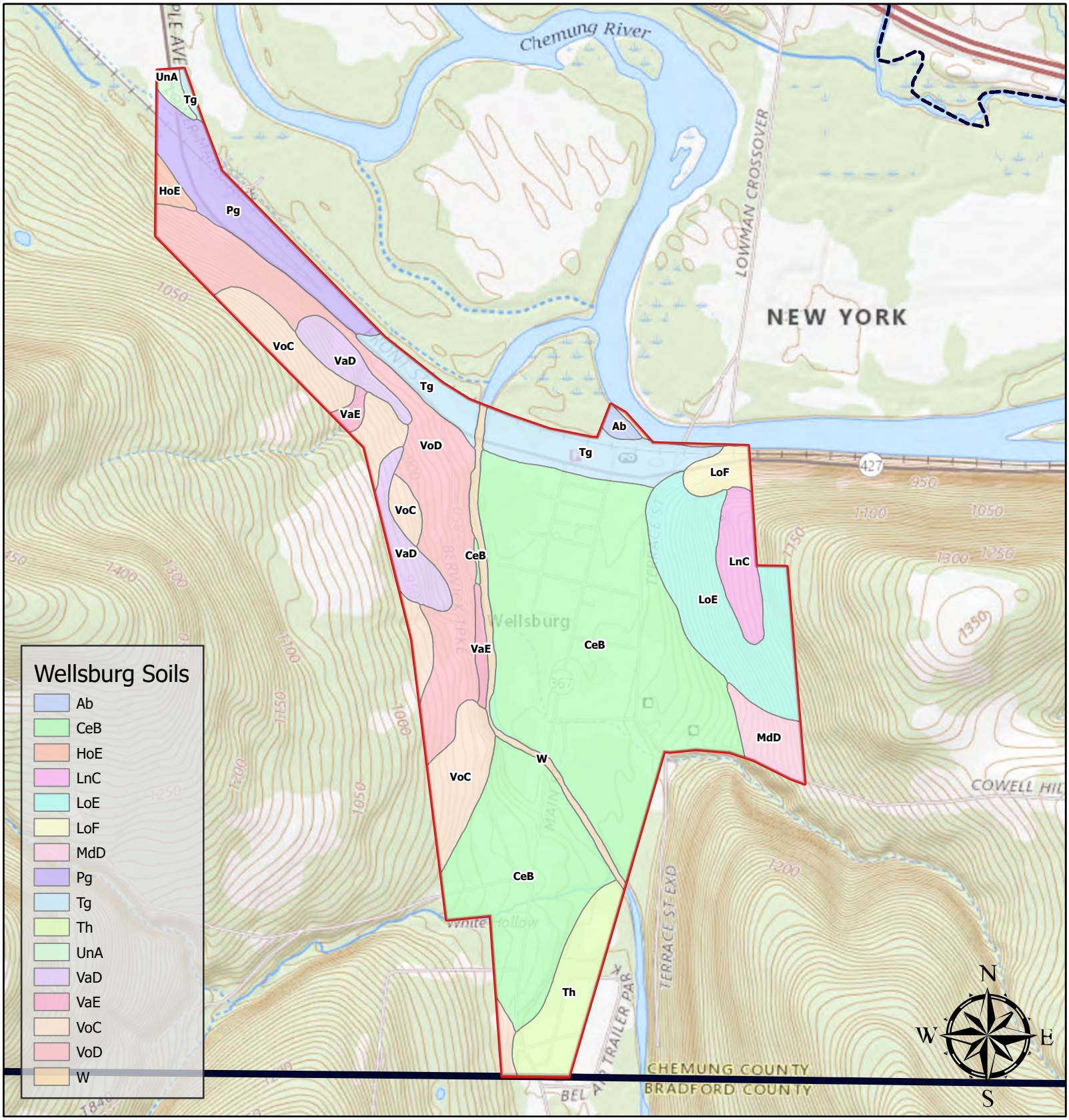

Figure 1. Wellsburg Soils Map

Site Area

1
2678.009

0 1,500 3,000 Feet

HUNT ENGINEERS | ARCHITECTS | SURVEYORS

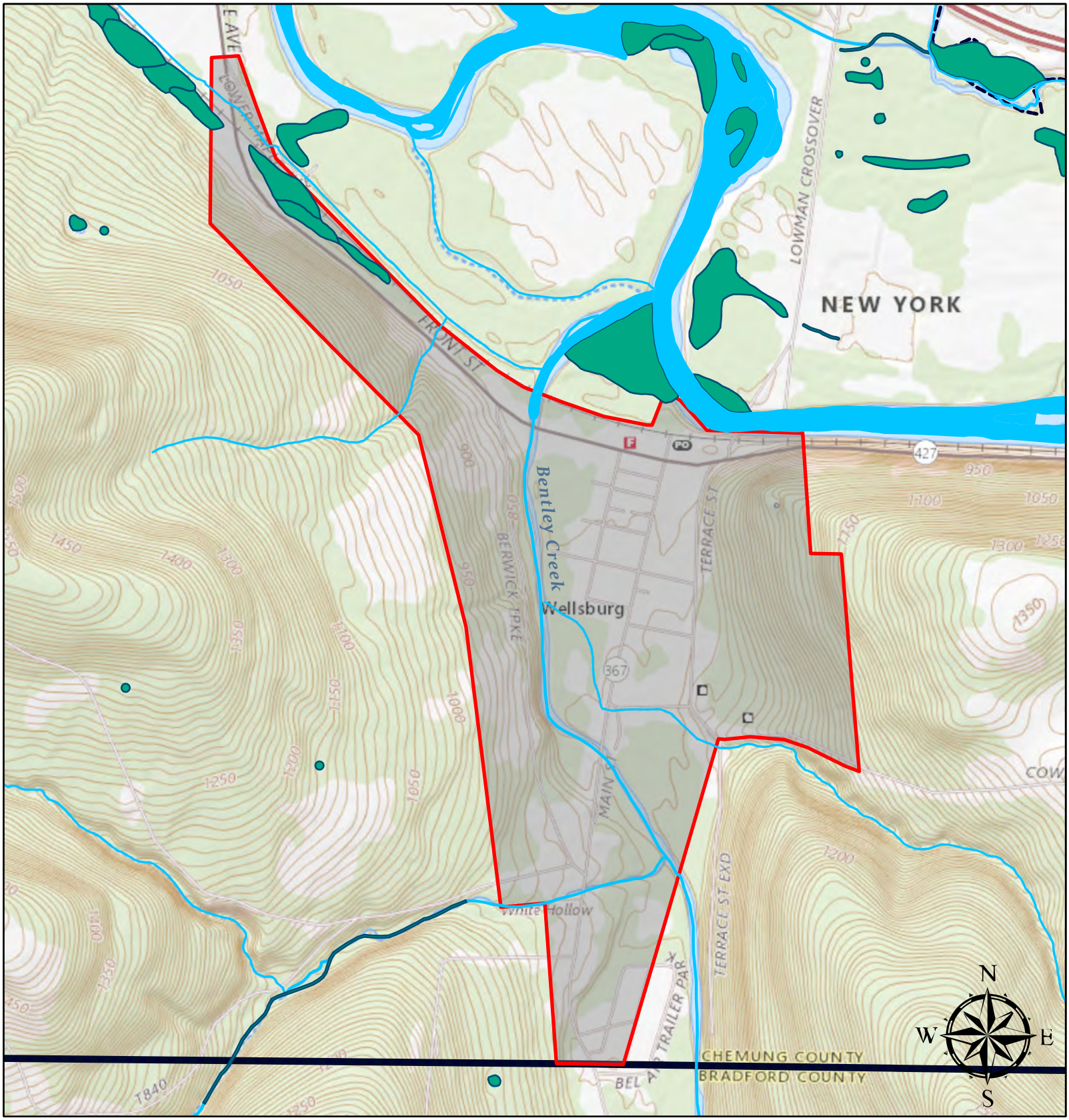

Figure 2. Wellsburg Wetlands Map

Site Area

USA Wetlands

Palustrine

Riverine

0 1,500 3,000 Feet

2

2678.009

HUNT ENGINEERS | ARCHITECTS | SURVEYORS

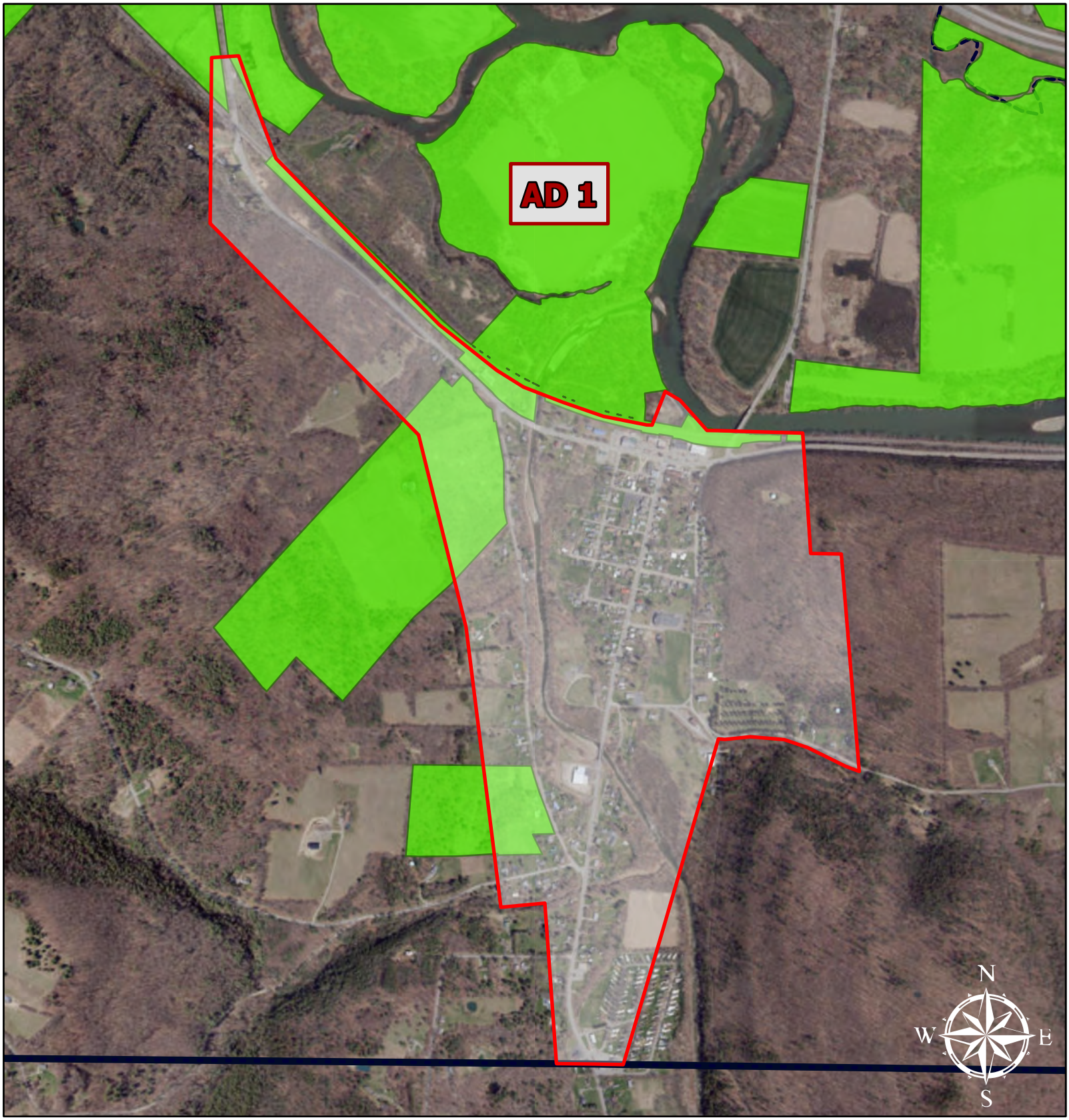

Figure 3. Wellsburg Agriculture District Map

WELLSBURG MUNICIPAL WATER STUDY

VILLAGE OF WELLSBURG

CHEMUNG COUNTY, NEW YORK

3

2678.009

HUNT ENGINEERS | ARCHITECTS | SURVEYORS

Site Area

Agri District

0 1,500 3,000 Feet

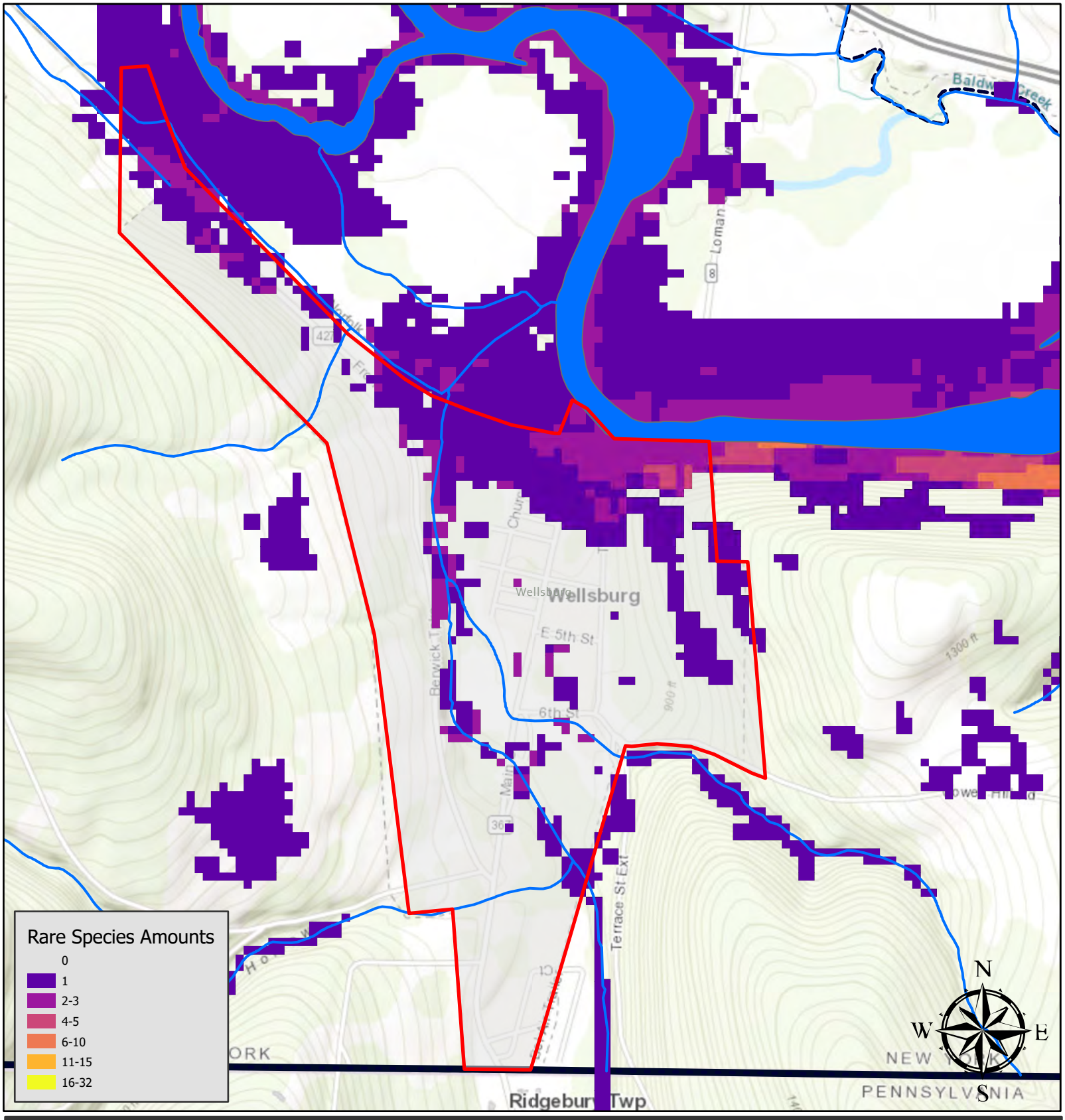

Figure 4. Wellsburg Rare Species Map

Site Area
Water Bodies
Streams

4
2678.009

0 1,500 3,000 Feet

HUNT ENGINEERS | ARCHITECTS | SURVEYORS

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

NOT FOR CONSULTATION

Location

New York and Pennsylvania

Local offices

New York Ecological Services Field Office

(607) 753-9334
(607) 753-9699

3817 Luker Road
Cortland, NY 13045-9385

http://www.fws.gov/northeast/nyfo/es/section7.htm

Pennsylvania Ecological Services Field Office

(814) 234-4090
(814) 234-0748

MAILING ADDRESS
110 Radnor Road Suite 101
State College, PA 16801-7987

PHYSICAL ADDRESS
110 Radnor Road
Suite 101
State College, PA 16801-7987

http://www.fws.gov/northeast/pafo/

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

NOT FOR CONSULTATION

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

NOT FOR CONSULTATION

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird

species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES IN WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Aug 31
Black-capped Chickadee *Poecile atricapillus practicus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Apr 10 to Jul 31
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31
Yellow-bellied Sapsucker *sphyrapicus varius* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8792	Breeds May 10 to Jul 15

NOT FOR CONSULTATION

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Publication and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

NOT FOR CONSULTATION

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see explanations for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

NOT FOR CONSULTATION

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

Palustrine

RIVERINE

Riverine

A full description for each wetland code can be found at the National Wetlands Inventory website

NOT FOR CONSULTATION

Data limitations

The Service's objective in mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

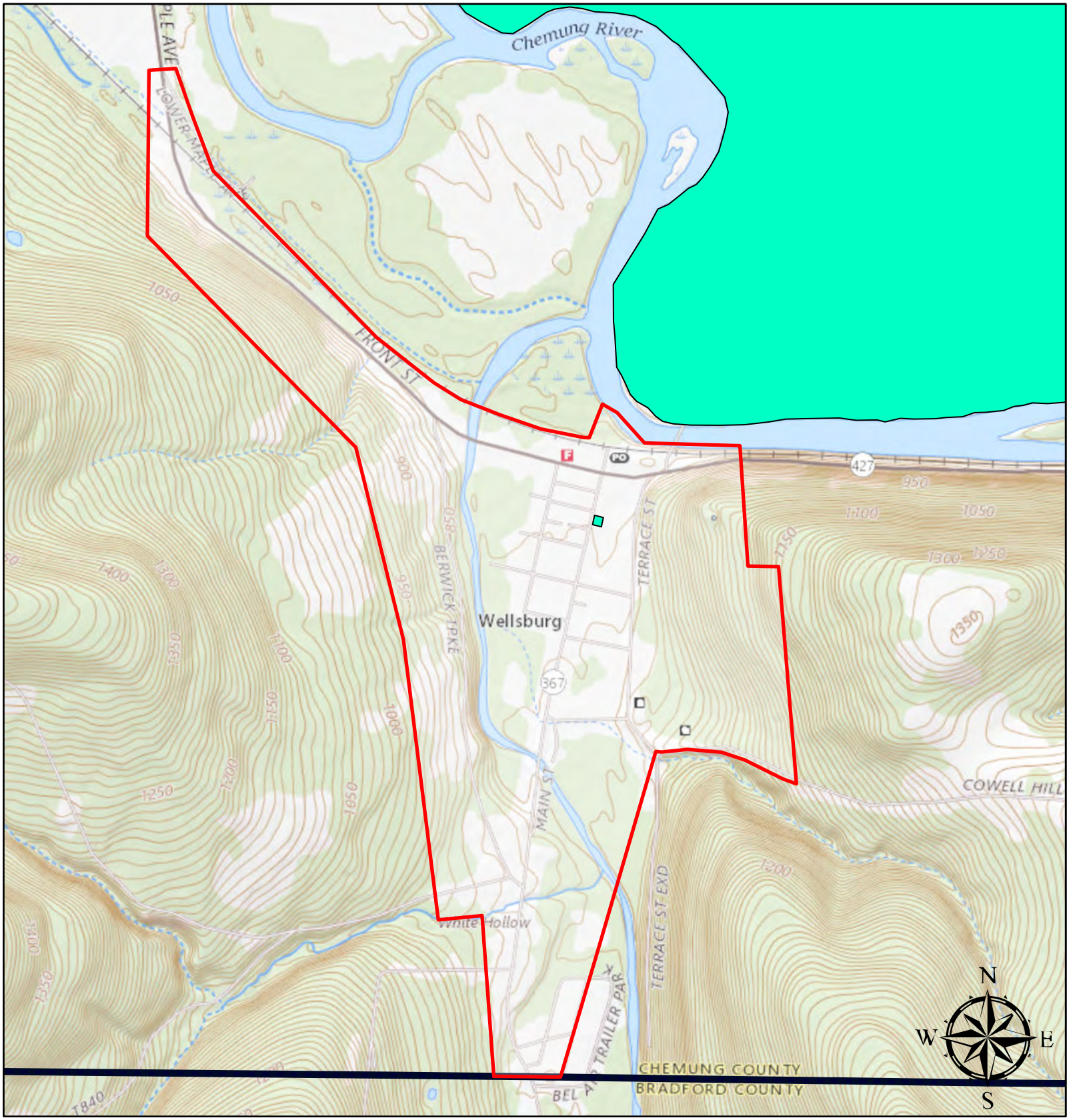


Figure 5. Wellsburg SHPO Map

NYS National Register of Historic Places
Site Area

0 1,500 3,000 Feet

5
2678.009

HUNT ENGINEERS | ARCHITECTS | SURVEYORS

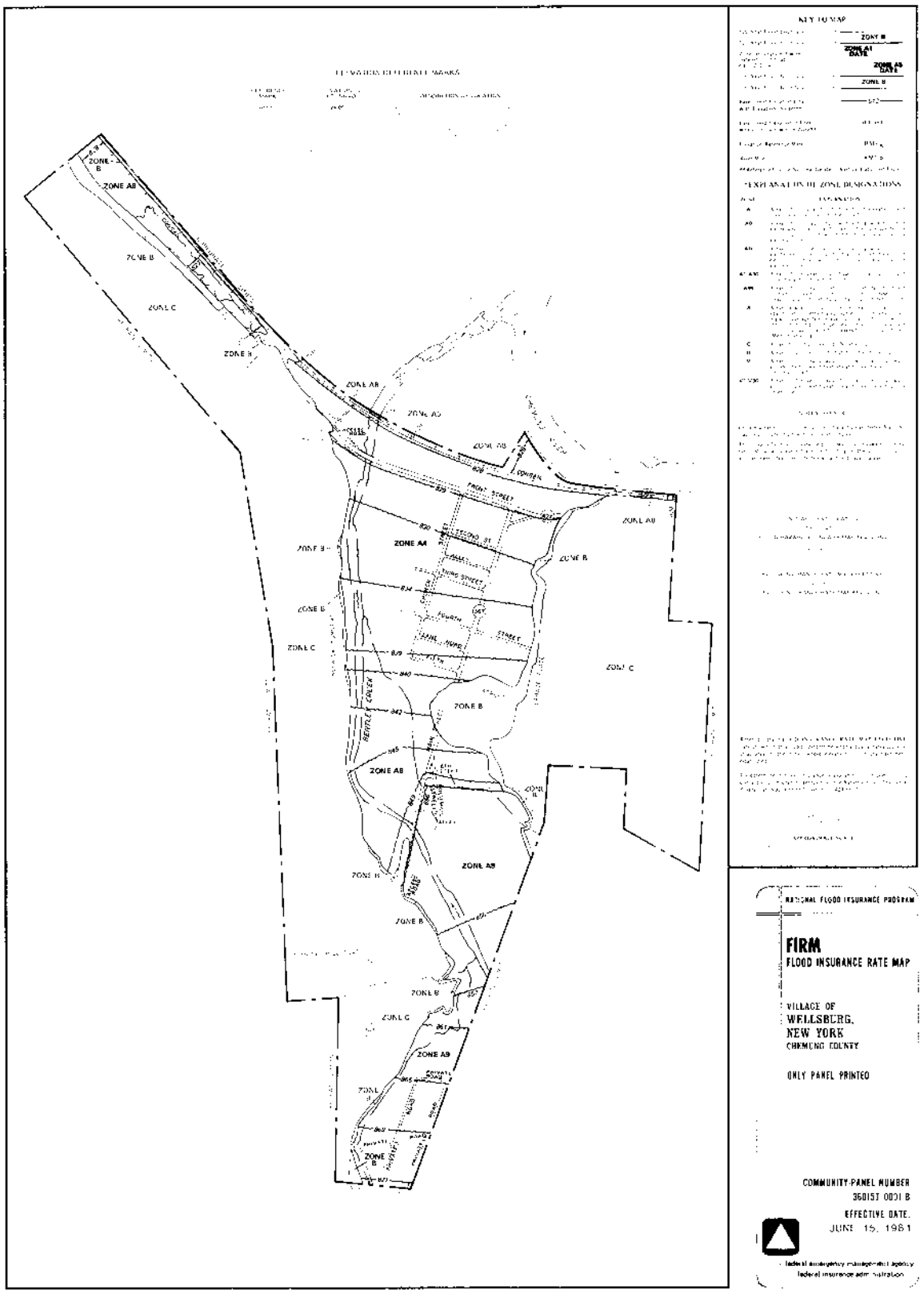


Figure 6. Wellsburg FEMA Map

WELLSBURG MUNICIPAL WATER STUDY

VILLAGE OF WELLSBURG

CHEMUNG COUNTY, NEW YORK

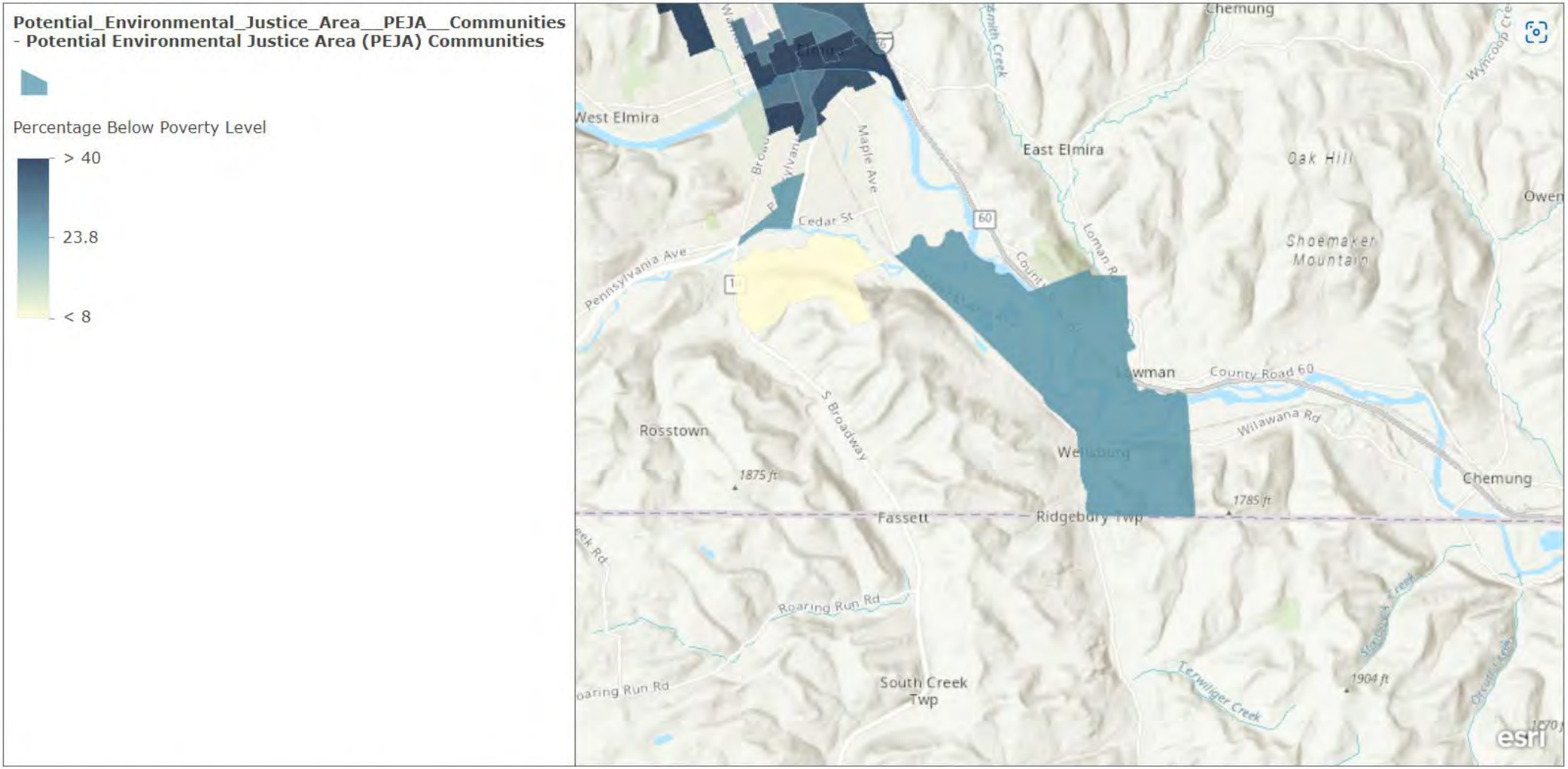
6

2678.009

0 10 20 Feet

HUNT ENGINEERS | ARCHITECTS | SURVEYORS

Environmental Justice Area Map



Esri, NASA, NGA, USGS | data.pa.gov, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA | Data collection: US Census Bureau Data analysis: David E. Witt, New York State Department of Environmental Conservation, Office of Environmental Justice (OEJ) Funding: NYS Taxpayers

APPENDIX C
NY Leak Detection Report

NYLD **Infrastructure**

NEW YORK LEAK DETECTION, INC.
PO Box 269 Jamesville, NY 13078
315-469-4601 info@nyld.com

Field Report - Leak Detection

Date(s) on site: 3/30 & 3/31/20

Technician: Sonny Kentile **Other Technicians on site:**

Customer: Hunt Engineers

Site Address: 3663 Sixth Street Wellsburg, NY

Contact Person: May Sharif **Phone:** 607-229-9759

Scope of Work: Leak Detection Survey – Leak testing for water distribution system in Wellsburg, NY. The project involves surveying all of the Wellsburg water distribution infrastructure downstream of the Elmira Water Board Metering Station. A map of the water system within the village limits (excludes the conveyance line from the Elmira metering station) is attached. By scaling it appears the system is approximately 5-6 miles of pipeline to investigate. Additionally, are the 8 inch and 4-inch lines also AC, DI or CI.

Type of Service: mark all that apply

☐ *Leak Detection*	☒ Comprehensive *Leak Survey*	☐ *Pressurized Pipe Inspection*
☐ *Infrastructure Assessment*	☐ *Utility Location/GPR*	☐ *Utility Mapping/AutoCAD*
☐ *EM Survey*	☐ *Video Inspection*	☐ *Valve Exercising*

Type of Equipment Used: mark all that apply

☐ *Profiler EMP 400*	☒ *RD8000 Pipe & Cable Locator*	☐ MetroTech vLocPro2
☒ *LC2500 Leak Correlator*	☐ *Noggin 250* mHz	☐ PosiTector UTG G3
☒ *S-30 Surveyor*	☐ Noggin 500 mHz	☐ *Video Inspection Camera*
☐ *Sonde / Locatable Rodder*	☐ Conquest 1000 mHz	☐ *Helium #* *Bottles*
☐ *Leica Robotic Total Station*	☐ *Leica RTK GPS*	☐ *JD7 Investigator*
☐ *Valve Maintenance Trailer*	☐ *Thermal Imaging Camera*	☐ *ZCorr Data Loggers*

Marking Used: mark all that apply

☒ *Paint*	☐ *Flags*	☐ *Chalk/Marker*
☐ *Tape*	☐ *Updated Onsite Mapping*	☐ *Other* _____

Site Access/Safety Training: N/A **Expiration Date:** N/A

NYLD **Infrastructure**

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315-469-4601 info@nyld.com

Field Report - Leak Detection

Ground Cover/Weather Conditions: Asphalt, Soil & Concrete / 40's & Periods of Heavy Rain

Instructions from Onsite Contact: Preform a thorough leak detection survey of the entire system pinpointing any leaks present (South of pumphouse).

Information Transfer:

☒ *Information relayed on site to:*

Rick (Wellsburg)

In addition to this field report, mark all that apply:

☐ *Hand drawn sketch*
☐ *Maps updated onsite*
☐ *Photographs*
☐ *Surveyed by others*
☐ *Surveyed and AutoCAD Mapping by NYLD*

Notes/Testing Results:

This report is back up to information relayed and marked on site at time of service. It is for informational purposes only.

Utilizing the S-30 Surveyor scanned all available and accessible contact points within the system for leak signal as needed. This included but was not limited to: Hydrants, in line main valves and where needed, service valves. The LC2500 Leak Correlator was used in determining leak locations coupled with acoustic testing.

Actions:
- ✓ Listened to all available contact points throughout the system
- ✓ Ran multiple correlations in areas of interest provided both from gathered information via on site contacts and also areas with leak signal
- ✓ Tested continuity in multiple locations on the system

Results:
- ✓ Correlation results placed leak location near meter pit for 233 W Fifth Street
- ✓ No other acoustic leak signal was found to be present throughout the system during the survey

Recommendations:
- ✓ Replace meter at booster station in order to compare Elmira water department numbers to usage numbers for Village of Wellsburg (after recovery from main break located by Rick & Mike on 3/29/20)

NYLD Infrastructure

NEW YORK LEAK DETECTION, INC.
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Field Report - Leak Detection

Provided Mapping

NYLD **Infrastructure**

NEW YORK LEAK DETECTION, INC.
PO Box 269 Jamesville, NY 13078
315-469-4601 info@nyld.com

Field Report - Leak Detection

LIST OF LEAKS

Date: 3/30/20

Technician: Sonny Kentile

Customer: Hunt Engineers

Leak #	Leak Type*	Address/Location	GPD.(gallons per day)	Comments
1	Service	233 W Fifth Street	7,500	See Diagram
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

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315-469-4601 info@nyld.com

Field Report - Leak Detection

LEAK LOCATION DIAGRAM

(Drawings Not To Scale)

Date: 3/31/20

Technician: Sonny Kentile

Customer: Hunt Engineers

Leak #: 1

Street Address: 233 W Fifth Street

Investigation of Leak:

Sonic	X
Surfaced Water	
Other	

Estimation of Leak: (GPD)

7,500

Leak Detected At:

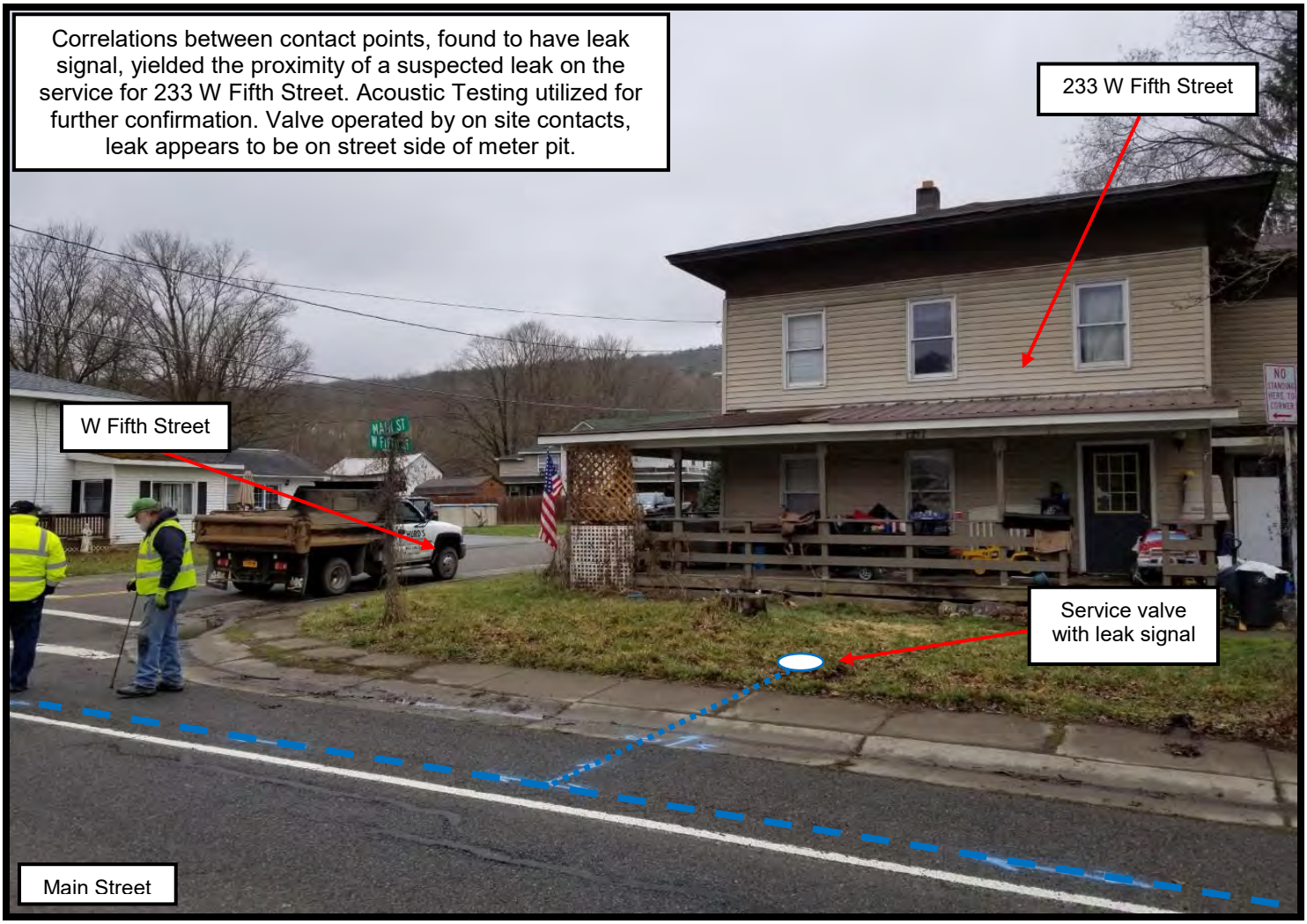
Main Valve	X
Curb Valve	X
Meter Box	
Hydrant	X
Other	

Leak Appears To Be On:

Main	
Service	X
Service Street Side	X
Service House Side	
Joint Connection	
Hydrant	
Valve	

Cover:

Concrete	X
Asphalt	X
Brick	
Gravel	
Soil	X
Other	



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Field Report - Leak Detection

Subsurface Limitations

Leak detection is the art and science of using non-intrusive methods to search for, find and mark out leak locations on pressurized pipelines. There are innumerable variables involved in locating underground utilities, such as topography, size and complexity of job site, depth and proximity of buried utilities, above ground obstructions, short turnaround schedules, changes in the scope of work, lack of (or outdated) blueprints and adverse weather conditions.

New York Leak Detection, Inc. (NYLD) has made a substantial financial investment in crossover technologies and training to meet our clients' needs when locating and marking leak locations. However, due to unpredictable factors that may affect the results, NYLD makes no guarantee, expressed or implied, with respect to the completeness or accuracy of the information provided. Any use or reliance on the information or opinion is at the risk of the user and NYLD shall not be liable for any damage or injury arising out of the use or misuse of the information provided.

NYLD strives to provide the highest quality leak detection services possible with the technical expertise of our field specialists and state-of-the-art equipment used. Every effort is made to provide our clients with the most accurate information possible without adverse consequences.

NYLD makes no guarantee that all leaks will be detected. NYLD is not responsible for detecting leaks that normally cannot be detected by the methods employed or that cannot be detected because of site conditions. NYLD is not responsible for maintaining mark-outs after leaving the work area. Mark-outs made in inclement weather and in high traffic areas may not last. Surveyor assumes responsibility of picking up data on site.

APPENDIX D
Tank Inspection Reports

UNDERWATER SOLUTIONS INC

SERVICES COMPLETED:	Inspection and Cleaning
CUSTOMER NAME:	Hunt Engineers-Architects-Surveyors
SITE ADDRESS:	3557 Comfort Hill Road Wellsburg, NY 14894
TANK NAME:	Comfort Hill Tank
SIZE:	203,000 Gallon
TYPE OF TANK:	Welded Steel Water Storage Tank
YEAR BUILT:	1964
DIMENSIONS:	211’ H x 38’ D

INSPECTION AND INTERIOR CLEANING (SEDIMENT REMOVAL) OF THE COMFORT HILL ROAD 203,000-GALLON WELDED STEEL WATER STORAGE TANK, LOCATED IN THE VILLAGE OF WELLSBURG, NEW YORK, PROJECT NUMBER 2678.009

HUNT-ENGINEERS-ARCHITECTS-SURVEYORS HORSEHEADS, NEW YORK

APRIL 13, 2020

SCOPE:

On April 13, 2020, Underwater Solutions Inc. conducted an inspection of the Comfort Hill Road 203,000-gallon welded steel potable water storage tank, located in The Village of Wellsburg, New York, project number 2678.009 to provide information regarding the overall condition and integrity of this structure and removed the sediment accumulation found on the floor.

EXTERIOR INSPECTION:

The entire exterior of this water storage tank was inspected, to include walls and coating, foundation, manway, ladder and safety cage, overflow, roof, vent and hatch.

Walls and Coating

The exterior steel wall panels and associated welds were inspected and appeared sound, however a wood dowel was found inserted into an area of steel fatigue (pitting) that has formed within the second wall panel above the tank base on the southernmost side of the tank.

A patch was observed adhered to the wall where the wood dowel is inserted into the wall, preventing an inspection of the wall panel at the wood dowel. No obvious leakage was occurring at the location of the wood dowel at the time of this inspection. The penetration in the wall panel where the wood dowel is inserted appeared to have occurred from within the tank. (See the interior walls and coating section).

The protective coating on the exterior wall surfaces appeared to have been applied uniformly, however was found having only fair adhesion value and has nearly expired at this time.

Adhesion loss (blistering, lifting and peeling) of the coating was observed throughout approximately 25% of the exterior wall surfaces, resulting in exposure of the primary coating, while exposure of the underlying steel was observed within approximately 25% of the wall surfaces showing adhesion loss of the protective coating at this time. No obvious fatigue (pitting) of the steel was evident within these ¼-1" diameter areas of steel exposure, rather mild corrosion exist at this time.

The average dry film thickness of the protective coating system applied to the exterior welded steel wall panels was measured during this inspection. The dry film thickness of the coating system applied to the exterior wall surfaces was found as follows (beginning at ground level):

Row	***Range of Mil Thickness***
1	3.95-7.7 mils
2	1.6-4.19 mils
3	.48-2.62 mils
4	2.52-6.4 mils

The American Water Works Association (AWWA) recommends a dry film thickness of 7.0 to 10.0 mils of coating film thickness be applied to the exterior surfaces of welded steel potable water storage tanks to provide adequate protection for welded steel structures.

A mild to moderate, non-uniform accumulation of mildew throughout the exterior walls has declined the overall aesthetics.

RECOMMENDATION(S): It is our recommendation to complete the interior rehabilitation prior to completing an exterior rehabilitation, allowing all areas of steel fatigue (pitting) found throughout the interior walls to be re-surfaced/sealed.

It is our recommendation to pressure-wash the exterior wall surfaces at 4,500 P.S.I. using an oscillating tip to remove the accumulated mildew from these surfaces and to remove any and all coating that has lost adhesion from the tank.

It is also our recommendation to re-coat the exterior walls using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior welded steel wall surfaces.

Ultrasonic Thickness Testing was completed at the time of this inspection. These measurements were taken in accessible locations and were taken in groups of (5) per panel, beginning at the ground and ending at the top panel.

Row	***Metal Thickness (in)***
1	.284, .280, .270, .240, .276
2	.244, .246, .263, .260, .249
3	.247, .264, .260, .265, .254
4	.211, .302, .314, .318, .317

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

At the time of this inspection, exterior lead content samples were obtained. The results from these samples are attached herein.

Foundation

The concrete foundation is located below grade and was found to be covered with moss and vegetation, preventing an inspection of these surfaces.

RECOMMENDATION(S): It is our recommendation that the next time the foundation is exposed, to complete an inspection of the concrete to determine the integrity of these structures.

Manway

One, 24” by 18” inside diameter steel manway penetrates the lowest wall panel on the southernmost side of the tank, located approximately 18” above the tank base and is securely installed, however mild leakage was observed throughout the base of the manway at the time of this inspection.

A series of Dry Film Thickness measurements were obtained on the manway exterior. These measurements provided a coating film thickness range from 6.1-9.1 mils and appeared to have been applied uniformly, meets the AWWA’s minimum recommendations and was found having mostly good adhesion value at this time.

Secondary coating adhesion loss was observed throughout approximately 15% of these surfaces, resulting in exposure of the primary coating. Coating loss throughout approximately 10% of these surfaces has resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

A non-uniform accumulation of moss and mildew throughout the manway has declined the overall aesthetics.

RECOMMENDATION(S): It would be our recommendation to complete the interior rehabilitation prior to completing the exterior rehabilitation. Upon completing the interior rehabilitation, we recommend utilizing a replacement NSF-61 EPDM rubber gasket to seal the manway in an effort to prevent leakage.

It is our recommendation to pressure-wash the exterior surfaces of the manway at 4,500 P.S.I. using an oscillating tip to remove the accumulated moss and mildew from these surfaces and to remove any and all coating that has lost adhesion.

It is also our recommendation to re-coat the exterior surfaces of the manway using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior surfaces of the manway.

A series of (5) Ultrasonic Thickness measurements were obtained on the manway at this time and were found to be:

Metal Thickness (in)
.311, .300, .303, .257, .309

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

Ladder and Safety Cage

An 18" wide welded steel ladder having rungs spaced 11" apart and a bolted steel safety cage extend from 97" above the ground up to the roof and is supported to the tank wall with three sets of welded and bolted standoffs, providing safe access and egress to and from the roof.

The protective coating on the steel ladder and safety cage appeared to have been applied uniformly and was found having mostly good adhesion value at this time. Adhesion loss of the protective coating was observed throughout approximately 10% of the ladder and throughout less than 5% of the safety cage, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of either the ladder or safety cage were evident within these areas of steel exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to pressure-wash the ladder and safety cage surfaces at 4,500 P.S.I. using an oscillating tip to remove any and all coating that has lost adhesion.

It is also our recommendation to re-coat the ladder and safety cage using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the steel ladder and safety cage.

Overflow

A 4" inside diameter steel overflow pipe penetrates the top wall panel on the southernmost side of the tank, located approximately 16" below the junction of where the roof and walls meet.

This steel pipe extends away from the tank approximately 12" and terminates. The outlet end of this pipe was free of obvious obstructions, and a metal (large mesh) screen was found securely installed at the outlet end of this overflow pipe at this time.

A series of Dry Film Thickness measurements were obtained on the overflow. These measurements provided a coating film thickness range from 1.96-4.55 mils and appeared to have been applied uniformly. This protective coating is below the AWWA's minimum recommendations yet was found having mostly good adhesion value at this time. Adhesion loss of the protective coating was observed throughout less than 5% of these surfaces, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to modify the overflow pipe so that the outlet end of the pipe is located and terminates between 12-24" above a splash plate or engineered rip-rap to protect against erosion during periods of overflow. The outlet end of the pipe should be directed down and or be protected to prevent rainwater run-off from entering the pipe.

It is also our recommendations to install a non-corrodible metal screen having 24-mesh within the outlet end of the pipe to prevent access to the interior of the pipe/tank and to install a duckbill (rubber check valve) at the end of this pipe to provide protection for the debris screen. Upon modifying the overflow pipe, we recommend coating the pipe using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to provide good protection for these steel surfaces.

Roof

The steel roof panels, and associated welds were inspected and was found appearing sound and free of obvious fatigue or failures at this time.

A series of Dry Film Thickness measurements were obtained on the roof surfaces. These measurements provided a coating film thickness range from 1.46-5.3 mils and appeared to have been applied uniformly. This protective coating is below the AWWA's minimum recommendations and no longer provides protection for the steel panels and associated welds.

Decline (thinning) of the secondary coating film thickness has resulted in exposure of the primary coating throughout approximately 40% of these surfaces, while decline and adhesion loss of the primary coating has resulted in exposure of the underlying steel throughout these areas showing exposed primary coating.

No obvious fatigue (pitting) of the steel panels or deterioration of the welds was evident within these areas of steel exposure, rather mild corrosion exists at this time.

A mild, non-uniform accumulation of mildew throughout the roof has declined the overall aesthetics.

A series of (9) Ultrasonic Thickness measurements were obtained on the roof at this time and were found to be:

Metal Thickness (in)
.255, .131, .252, .210, .251, .252, .233, .265, .253

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

RECOMMENDATION(S): It is our recommendation to pressure-wash the exterior roof surfaces at 4,500 P.S.I. using an oscillating tip to remove to remove any and all coating that has lost adhesion.

It is also our recommendation to re-coat the exterior roof surfaces using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior welded steel roof surfaces.

Vent

A steel vent assembly is located within the center of the roof, having a 16" inside diameter and stands 19" tall.

A 32" outside diameter steel cap and a perforated steel screen equivalent to approximately 2-mesh was found securely installed over the vent penetration in the roof at this time.

A series of Dry Film Thickness measurements were obtained on the vent cap. These measurements provided a coating film thickness range from 2.01-3.22 mils and appeared to have been applied uniformly, however was found having only fair adhesion value at this time.

A series of Dry Film Thickness measurements were obtained on the vent riser pipe. These measurements provided a coating film thickness range from 6.2-11.3 mils and appeared to have been applied uniformly, however was found having only fair adhesion value at this time.

Decline (tinning) of the coating film thickness has resulted in surface corrosion to show through the coating throughout less than 5% of these surfaces, while adhesion loss (lifting/peeling) of the coating has resulted in exposure of the underlying steel throughout approximately 40% of these surfaces. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

A series of (5) Ultrasonic Thickness measurements were obtained on the vent cap at this time and were found to be:

Metal Thickness (in)
.244, .257, .247, .247, .249

A series of (5) Ultrasonic Thickness measurements were obtained on the vent riser pipe at this time and were found to be:

Metal Thickness (in)
.343, .370, .372, .380, .387

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

RECOMMENDATION(S): It is our recommendation to unbolt and remove the vent cap and to place a non-corrodible metal screen having 24-mesh over the existing screen and vent penetration in the roof. We recommend then reinstalling and securing the vent cap in an effort to prevent access to the interior of the tank.

It is also our recommendation to re-coat the exterior of the vent assembly using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior surfaces of the vent assembly.

Hatch

One, 24" inside diameter steel hatch provides access to the interior of the tank through the roof and is located on the southernmost side of the tank.

This hatch is in good working condition and was found secured with a lock, preventing unwanted access.

A series of Dry Film Thickness measurements were obtained on the steel hatch exterior. These measurements provided a coating film thickness range from 3.34-5.2 mils and appeared to have been applied uniformly. This protective coating is below the AWWA's minimum recommendations and was found having mostly good adhesion value at this time. Adhesion loss of the protective coating was observed throughout approximately 20% of these surfaces, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these isolated areas of exposure, rather mild corrosion exists at this time.

A series of (5) Ultrasonic Thickness measurements were obtained on steel hatch cover at this time and were found to be:

Metal Thickness (in)
.194, .182, .180, .197, .192

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

RECOMMENDATION(S): It is our recommendation to re-coat the exterior of the hatch using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior surfaces of the hatch.

The protective coating on the interior of this steel hatch cover and steel trunk appeared to have been applied uniformly and was found having mostly good adhesion value at this time.

Adhesion loss of the protective coating was observed throughout approximately 20% of the interior of the hatch cover and trunk, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these isolated areas of exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to re-coat the interior of the hatch cover and trunk using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the interior surfaces of the hatch cover and trunk.

INTERIOR INSPECTION:

The entire interior of this water storage tank was inspected, to include sediment accumulations, floor, manway, piping, walls and coating, overhead, overflow and aesthetic water quality.

Sediment Accumulations

A uniform layer of accumulated precipitate was found throughout the floor, ranging from 1/16-1/4" in depth.

Upon completing this inspection, all precipitate was removed (vacuumed) from the floor.

Floor

After removing all accumulated precipitate, the steel floor panels, and associated welds were inspected and appeared sound and free of obvious fatigue or failures.

A series of Dry Film Thickness measurements were obtained on the floor surfaces. These measurements provided a coating film thickness range from 8.2-15.0 mils. These non-uniform measurements meet the AWWA's minimum recommendations yet were found having poor adhesion value at this time.

Adhesion loss (cracking/lifting) of the protective coating was observed throughout approximately 60% of these surfaces, resulting in exposure of the underlying steel. Moderate to heavy corrosion exists within these 1/16-5" diameter areas of steel exposure, and fatigue (pitting) of the steel having depths ranging from barely detectable levels up to 1/16" deep was evident within approximately 20% of the floor surfaces showing steel exposure at this time.

An additional protective coating applied to the floor was observed throughout less than 5% of the floor surfaces that was found having good adhesion value at this time.

Mild staining remains throughout the floor due to the accumulation of precipitate.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior floor surfaces to white or near white metal and to then re-evaluate these surfaces to conclude the overall extent of steel fatigue/deterioration and the most suitable means to re-surface the areas of steel fatigue.

It is also our recommendation to re-coat the interior floor surfaces using a 100% solids protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent further steel fatigue/deterioration and to provide good protection for the steel floor panels and associated welds.

Manway

One, 24" by 18" inside diameter steel manway penetrates the lowest wall panel on the southernmost side of the tank, located approximately 18" above the floor and appeared to be securely installed. Although mild leakage was observed at the manway base on the exterior of the tank, no obvious leakage could be detected from within the tank.

A series of Dry Film Thickness measurements were obtained on the steel manway lid and trunk. These measurements provided a coating film thickness range from 14.8-20.4 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having fair adhesion value at this time. Adhesion loss (blistering) of the coating was observed throughout approximately 30% of these surfaces, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild to moderate corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to re-coat the interior surfaces of the manway using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to provide good protection for the interior steel surfaces of the manway assembly.

It would be our recommendation that upon completing the interior rehabilitation that a replacement NSF-61 EPDM rubber gasket be installed to seal the manway in an effort to prevent leakage.

Piping

One pipe penetrates the floor of this potable water storage tank.

The influent/effluent pipe penetrates the floor approximately 36" in from the wall on the southernmost side of the tank, having an 8" inside diameter and is flush with the floor.

An 8" inside diameter by 6" tall removable riser is installed above this pipe, serving as a silt stop. This pipe was free of obvious obstructions and was without flow at this time.

A series of Dry Film Thickness measurements were obtained on the steel removable silt stop. These measurements provided a coating film thickness range from 23.0-37 mils. These non-uniform measurements were found having mostly good adhesion value at this time.

Adhesion loss (blistering) of the coating was observed throughout approximately 10% of these surfaces, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

The interior surfaces of the pipe within the floor was found having moderate corrosion throughout, however no obvious fatigue/deterioration of the interior surfaces of the pipe was evident at this time.

RECOMMENDATION(S): It is our recommendation to re-coat the interior surfaces of the pipe within the floor, including the removable silt stop using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the pipe within the floor, including the removable silt stop.

Walls and Coating

The interior walls were inspected beginning at the floor and by spiraling the circumference of the tank up to the water surface.

These steel wall panels and associated welds appeared sound, however coating loss, steel exposure and corrosion were observed throughout these surfaces at this time.

The average dry film thickness of the protective coating system applied to the interior welded steel wall panels was measured during this inspection. The dry film thickness of the coating system applied to the interior wall surfaces was found as follows (moving from South in counterclockwise order):

Row	***Range of Mil Thickness***
1	16.5-59.1 mils
2	13.5-59.1 mils
3	10.6-59 mils
4	30.5-59 mils

The American Water Works Association (AWWA) recommends a dry film thickness of 10.5 to 15.5 mils of coating film thickness be applied to the interior surfaces of welded steel potable water storage tanks to provide adequate protection for welded steel structures.

The protective coating on these steel panels and welds was found having poor adhesion value and no longer provides protection for the steel panels and associated welds.

Adhesion loss (blistering/lifting) of the protective coating was observed throughout approximately 75% of the interior wall panels and welds, resulting in exposure of the underlying steel. Mild to moderate corrosion exists within these areas of steel exposure, and fatigue (pitting) of the panels and deterioration of the welds was evident within approximately 5% of these areas of steel exposure, ranging from barely detectable levels up to 1/8" in depth.

Moderate staining exists throughout the interior walls, beginning approximately at overflow level and extends down to the floor.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior wall surfaces to white or near white metal. We recommend the re-evaluating these surfaces to conclude the overall extent of steel fatigue/deterioration and the most suitable means to re-surface the areas of steel fatigue, to include the sealing of the penetration that extends through the second wall panel above the ground on the southernmost side of the tank.

It is also our recommendation to re-coat the interior wall surfaces using a 100% solids protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent further steel fatigue/deterioration and to provide good protection for the steel wall panels and associated welds.

At the time of this inspection, interior lead content samples were obtained. The results from these samples are attached herein.

Overhead

The entire overhead was inspected from the water surface.

These steel panels and angle iron supports appeared sound, however adhesion loss of the protective coating was observed throughout these surfaces at this time.

A series of Dry Film Thickness measurements were obtained on the steel panels and angle iron supports. These measurements provided a coating film thickness range from 7.6-19.4 mils. These non-uniform measurements meet the AWWA's recommendations and were found having fair adhesion value at this time.

Adhesion (blistering/lifting) of the coating was observed throughout approximately 40% of overhead panel and angle iron support surfaces, resulting in exposure of the underlying steel.

No obvious fatigue (pitting) of the steel panels or deterioration of the angle iron supports was evident within these areas of steel exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior overhead panels and angle iron supports to white or near white metal and to re-coat the interior overhead panels and angle iron supports using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent fatigue/deterioration of the steel and to provide good protection for the overhead panels and angle iron supports.

Overflow

The overflow consists of a 4" inside diameter steel pipe that penetrates the top wall panel on the southernmost side of the tank, located approximately 16" below the junction of where the roof and walls meet. This steel pipe extends into the tank approximately 12", turns 90° up and flares out to an 8" inside diameter prior to terminating approximately 8" below the junction of where the roof and walls meet. This overflow pipe was free of obvious obstructions at the time of this inspection.

The protective coating on this steel pipe appeared to have been applied uniformly and was found having poor adhesion value at this time. Adhesion loss (blistering/lifting) of the coating was observed throughout approximately 90% of these surfaces, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild to moderate corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior overflow pipe to white or near white metal and to re-coat the pipe using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent fatigue/deterioration of the steel and to provide good protection for this steel pipe.

Aesthetic Water Quality

The aesthetic water quality was found to be good throughout this tank, allowing unlimited visibility for this inspection.

ADDITONAL REMARKS/RECOMMENDATION(S):

It is our recommendation to install an active mixer within this structure to prevent ice cap formation and to improve overall water quality.

CONCLUSION:

It is the opinion of Underwater Solutions Inc. that this welded steel potable water storage tank appeared mostly sound, however minimal leakage was occurring through the base of the manway. A penetration through the second wall panel above the ground on the southernmost side of the tank has been temporarily sealed with a wood dowel.

We recommend that a budget be prepared to rehabilitate the interior and exterior surfaces within two (2) years, as prolonged steel exposure and fatigue could lead to structural failure of this tank.

As always, we recommend that re-inspection and cleaning of all water storage facilities be performed in accordance with state and federal mandates, A.W.W.A. standards, and completed by an experienced and authorized inspection corporation.

UNDERWATER SOLUTIONS INC.
Christopher A. Cole, Project Manager

This report, the conclusions, recommendations and comments prepared by Underwater Solutions Inc. are based upon spot examination from readily accessible parts of the tank. Should latent defects or conditions which vary significantly from those described in the report be discovered at a later date, these should be brought to the attention of a qualified individual at that time. These comments and recommendations should be viewed as information to be used by the Owner in determining the proper course of action and not to replace a complete set of specifications. All repairs should be done in accordance with A.W.W.A. and/or other applicable standards.

1 *Tank Identification Plate*

2 *Wood Dowel And Patch Temporarily Sealing A Penetration In The Second Wall Panel On The Southernmost Side Of The Tank*

3 *Wood Dowel And Patch Temporarily Sealing A Penetration In The Second Wall Panel On The Southernmost Side Of The Tank*

4 *Exterior Wall Having Coating Loss, Exposed Primary Coating, Exposed Steel, Corrosion And Accumulated Mildew*

5 *Exterior Wall Having Coating Loss, Exposed Primary Coating, Exposed Steel, Corrosion And Accumulated Mildew*

6 *Exterior Wall Having Coating Loss, Exposed Primary Coating, Exposed Steel, Corrosion And Accumulated Mildew*

7 ***Exterior Wall Having Coating Loss, Exposed Primary Coating, Exposed Steel, Corrosion And Accumulated Mildew***

8 ***Exterior Wall Having Coating Loss, Exposed Primary Coating, Exposed Steel, Corrosion And Accumulated Mildew***

9 ***Exterior Wall Having Coating Loss, Exposed Primary Coating, Exposed Steel, Corrosion And Accumulated Mildew***

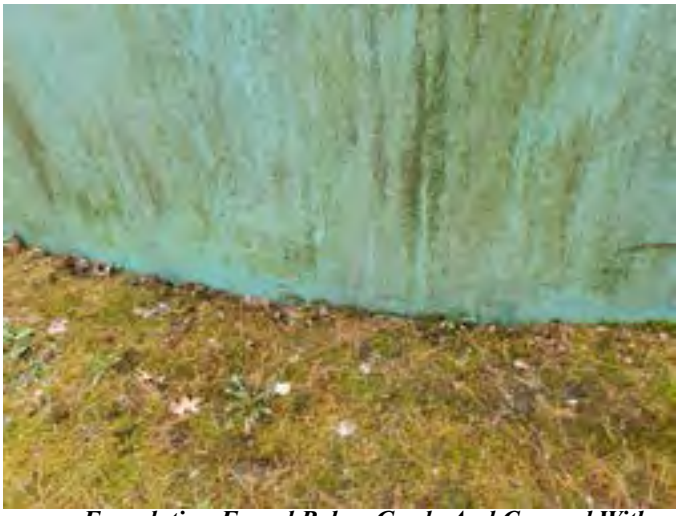
10 ***Exterior Wall Having Coating Loss, Exposed Steel, Corrosion And Accumulated Mildew***

11 ***Exterior Wall Having Coating Loss, Exposed Steel, Corrosion And Accumulated Mildew***

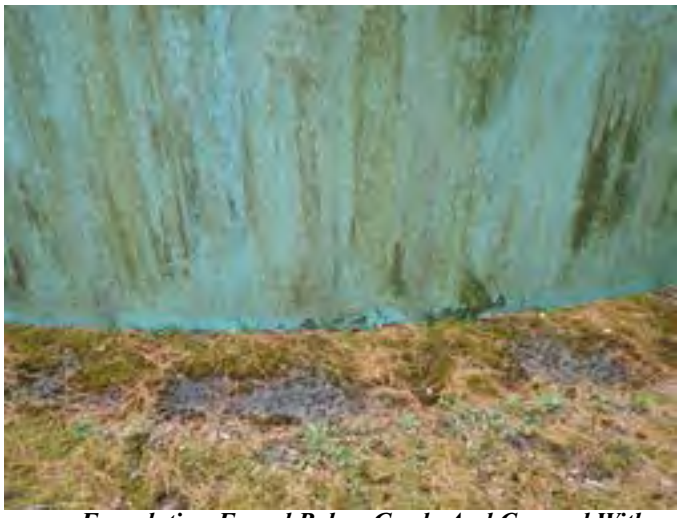
12 ***Exterior Wall Having Coating Loss, Exposed Steel, Corrosion And Accumulated Mildew***

13 ***Exterior Wall Having Coating Loss, Exposed Steel, Corrosion And Accumulated Mildew***

14 ***Exterior Wall Having Coating Loss, Exposed Steel, Corrosion And Accumulated Mildew***



15 ***Foundation Found Below Grade And Covered With Moss And Vegetation***



16 ***Foundation Found Below Grade And Covered With Moss And Vegetation***

17 ***Manway Having Coating Fatigue***

18 ***Manway Having Exposed Primary Coating***

19 ***Manway Having Exposed Steel And Corrosion***

20 ***Manway Having Mild Leakage At Its Base***

21 ***Ladder And Safety Cage Having Coating Loss, Exposed Steel And Corrosion***

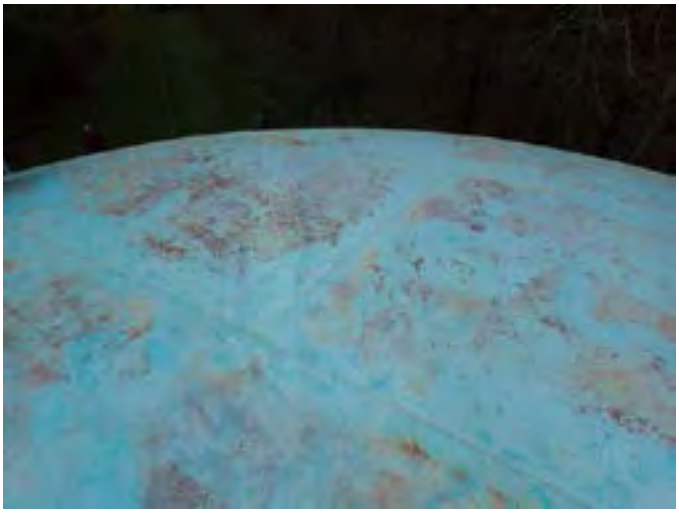
22 ***Ladder And Safety Cage Having Coating Loss, Exposed Steel And Corrosion***

23 ***Overflow Pipe Having Coating Loss, Exposed Steel And Corrosion***

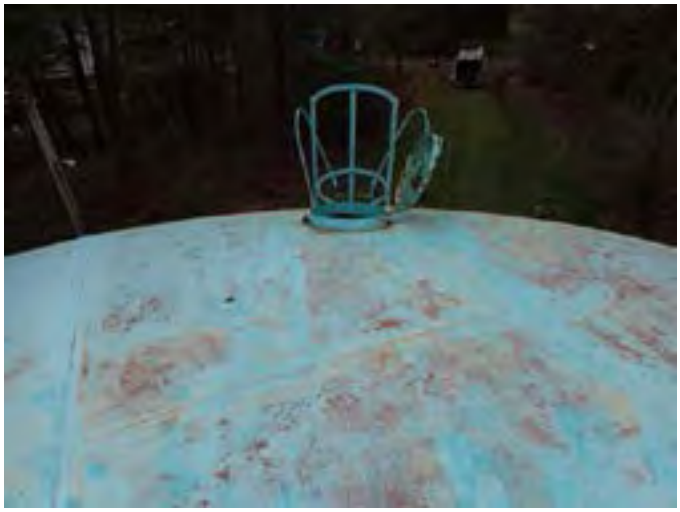
24 ***Unobstructed And Screened Overflow Pipe***

25 ***Roof Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

26 ***Roof Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***



27 ***Roof Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***



28 ***Roof Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

29 ***Roof Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

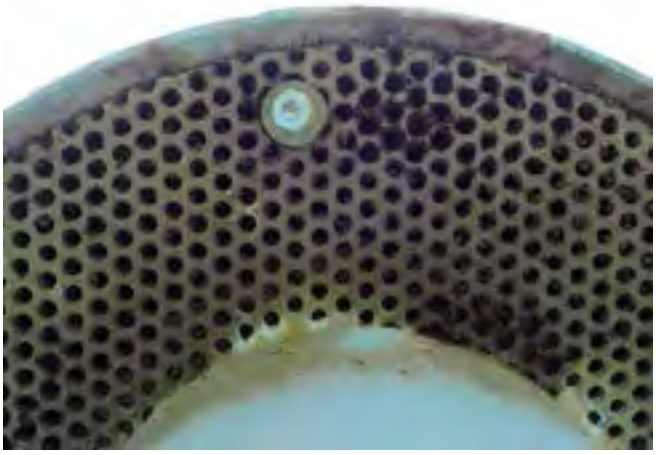
30 ***Roof Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

31 ***Vent Assembly Having Coating Loss, Exposed Steel And Corrosion***

32 ***Perforated Steel Vent***

33 ***Perforated Steel Vent***

34 ***Perforated Steel Vent***

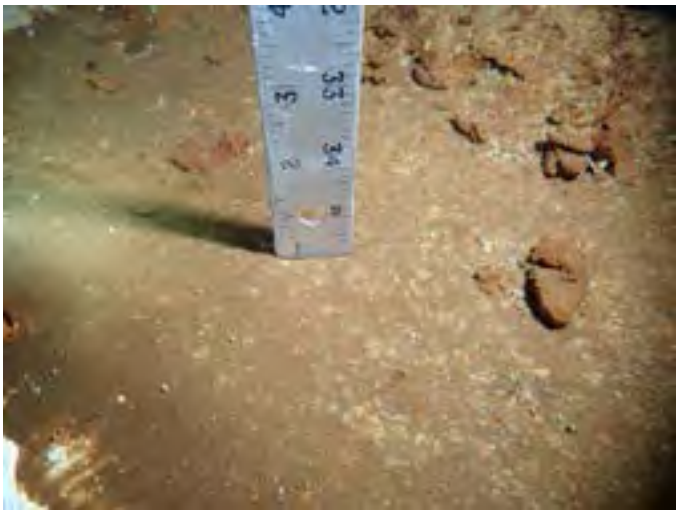


35 ***Perforated Steel Vent***

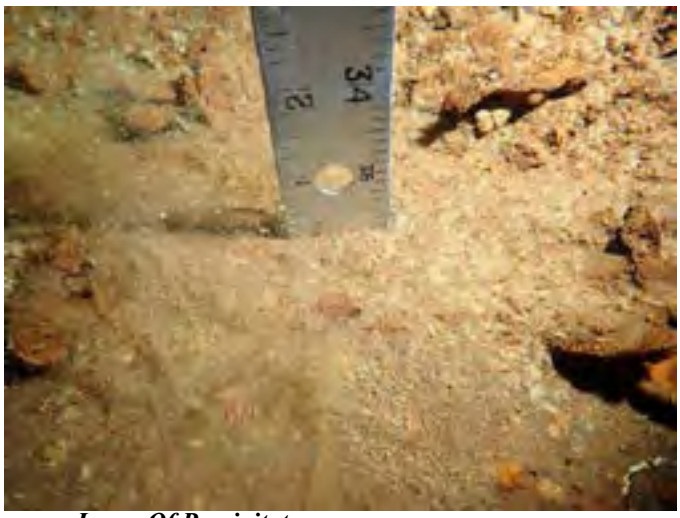
36 ***Interior Of The Hatch Cover Having Exposed Steel And Corrosion***

37 ***Interior Of The Hatch Trunk Having Exposed Steel And Corrosion***

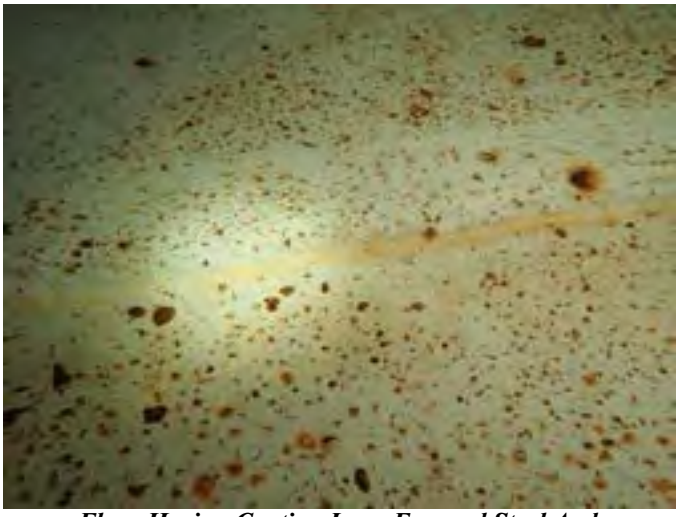
38 ***Closed Access Hatch Secured With A Lock***



39 ***Layer Of Precipitate***

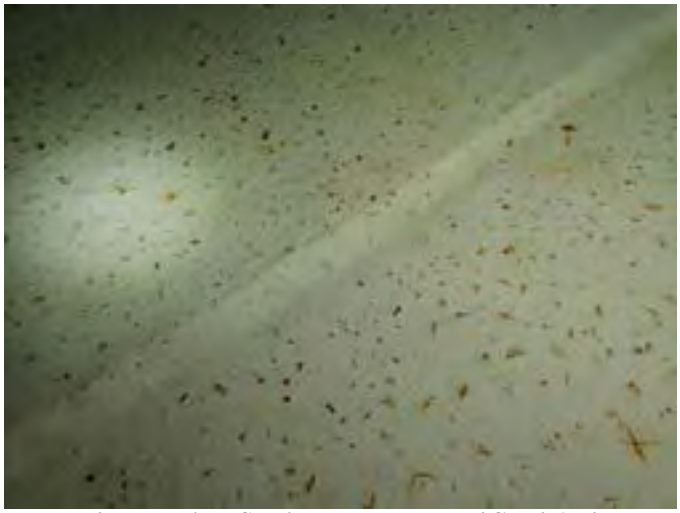


40 ***Layer Of Precipitate***



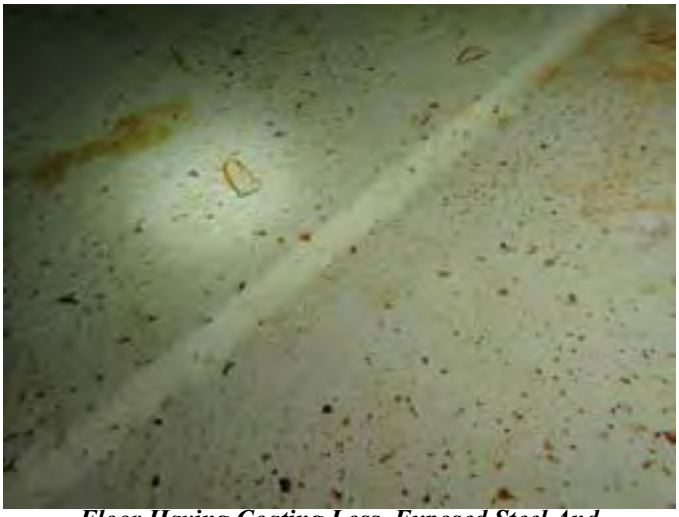
41 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

42 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

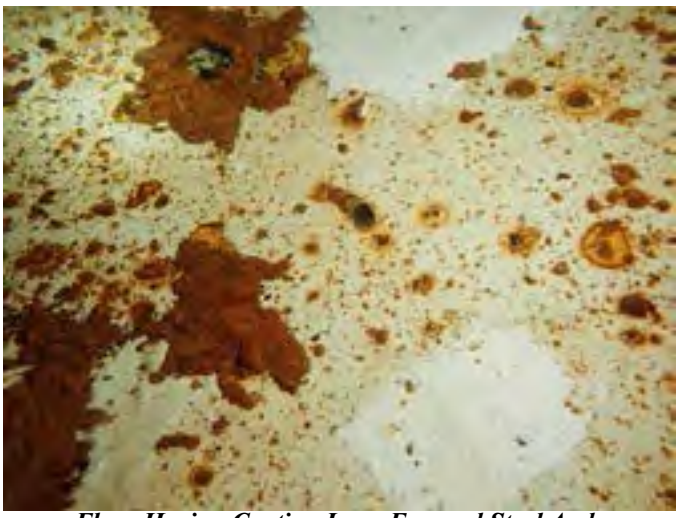


43 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

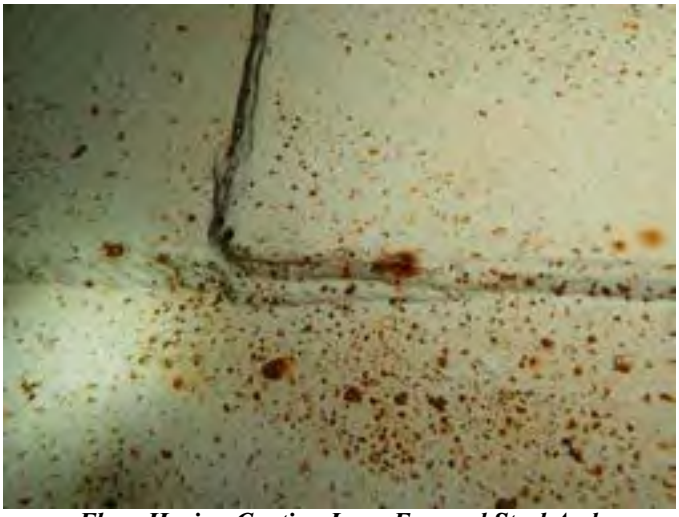
44 ***Floor Having Coating Loss, Exposed Steel And Corrosion***



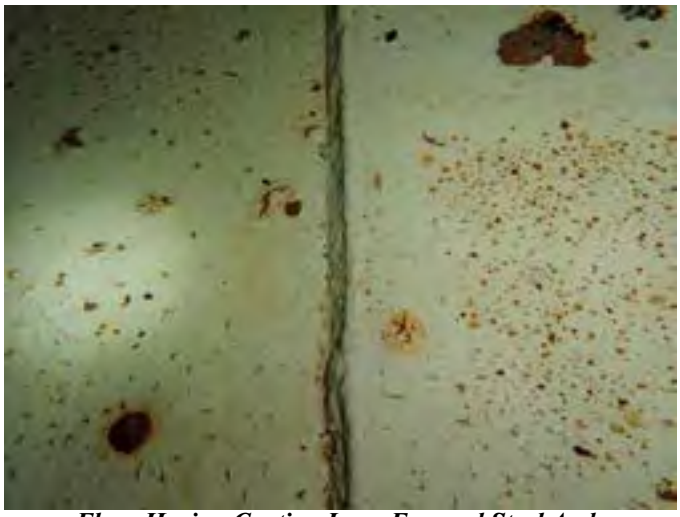
45 ***Floor Having Coating Loss, Exposed Steel And Corrosion***



46 ***Floor Having Coating Loss, Exposed Steel And Corrosion***



47 ***Floor Having Coating Loss, Exposed Steel And Corrosion***



48 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

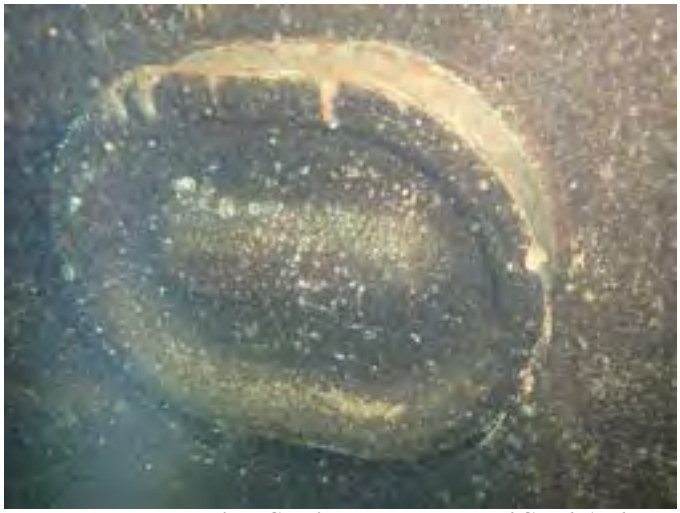
49 ***Additional Protective Coating Applied To The Tank Floor Having Good Adhesion Value***

50 ***Additional Protective Coating Applied To The Tank Floor Having Good Adhesion Value***

51 ***Additional Protective Coating Applied To The Tank Floor Having Good Adhesion Value***

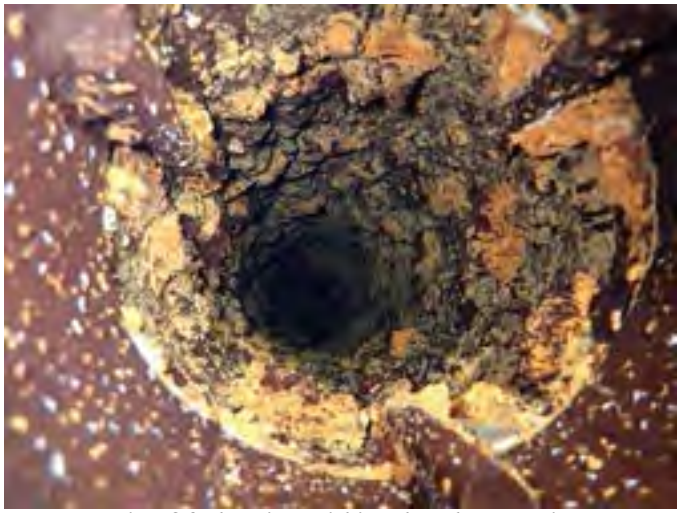
52 ***Additional Protective Coating Applied To The Tank Floor Having Good Adhesion Value***

53 ***Manway Having Coating Loss, Exposed Steel And Corrosion***

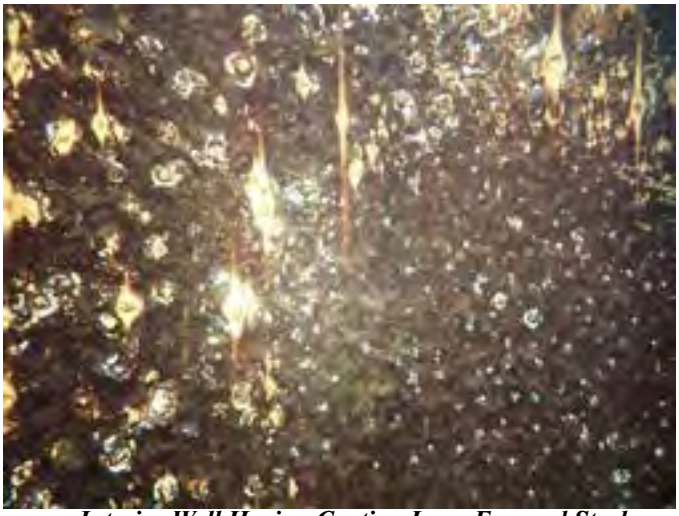


54 ***Manway Having Coating Loss, Exposed Steel And Corrosion***

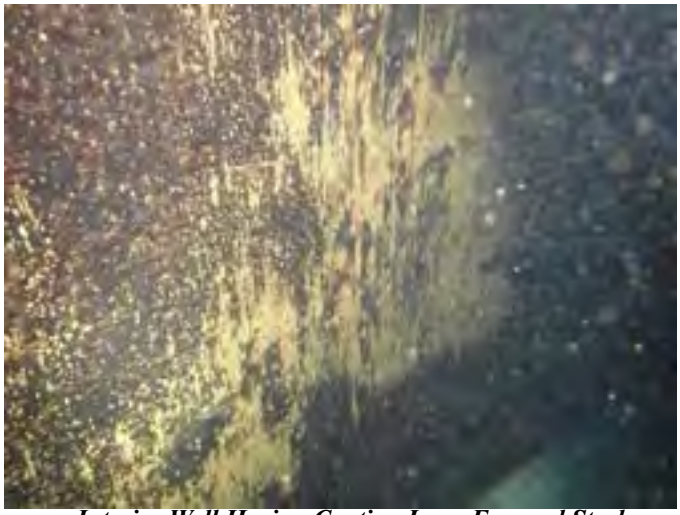
55 ***Removable Silt Stop Riser Having Exposed Steel And Corrosion***



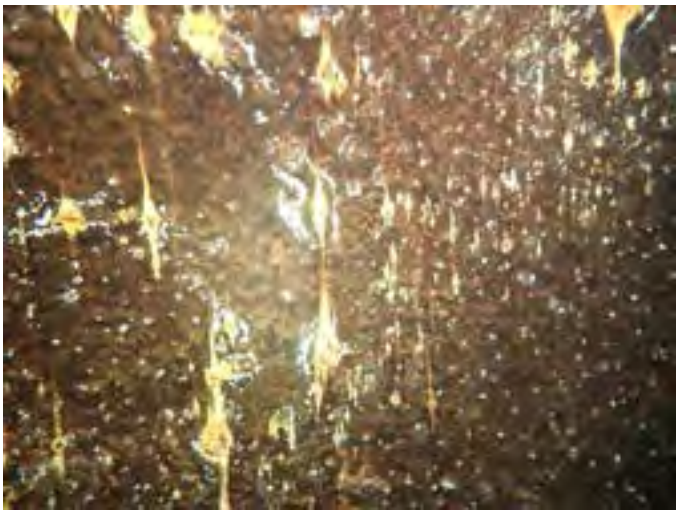
56 ***Interior Of The Pipe Within The Floor Having Corrosion***



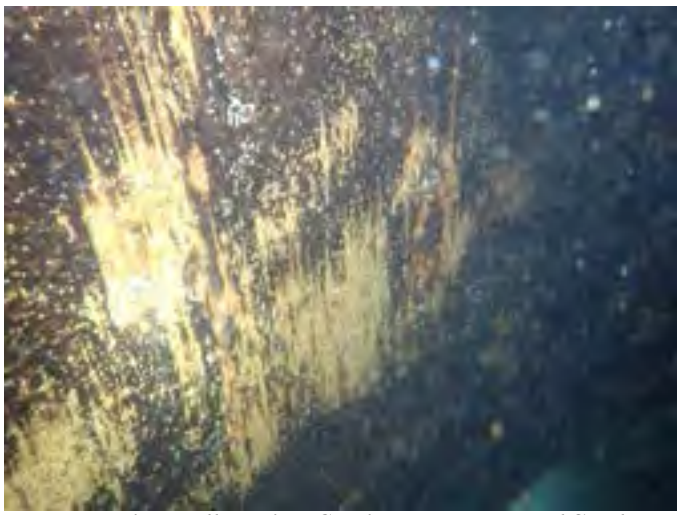
57 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***



58 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

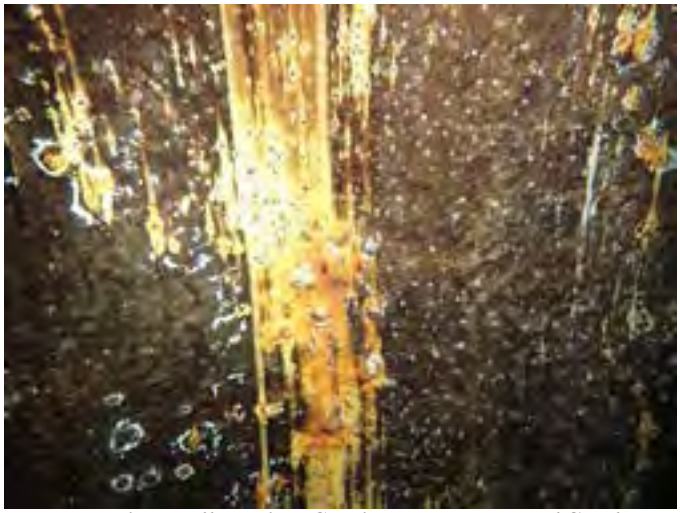


59 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***



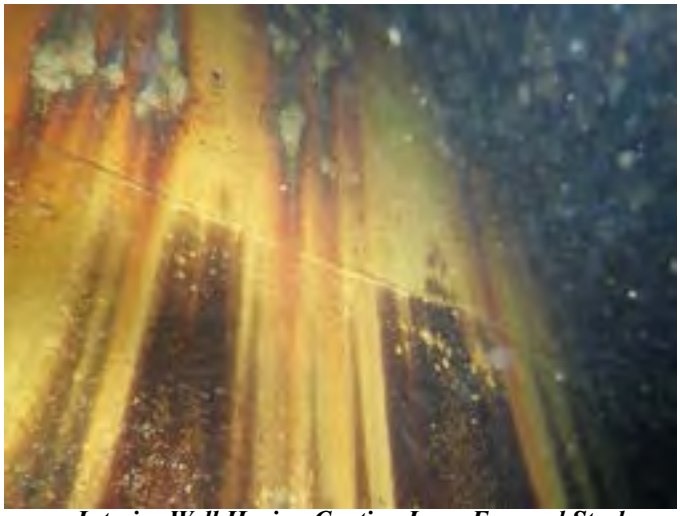
60 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

61 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***



62 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

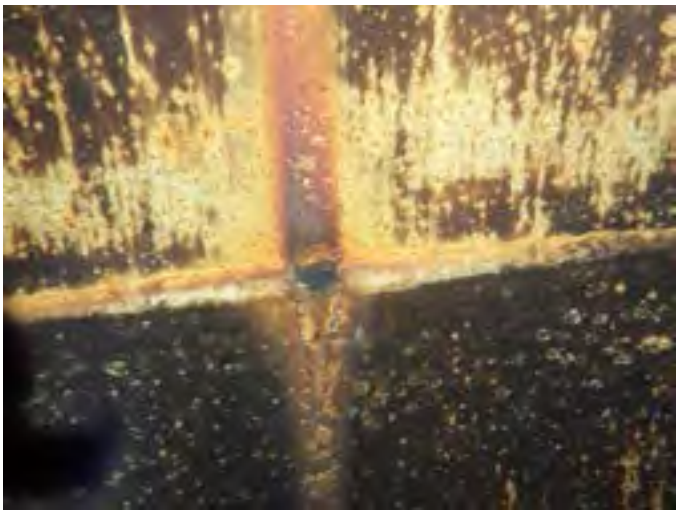
63 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***



64 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

65 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

66 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***



67 ***Wall Panel Weld Having Deterioration***

68 ***Wall Panel Having Pitting Of The Steel***

69 ***Wall Panel Having Pitting Of The Steel***

70 ***Wall Panel Having Pitting Of The Steel***

71 ***Wall Panel Having Pitting Of The Steel***

72 ***Wall Panel Having Pitting Of The Steel***

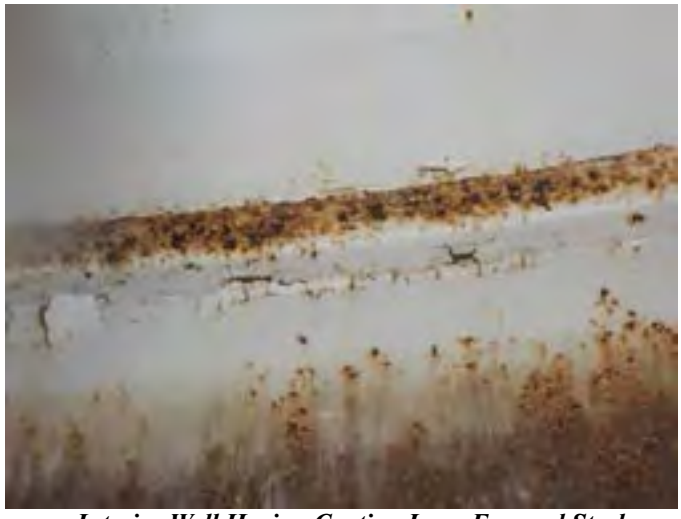
73 ***Wall Panel Having Pitting Of The Steel***

74 ***Wall Panel Having Pitting Of The Steel***

75 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

76 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

77 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***



78 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

79 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

80 ***Interior Wall Having Coating Loss, Exposed Steel And Corrosion***

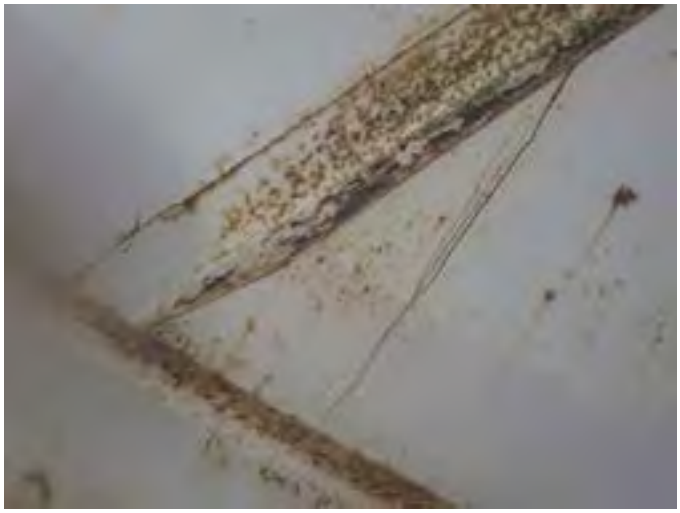
81 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***

82 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***

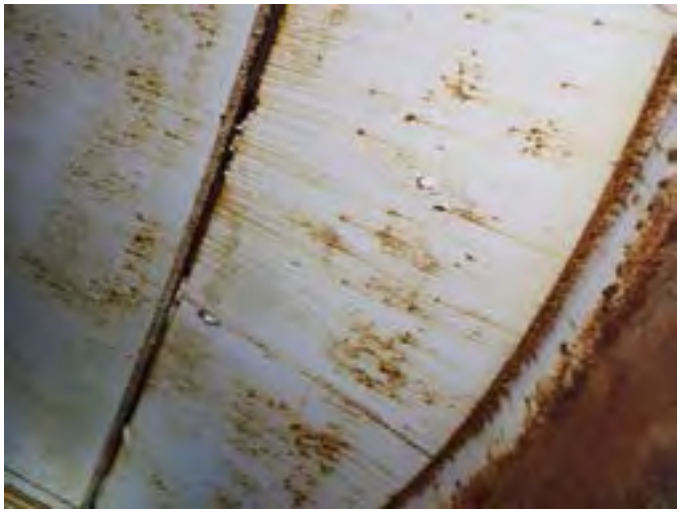
83 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***

84 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***

85 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***



86 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***



87 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***

88 ***Overflow Pipe Having Exposed Steel And Corrosion***

89 ***Unobstructed Overflow Pipe***

90 ***Discharge From Cleaning***

UNDERWATER SOLUTIONS INC

SERVICES COMPLETED:	Inspection and Cleaning
CUSTOMER NAME:	Hunt Engineers-Architects-Surveyors
SITE ADDRESS:	3765 Cowell Hill Road Elmira, NY 14902
TANK NAME:	Cowell Hill Tank
SIZE:	262,000 Gallon
TYPE OF TANK:	Welded Steel Water Storage Tank
YEAR BUILT:	1973
DIMENSIONS:	24’ H x 40’ D

INSPECTION AND INTERIOR CLEANING (SEDIMENT REMOVAL) OF THE COWELL HILL ROAD 262,000-GALLON WELDED STEEL WATER STORAGE TANK, LOCATED IN THE VILLAGE OF WELLSBURG, NEW YORK, PROJECT NUMBER 2678.009

HUNT-ENGINEERS-ARCHITECTS-SURVEYORS HORSEHEADS, NEW YORK

APRIL 13 & 14, 2020

SCOPE:

On April 13 & 14, 2020, Underwater Solutions Inc. conducted an inspection of the Cowell Hill Road 262,000-gallon welded steel potable water storage tank, located in The Village of Wellsburg, New York, project number 2678.009 to provide information regarding the overall condition and integrity of this structure and removed the sediment accumulation found on the floor.

EXTERIOR INSPECTION:

The entire exterior of this water storage tank was inspected, to include walls and coating, foundation, manway, ladder and safety cage, overflow, roof, vent and hatch.

Walls and Coating

The exterior steel wall panels and associated welds were inspected and appeared sound and free of obvious fatigue or failures at this time.

The protective coating on the exterior wall surfaces appeared to have been applied uniformly, however was found having fair adhesion value at this time.

Adhesion loss (lifting/peeling) of the coating was observed throughout approximately 25% of the exterior wall surfaces, resulting in exposure of the primary coating. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

Adhesion loss of the protective coating has also resulted in exposure of the underlying steel throughout less than 5% of these surfaces at this time.

No obvious fatigue (pitting) of the steel was evident within these areas of steel exposure, rather mild corrosion exists at this time.

The average dry film thickness of the protective coating system applied to the exterior welded steel wall panels was measured during this inspection. The dry film thickness of the coating system applied to the exterior wall surfaces was found as follows (beginning at ground level):

Row	***Range of Mil Thickness***
1	6.1-21.8 mils
2	8.3-12.4 mils
3	9.5-14.5 mils

The American Water Works Association (AWWA) recommends a dry film thickness of 7.0 to 10.0 mils of coating film thickness be applied to the exterior surfaces of welded steel potable water storage tanks to provide adequate protection for welded steel structures.

A mild to moderate, non-uniform accumulation of mildew throughout the exterior walls has declined the overall aesthetics.

RECOMMENDATION(S): It is our recommendation to pressure-wash the exterior wall surfaces at 4,500 P.S.I. using an oscillating tip to remove the accumulated mildew from these surfaces and to remove any and all coating that has lost adhesion from the tank.

It is also our recommendation to re-coat the exterior walls using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior welded steel wall surfaces.

Ultrasonic Thickness Testing was completed at the time of this inspection. These measurements were taken in accessible locations and were taken in groups of (5) per panel, beginning at the ground and ending at the top panel.

Row	***Metal Thickness (in)***
1	.278, .309, .276, .286, .291
2	.267, .270, .269, .261, .259
3	.261, .268, .271, .276, .269

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

At the time of this inspection, exterior lead content samples were obtained. The results from these samples are attached herein.

Foundation

The exposed surfaces of the 5" wide by 3" tall concrete foundation were found covered with moss/vegetation, preventing an inspection of the concrete.

RECOMMENDATION(S): It is our recommendation that when the exterior walls are pressure-washed to also pressure-wash the exposed surfaces of the foundation to remove the moss and vegetation. Upon removing the vegetation, we recommend inspecting the concrete to determine the integrity of its surfaces.

Manway

One, 24" inside diameter steel manway penetrates the lowest wall panel on the westernmost side of the tank, located approximately 17-1/2" above the tank base and is securely installed and free of obvious leakage.

A series of Dry Film Thickness measurements were obtained on the manway exterior. These measurements provided a coating film thickness range from 3.9-6.6 mils and appeared to have been applied uniformly. This protective coating is below the AWWA's recommendations, yet a was found having mostly good adhesion value at this time.

Secondary coating adhesion loss was observed throughout less than 5% of these surfaces, resulting in exposure of the primary coating. Coating loss throughout less than 5% of these surfaces has resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

A non-uniform accumulation of mildew throughout the manway has declined the overall aesthetics.

RECOMMENDATION(S): It is our recommendation to pressure-wash the exterior surfaces of the manway at 4,500 P.S.I. using an oscillating tip to remove the accumulated mildew from these surfaces and to remove any and all coating that has lost adhesion.

It is also our recommendation to re-coat the exterior surfaces of the manway using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior surfaces of the manway.

A series of (5) Ultrasonic Thickness measurements were obtained on the manway at this time and were found to be:

Metal Thickness (in)
.401, .389, .391, .399,.403

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

Ladder and Safety Cage

A 19" wide welded steel ladder having rungs spaced 12" apart and a welded steel safety cage extend from 6' above the ground up to the roof and is supported to the tank wall with three sets of welded standoffs, providing safe access and egress to and from the roof.

The protective coating on the steel ladder and safety cage appeared to have been applied uniformly and was found having mostly good adhesion value at this time.

Secondary coating loss was observed throughout less than 5% of the ladder and safety cage, resulting in exposure of the primary coating. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

Adhesion loss of the coating throughout less than 5% of the ladder and safety cage has resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the ladder and safety cage were evident within these areas of steel exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to pressure-wash the ladder and safety cage surfaces at 4,500 P.S.I. using an oscillating tip to remove any and all coating that has lost adhesion.

It is also our recommendation to re-coat the ladder and safety cage using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the steel ladder and safety cage.

A second welded steel ladder extends from the edge of the roof on the westernmost side of the tank up to the vent within the center of the roof and is supported to the roof with a series of welded steel standoffs, providing good access to and from the vent/center of roof.

The protective coating on the steel ladder appeared to have been applied uniformly and was found having mostly good adhesion value at this time.

Adhesion loss of the coating throughout less than 5% of this ladder has resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the ladder was evident within these areas of steel exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to pressure-wash the ladder surfaces at 4,500 P.S.I. using an oscillating tip to remove any and all coating that has lost adhesion.

It is also our recommendation to re-coat the ladder using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the steel ladder.

It would be our recommendation to install a non-corrodible, metal OSHA approved fall prevention device throughout the length of this ladder in an effort to provide safe access and egress to and from the vent/center of roof.

Overflow

An 8" inside diameter steel overflow pipe penetrates the top wall panel on the westernmost side of the tank, located approximately 17" below the junction of where the roof and walls meet.

This steel pipe extends away from the tank approximately 15-1/2" and terminates. The outlet end of this pipe was free of obvious obstructions, and a metal 12- mesh screen was found securely installed at the outlet end of this overflow pipe at this time.

A series of Dry Film Thickness measurements were obtained on the overflow. These measurements provided a coating film thickness range from 5.1-20.5 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having mostly good adhesion value at this time. Adhesion loss of the protective coating was observed throughout less than 5% of these surfaces, resulting in exposure of the primary coating, while isolated areas of coating loss throughout less than 5% of these surfaces have resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

A series of (5) Ultrasonic Thickness measurements were obtained on the overflow pipe at this time and were found to be:

Metal Thickness (in)
.48, .232, .237, .267, .215

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

RECOMMENDATION(S): It is our recommendation to modify the overflow pipe so that the outlet end of the pipe is located and terminates between 12-24" above a splash plate or engineered rip-rap to protect against erosion during periods of overflow. The outlet end of the pipe should be directed down and/or be protected to prevent rainwater run-off from entering the pipe.

It is also our recommendations to install a non-corrodible metal screen having 24-mesh within the outlet end of the pipe to prevent access to the interior of the pipe/tank and to install a duckbill (rubber check valve) at the end of this pipe to provide protection for the debris screen. Upon modifying the overflow pipe, we recommend coating the pipe using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to provide good protection for these steel surfaces.

Roof

The steel roof panels, and associated welds were inspected and appeared sound and free of obvious fatigue or failures at this time.

A series of Dry Film Thickness measurements were obtained on the roof surfaces. These measurements provided a coating film thickness range from 12.3-46.0 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having mostly good adhesion value at this time.

Adhesion loss of the protective coating was observed throughout approximately 5-10% of the roof, resulting in exposure of the underlying steel.

No obvious fatigue (pitting) of the steel panels or deterioration of the welds was evident within these areas of steel exposure, rather mild corrosion exists at this time.

A mild, non-uniform accumulation of mildew throughout the roof has declined the overall aesthetics.

RECOMMENDATION(S): It is our recommendation to pressure-wash the exterior roof surfaces at 4,500 P.S.I. using an oscillating tip to remove to remove any and all coating that has lost adhesion.

It is also our recommendation to re-coat the exterior roof surfaces using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior welded steel roof surfaces.

A series of (5) Ultrasonic Thickness measurements were obtained on the roof at this time and were found to be:

Metal Thickness (in)
.248, .232, .237, .267, .215

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

Vent

A steel vent assembly is located within the center of the roof, having a 12" inside diameter and stands 28" tall.

A 16" outside diameter steel cap and a steel screen having 8-mesh was found securely installed over the vent penetration in the roof at this time.

A series of Dry Film Thickness measurements were obtained on the vent cap. These measurements provided a coating film thickness range from 4.3-12.7 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having mostly good adhesion value at this time.

A series of Dry Film Thickness measurements were obtained on the vent riser pipe. These measurements provided a coating film thickness range from 5.1-10.1 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having mostly good adhesion value at this time.

Adhesion loss of the protective coating was observed throughout less than 5% of the exterior surfaces of the vent assembly and throughout approximately 80% of the interior of the vent assembly, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild to moderate corrosion exists at this time.

A series of (5) Ultrasonic Thickness measurements were obtained on the vent cap at this time and were found to be:

Metal Thickness (in)
.307, .325, .301, .281, .309

A series of (5) Ultrasonic Thickness measurements were obtained on the vent riser pipe at this time and were found to be:

Metal Thickness (in)
3.04, .262, .271, .301, .284

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

RECOMMENDATION(S): It is our recommendation to remove the current screen and to install a replacement, non-corrodible metal screen having 24-mesh throughout the outside circumference of the vent in an effort to prevent access to the interior of the tank and to reinstall the 8-mesh screen to provide protection for the 24-mesh screen.

It is also our recommendation to re-coat the exterior of the vent assembly using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior surfaces of the vent assembly.

When the interior of the tank is re-coated, it would be our recommendation to re-coat the interior of the vent riser pipe using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the interior steel surfaces of the vent riser pipe.

Hatch

One, 24" inside diameter steel hatch provides access to the interior of the tank through the roof and is located on the westernmost side of the tank.

This hatch is in good working condition and was found secured with a lock, preventing unwanted access.

A series of Dry Film Thickness measurements were obtained on the steel hatch exterior. These measurements provided a coating film thickness range from 6.7-19.6 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having mostly good adhesion value at this time. Adhesion loss of the protective coating was observed throughout less than 5% of these surfaces, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these isolated areas of exposure rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to re-coat the exterior of the hatch using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior surfaces of the hatch.

INTERIOR INSPECTION:

The entire interior of this water storage tank was inspected, to include sediment accumulations, floor, manway, piping, walls and coating, overhead, overflow and aesthetic water quality.

Sediment Accumulations

A uniform layer of accumulated precipitate was found throughout the floor, averaging 1/8" in depth.

Upon completing this inspection, all precipitate was removed (vacuumed) from the floor.

Floor

After removing all accumulated precipitate, the steel floor panels, and associated welds were inspected and appeared sound and free of obvious fatigue or failures.

A series of Dry Film Thickness measurements were obtained on the floor surfaces. These measurements provided a coating film thickness range from 11.0-20.5 mils. These non-uniform measurements meet the AWWA's recommendations and were found having fair adhesion value at this time.

Adhesion loss (blistering) of the coating was observed throughout approximately 50% of these surfaces at this time.

Approximately 45% of these coating blisters have ruptured, resulting in exposure of the underlying steel.

No obvious fatigue (pitting) of the floor panels or deterioration of the welds was evident within these areas of steel exposure, rather mild to moderate corrosion exists at this time.

Mild staining remains throughout the floor due to the accumulation of precipitate.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior floor surfaces to white or near white metal and to re-coat the interior floor surfaces using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend that this coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the steel floor panels and associated welds.

Manway

One, 24" inside diameter steel manway penetrates the lowest wall panel on the westernmost side of the tank, located approximately 17-1/2" above the floor and is securely installed and free of obvious leakage.

A series of Dry Film Thickness measurements were obtained on the steel manway lid, trunk and davit hinge. These measurements provided a coating film thickness range from 8.7-18.6 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having fair adhesion value at this time.

Adhesion loss (blistering) of the coating was observed throughout approximately 50% of these surfaces, while approximately 30% of these coating blisters have ruptured, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild to moderate corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to re-coat the interior surfaces of the manway using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend that this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to provide good protection for the interior steel surfaces of the manway assembly.

Piping

One pipe penetrates the floor of this potable water storage tank.

The influent/effluent pipe penetrates the floor approximately 25" in from the wall on the westernmost side of the tank, having an 8" inside diameter and is flush with the floor.

An 8" inside diameter by 6-1/2" tall removable riser is installed above this pipe, serving as a silt stop. This pipe was free of obvious obstructions and flow was entering the tank through this pipe at the time of this inspection.

A series of Dry Film Thickness measurements were obtained on the steel removable silt stop. These measurements provided a coating film thickness range from 11.0-27.5 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having mostly good adhesion value at this time.

Adhesion loss (blistering) of the coating was observed throughout approximately 75% of these surfaces, while approximately 25% of these coating blisters have ruptured, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

The interior surfaces of the pipe within the floor was found having moderate corrosion throughout, however no obvious fatigue/deterioration of the interior surfaces of the pipe was evident at this time.

RECOMMENDATION(S): It is our recommendation to re-coat the interior surfaces of the pipe within the floor, including the removable silt stop using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the pipe within the floor, including the removable silt stop.

Walls and Coating

The interior walls were inspected beginning at the floor and by spiraling the circumference of the tank up to the water surface.

These steel wall panels and associated welds appeared sound, however coating loss, steel exposure and corrosion were observed throughout these surfaces at this time.

The average dry film thickness of the protective coating system applied to the interior welded steel wall panels was measured during this inspection. The dry film thickness of the coating system applied to the interior wall surfaces was found as follows (beginning at ground level):

Row	***Range of Mil Thickness***
1	8.9-18.2 mils
2	8.7-14.8mils
3	7.2-34.6 mils

The American Water Works Association (AWWA) recommends a dry film thickness of 10.5 to 15.5 mils of coating film thickness be applied to the interior surfaces of welded steel potable water storage tanks to provide adequate protection for welded steel structures.

The protective coating on these steel panels and welds appeared to have been applied uniformly and was found having poor adhesion value and no longer provides protection for the steel panels and associated welds.

Adhesion loss (blistering/lifting) of the protective coating was observed throughout approximately 80% of the interior wall panels and welds, resulting in exposure of the underlying steel. Mild to moderate corrosion exists within these areas of steel exposure, and fatigue (pitting) of the panels and deterioration of the welds was evident throughout less than 5% of the third row of wall panels above the tank floor, ranging from barely detectable levels up to 1/8” in depth.

Moderate to heavy staining exists throughout the interior walls, beginning approximately at overflow level and extends down to the floor.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior wall surfaces to white or near white metal and to then re-evaluate these surfaces to conclude the overall extent of steel fatigue/deterioration and the most suitable means to re-surface the areas of steel fatigue.

It is also our recommendation to re-coat the interior wall surfaces using a 100% solids protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer’s surface preparation and application recommendations in an effort to halt corrosion, prevent further steel fatigue/deterioration and to provide good protection for the steel wall panels and associated welds.

At the time of this inspection, interior lead content samples were obtained. The results from these samples are attached herein.

Overhead

The entire overhead was inspected from the water surface.

These steel panels appeared sound, however adhesion loss of the protective coating was observed throughout these surfaces at this time.

The protective coating on these steel panels appeared to have been applied uniformly, however was found having poor adhesion value at this time.

Adhesion (blistering/lifting) of the coating was observed throughout approximately 40% of overhead panel surfaces, resulting in exposure of the underlying steel.

No obvious fatigue (pitting) of the steel panels was evident within these areas of steel exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior overhead panels to white or near white metal and to re-coat the interior overhead panels using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent fatigue/deterioration of the steel and to provide good protection for the steel overhead panels.

Overflow

The overflow consists of an 8" inside diameter steel pipe that penetrates the top wall panel on the westernmost side of the tank, located approximately 17" below the junction of where the roof and walls meet. This steel pipe extends into the tank approximately 12", turns 90° up and flares out to a 16" inside diameter prior to terminating approximately 4" below the junction of where the roof and walls meet. This overflow pipe was free of obvious obstructions at the time of this inspection.

The protective coating on this steel pipe appeared to have been applied uniformly and was found having poor adhesion value at this time. Adhesion loss (blistering/lifting) of the coating was observed throughout approximately 45% of these surfaces, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild to moderate corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior overflow pipe to white or near white metal. We recommend then re-coating the pipe using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water and applying it in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent fatigue/deterioration of the steel and to provide good protection for this steel pipe.

Aesthetic Water Quality

The aesthetic water quality was found to be good throughout this tank, allowing unlimited visibility for this inspection.

ADDITONAL REMARKS/RECOMMENDATION(S):

It is our recommendation to install an active mixer within this structure to prevent ice cap formation and to improve overall water quality.

CONCLUSION:

It is the opinion of Underwater Solutions Inc. that this welded steel potable water storage tank appeared mostly sound and free of obvious leakage at this time.

As always, we recommend that re-inspection and cleaning of all water storage facilities be performed in accordance with state and federal mandates, A.W.W.A. standards, and completed by an experienced and authorized inspection corporation.

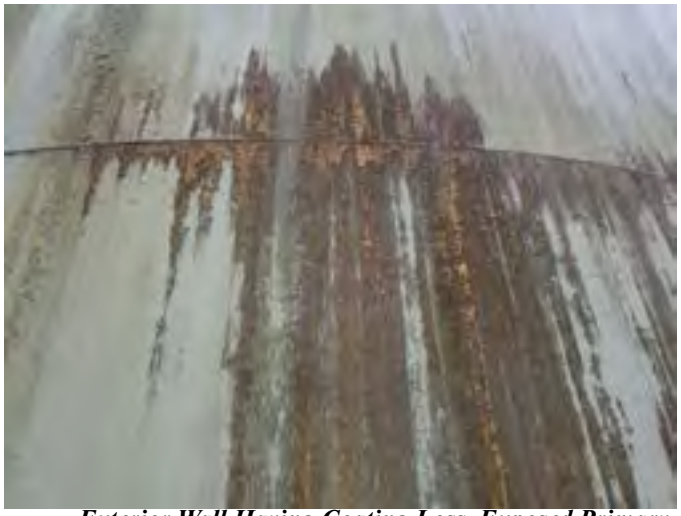
UNDERWATER SOLUTIONS INC.
Christopher A. Cole, Project Manager

This report, the conclusions, recommendations and comments prepared by Underwater Solutions Inc. are based upon spot examination from readily accessible parts of the tank. Should latent defects or conditions which vary significantly from those described in the report be discovered at a later date, these should be brought to the attention of a qualified individual at that time. These comments and recommendations should be viewed as information to be used by the Owner in determining the proper course of action and not to replace a complete set of specifications. All repairs should be done in accordance with A.W.W.A. and/or other applicable standards.

1 *Tank Identification Plate*

2 *Exterior Wall Having Coating Loss, Exposed Primary Coating And Accumulated Mildew*

3 *Exterior Wall Having Coating Loss, Exposed Primary Coating And Accumulated Mildew*

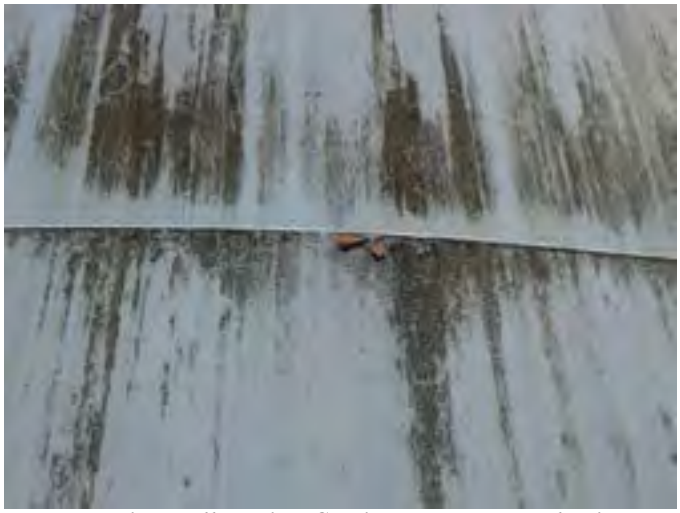


4 *Exterior Wall Having Coating Loss, Exposed Primary Coating And Accumulated Mildew*

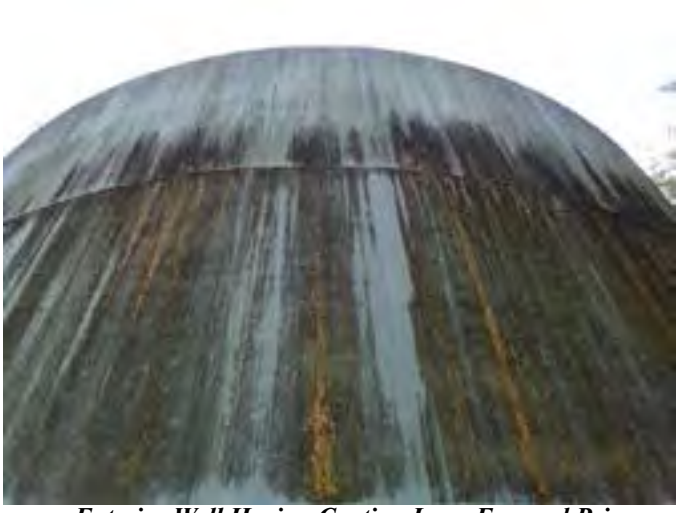
5 *Exterior Wall Having Coating Loss, Exposed Primary Coating And Accumulated Mildew*

6 *Exterior Wall Having Coating Loss, Exposed Primary Coating And Accumulated Mildew*

7 ***Exterior Wall Having Coating Loss, Exposed Primary Coating And Accumulated Mildew***



8 ***Exterior Wall Having Coating Loss, Exposed Primary Coating And Accumulated Mildew***



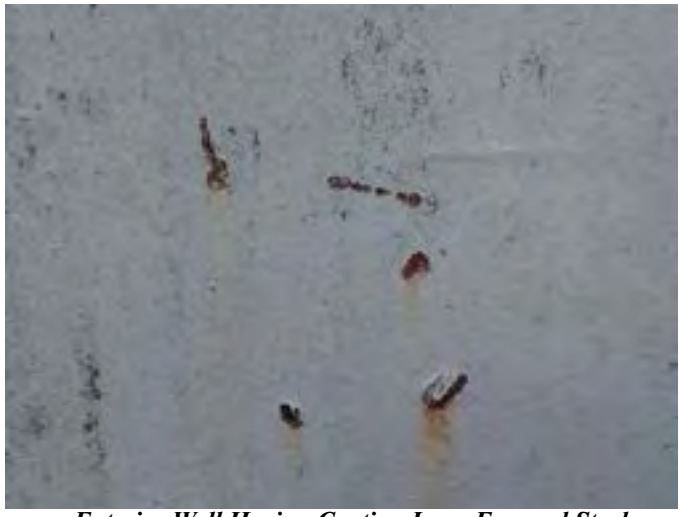
9 ***Exterior Wall Having Coating Loss, Exposed Primary Coating And Accumulated Mildew***

10 ***Exterior Wall Having Coating Loss, Exposed Primary Coating And Accumulated Mildew***

11 ***Exterior Wall Having Coating Loss, Exposed Steel And Corrosion***

12 ***Exterior Wall Having Coating Loss, Exposed Steel And Corrosion***

13 *Exterior Wall Having Coating Loss, Exposed Steel And Corrosion*



14 *Exterior Wall Having Coating Loss, Exposed Steel And Corrosion*

15 *Exposed Foundation Surface Found Covered With Moss And Vegetation*

16 *Exposed Foundation Surface Found Covered With Moss And Vegetation*

17 *Exposed Foundation Surface Found Covered With Moss And Vegetation*

18 *Exposed Foundation Surface Found Covered With Moss And Vegetation*

19 ***Manway Having Coating Loss***

20 ***Manway Having Exposed Primary Coating***

21 ***Manway Having Exposed Steel And Corrosion***

22 ***Ladder And Safety Cage Having Exposed Steel And Corrosion***

23 ***Ladder Having Exposed Steel And Corrosion***

24 ***Vent Access Ladder Having Exposed Steel And Corrosion***

25 ***Vent Access Ladder Having Exposed Steel And Corrosion***

26 ***Overflow Pipe Having Exposed Primary Coating, Exposed Steel And Corrosion***

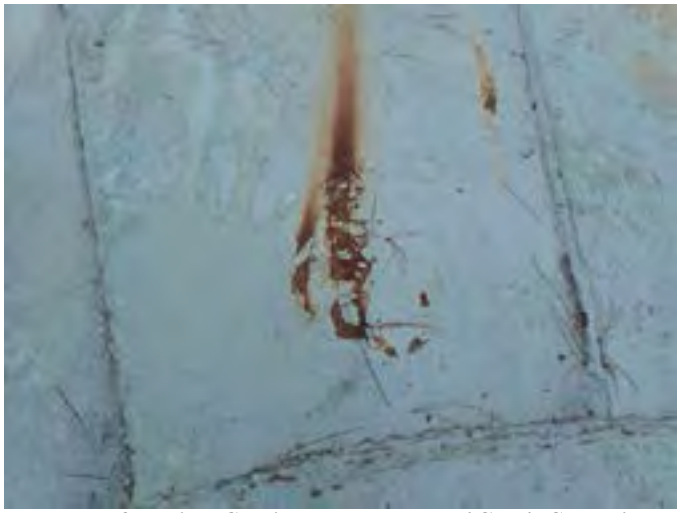
27 ***Unobstructed And Screened Overflow Pipe***

28 ***Roof Having Coating Loss, Exposed Steel, Corrosion And A Non-Uniform Accumulation Of Mildew***

29 ***Roof Having Coating Loss, Exposed Steel, Corrosion And A Non-Uniform Accumulation Of Mildew***

30 ***Roof Having Coating Loss, Exposed Steel, Corrosion And A Non-Uniform Accumulation Of Mildew***

31 ***Roof Having Coating Loss, Exposed Steel, Corrosion And A Non-Uniform Accumulation Of Mildew***

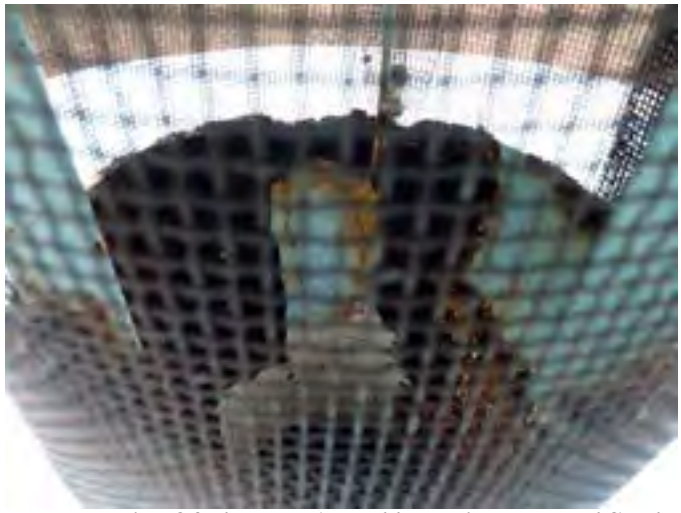


32 ***Roof Having Coating Loss, Exposed Steel, Corrosion And A Non-Uniform Accumulation Of Mildew***

33 ***Roof Having Coating Loss, Exposed Steel, Corrosion And A Non-Uniform Accumulation Of Mildew***

34 ***Vent Assembly Having Exposed Steel And Corrosion***

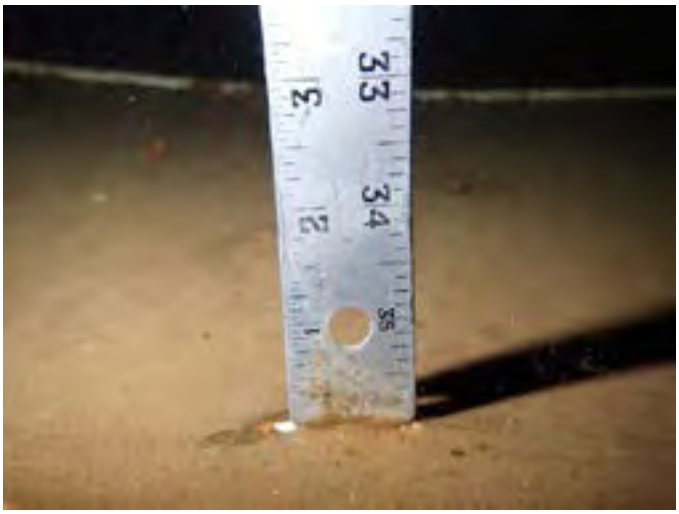
35 ***Vent Assembly Having Exposed Steel And Corrosion***



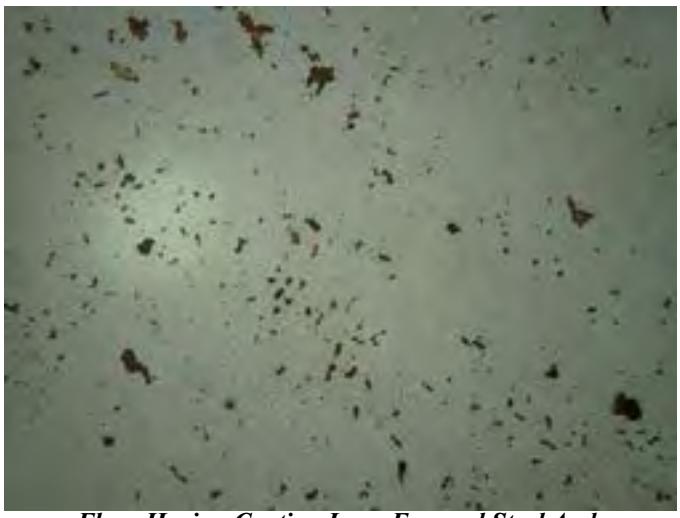
36 ***Interior Of The Vent Assembly Having Exposed Steel And Corrosion***

37 ***8-Mesh Screen***

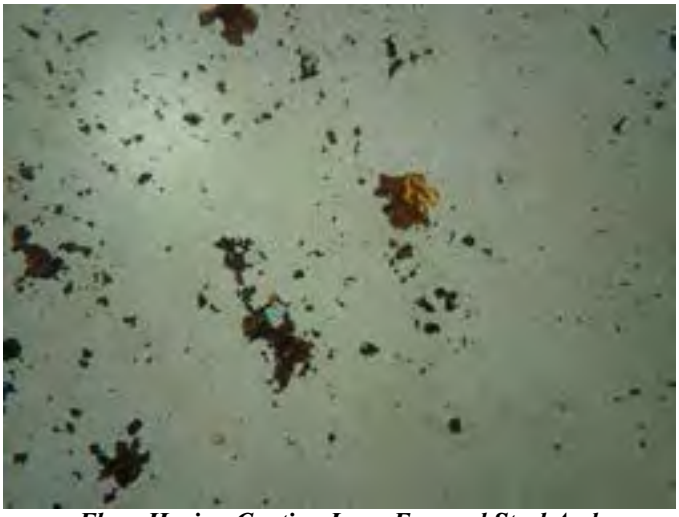
38 ***Hatch Closed And Secured With A Lock***



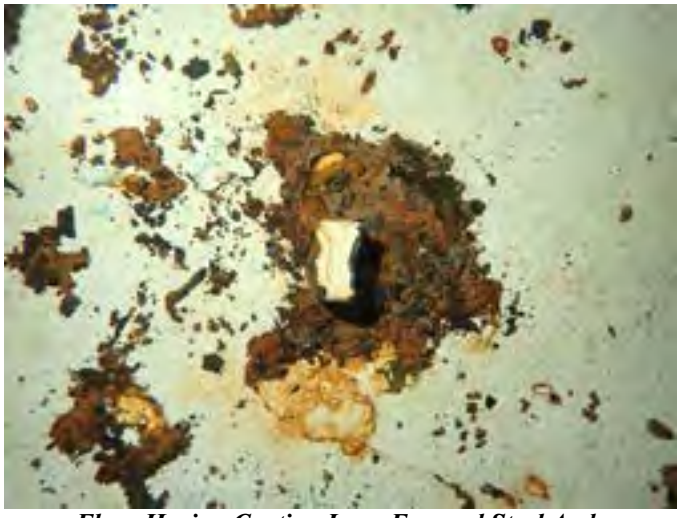
39 ***Layer Of Precipitate***



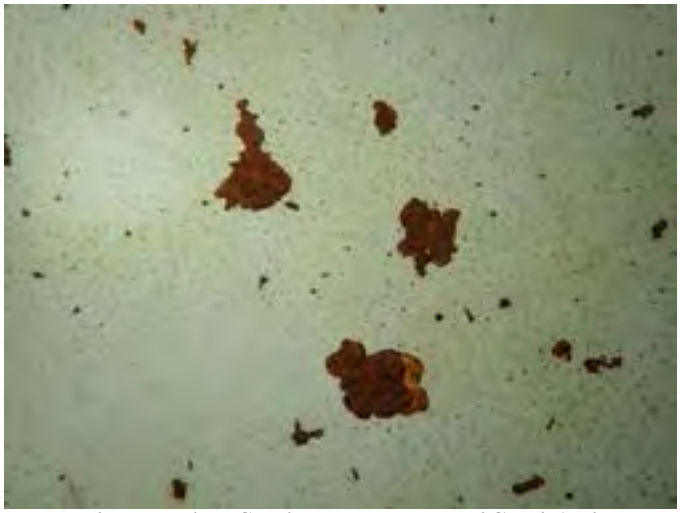
40 ***Floor Having Coating Loss, Exposed Steel And Corrosion***



41 ***Floor Having Coating Loss, Exposed Steel And Corrosion***



42 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

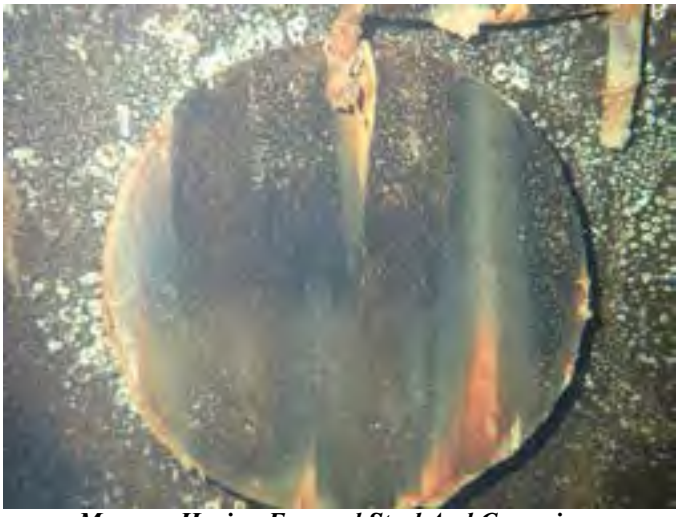


43 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

44 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

45 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

46 ***Floor Having Coating Loss, Exposed Steel And Corrosion***



47 ***Manway Having Exposed Steel And Corrosion***

48 ***Manway Having Exposed Steel And Corrosion***

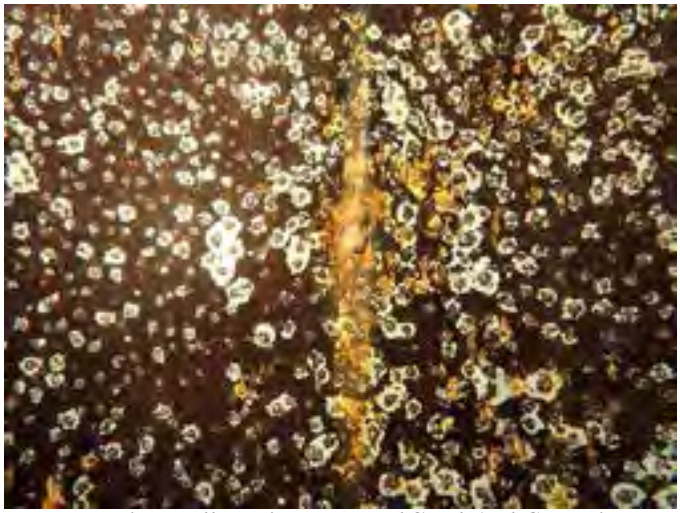
49 ***Removable Silt Stop Riser Having Exposed Steel And Corrosion***

50 ***Interior Of The Pipe Within The Floor Having Corrosion***

51 ***Interior Wall Having Exposed Steel And Corrosion***

52 ***Interior Wall Having Exposed Steel And Corrosion***

53 ***Interior Wall Having Exposed Steel And Corrosion***



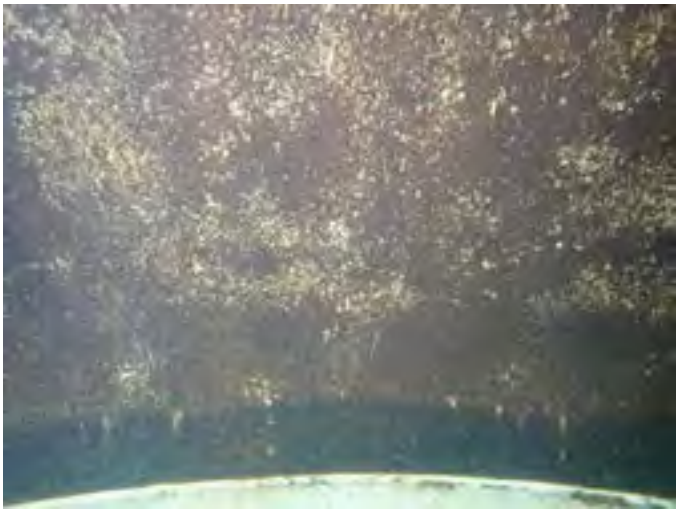
54 ***Interior Wall Having Exposed Steel And Corrosion***

55 ***Interior Wall Having Exposed Steel And Corrosion***

56 ***Interior Wall Having Exposed Steel And Corrosion***

57 ***Interior Wall Having Exposed Steel And Corrosion***

58 ***Interior Wall Having Exposed Steel And Corrosion***



59 ***Interior Wall Having Exposed Steel And Corrosion***

60 ***Interior Wall Having Exposed Steel And Corrosion***

61 *Interior Wall Having Exposed Steel And Corrosion*

62 *Third Row Of Wall Panels Above The Tank Floor Having Pitting Of The Steel*

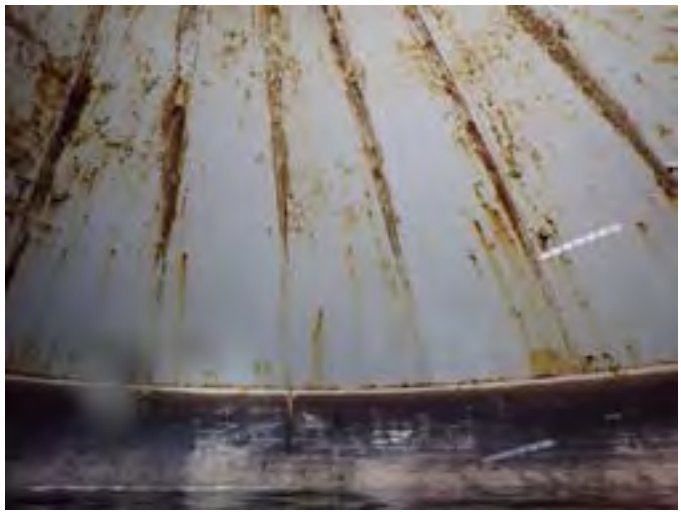
63 *Third Row Of Wall Panels Above The Tank Floor Having Pitting Of The Steel*

64 *Third Row Of Wall Panels Above The Tank Floor Having Pitting Of The Steel*

65 *Third Row Of Wall Panels Above The Tank Floor Having Pitting Of The Steel*

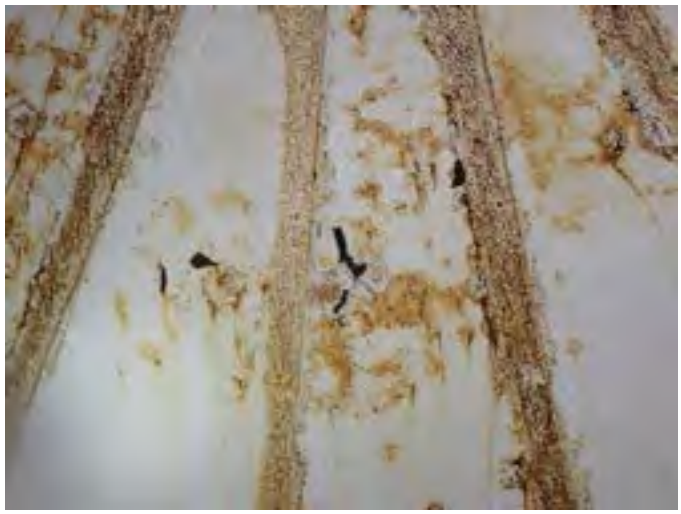
66 *Deteriorating Weld Between The Second And Third Wall Panel Above The Floor*

67 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***



68 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***

69 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***



70 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***

71 ***Overhead Having Coating Loss, Exposed Steel And Corrosion***

72 ***Overflow Pipe Having Exposed Steel And Corrosion***

73 ***Unobstructed Overflow Pipe***

74 ***Discharge From Cleaning***

UNDERWATER SOLUTIONS INC

SERVICES COMPLETED:	Inspection and Cleaning
CUSTOMER NAME:	Hunt Engineers-Architects-Surveyors
SITE ADDRESS:	Front Street Wellsburg, NY 14894
TANK NAME:	Front Street Tank
SIZE:	209,000 Gallon
TYPE OF TANK:	Welded Steel Water Storage Tank
YEAR BUILT:	1966
DIMENSIONS:	24’ H x 38’ 5” D

INSPECTION AND INTERIOR CLEANING (SEDIMENT REMOVAL) OF THE FRONT STREET 209,000-GALLON WELDED STEEL WATER STORAGE TANK, LOCATED IN THE VILLAGE OF WELLSBURG, NEW YORK, PROJECT NUMBER 2678.009

HUNT-ENGINEERS-ARCHITECTS-SURVEYORS HORSEHEADS, NEW YORK

APRIL 14, 2020

SCOPE:

On April 14, 2020, Underwater Solutions Inc. conducted an inspection of the Front Street 209,000-gallon welded steel potable water storage tank, located in The Village of Wellsburg, New York, project number 2678.009 to provide information regarding the overall condition and integrity of this structure and removed the sediment accumulation found on the floor.

EXTERIOR INSPECTION:

The entire exterior of this water storage tank was inspected, to include walls and coating, foundation, manway, ladder and safety cage, overflow, roof, vent and hatch.

Walls and Coating

The exterior steel wall panels and associated welds were inspected and appeared sound, however three steel patches were observed welded to the exterior wall surfaces at the time of this inspection.

A steel patch has been welded over the weld between the first and second row of wall panels above the ground on the northernmost side of the tank.

A second steel patch has been welded over a wall panel within the second wall panel above the ground on the north-westernmost side of the tank.

A third steel patch has been welded over the weld between the second and third row of wall panels above the ground on the northernmost side of the tank.

Each steel patch appeared to be securely welded in-place, while minimal leakage was occurring through the second steel patch, welded over a wall panel within the second wall panel above the ground on the north-westernmost side of the tank.

The protective coating on the exterior wall surfaces appeared to have been applied uniformly, however was found having only fair adhesion value at this time.

Adhesion loss (lifting/peeling) of the coating was observed throughout approximately 30% of the exterior wall surfaces, resulting in exposure of the primary coating. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

Adhesion loss of the protective coating has also resulted in exposure of the underlying steel throughout approximately 5% of these surfaces at this time.

No obvious fatigue (pitting) of the steel was evident within these areas of steel exposure, rather mild corrosion exist at this time.

The average dry film thickness of the protective coating system applied to the exterior welded steel wall panels was measured during this inspection. The dry film thickness of the coating system applied to the exterior wall surfaces was found as follows (beginning at ground level):

Row	***Range of Mil Thickness***
1	3.68-10.4 mils
2	3.41-12.1 mils
3	3.9-10.0 mils

The American Water Works Association (AWWA) recommends a dry film thickness of 7.0 to 10.0 mils of coating film thickness be applied to the exterior surfaces of welded steel potable water storage tanks to provide adequate protection for welded steel structures.

A mild to moderate, non-uniform accumulation of mildew throughout the exterior walls has declined the overall aesthetics.

RECOMMENDATION(S): It is our recommendation to complete the interior rehabilitation prior to completing an exterior rehabilitation, allowing all areas of steel fatigue (pitting) found throughout the interior walls to be re-surfaced/sealed.

It is our recommendation to pressure-wash the exterior wall surfaces at 4,500 P.S.I. using an oscillating tip to remove the accumulated mildew from these surfaces and to remove any and all coating that has lost adhesion from the tank.

It is also our recommendation to re-coat the exterior walls using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior welded steel wall surfaces.

Ultrasonic Thickness Testing was completed at the time of this inspection. These measurements were taken in accessible locations and were taken in groups of (5) per panel, beginning at the ground and ending at the top panel.

Row	***Metal Thickness (in)***
1	.245, .257, .268, .260, .260
2	.248, .248, .251, .249, .266
3	.265, .279, .270, .269, .266

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

At the time of this inspection, exterior lead content samples were obtained. The results from these samples are attached herein.

Foundation

This welded steel potable water storage tank did not have a foundation visible for inspection.

Manway

One, 24" inside diameter steel manway penetrates the lowest wall panel on the westernmost side of the tank, located approximately 17" above the tank base and is securely installed and free of obvious leakage.

A series of Dry Film Thickness measurements were obtained on the steel manway lid, trunk and securing hardware. These measurements provided a coating film thickness range from 11.8-29.7 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having mostly good adhesion value at this time.

Secondary coating adhesion loss was observed throughout less than 5% of these surfaces, resulting in exposure of the primary coating. Coating loss throughout less than 5% of these surfaces has resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

A non-uniform accumulation of mildew throughout the manway has declined the overall aesthetics.

RECOMMENDATION(S): It is our recommendation to pressure-wash the exterior surfaces of the manway at 4,500 P.S.I. using an oscillating tip to remove the accumulated mildew from these surfaces and all coating that has lost adhesion.

It is also our recommendation to re-coat the exterior surfaces of the manway using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior surfaces of the manway.

A series of (5) Ultrasonic Thickness measurements were obtained on the manway at this time and were found to be:

Metal Thickness (in)
.427, .426, .421, .428, .422

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

Ladder and Safety Cage

A 14-1/2" wide welded steel ladder and a welded steel safety cage extend from 8' above the ground up to the roof and is supported to the tank wall with two sets of welded standoffs, providing safe access and egress to and from the roof.

The protective coating on the steel ladder and safety cage appeared to have been applied uniformly and was found having mostly good adhesion value at this time.

Secondary coating loss was observed throughout less than 5% of the ladder and safety cage, resulting in exposure of the primary coating. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

Adhesion loss of the coating throughout approximately 5% of the ladder and less than 5% of the safety cage has resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of either the ladder and safety cage were evident within these areas of steel exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to pressure-wash the ladder and safety cage surfaces at 4,500 P.S.I. using an oscillating tip to remove any and all coating that has lost adhesion.

It is also our recommendation to re-coat the ladder and safety cage using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the steel ladder and safety cage.

A second, 14-1/2" wide welded steel ladder is supported to the vent with one bolted support and extends to the edge of the roof and has two sets of wheels, allowing this ladder to rotate throughout the circumference of the roof. The ladder appeared sound and secure, providing good access and egress.

The protective coating on the steel ladder appeared to have been applied uniformly and was found having fair adhesion value at this time.

Adhesion loss of the coating throughout approximately 35% of this ladder has resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the ladder was evident within these areas of steel exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to pressure-wash the ladder surfaces at 4,500 P.S.I. using an oscillating tip to remove any and all coating that has lost adhesion.

It is also our recommendation to re-coat the ladder using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the steel ladder.

It would be our recommendation to install a non-corrodible, metal OSHA approved fall prevention device throughout the length of this ladder in an effort to provide safe access and egress while utilizing this ladder.

Overflow

A 6" inside diameter steel overflow pipe penetrates the top wall panel on the westernmost side of the tank, located approximately 20" below the junction of where the roof and walls meet.

This steel pipe extends away from the tank approximately 20" and terminates. The outlet end of this pipe was free of obvious obstructions, and a perforated steel screen equivalent to 8-mesh was found securely installed at the outlet end of this overflow pipe at this time.

The protective coating on the steel overflow pipe appeared to have been applied uniformly and was found having mostly good adhesion value at this time. Adhesion loss of the protective coating was observed throughout less than 5% of these surfaces, resulting in exposure of the primary coating, while isolated areas of coating loss throughout less than 5% of these surfaces have resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to modify the overflow pipe so that the outlet end of the pipe is located and terminates between 12-24" above a splash plate or engineered rip-rap to protect against erosion during periods of overflow. The outlet end of the pipe should be directed down and or be protected to prevent rainwater run-off from entering the pipe.

It is also our recommendation to install a non-corrodible, metal screen having 24-mesh within the outlet end of the pipe to prevent access to the interior of the pipe/tank and to install a duckbill (rubber check valve) at the end of this pipe to provide protection for the debris screen. Upon modifying the overflow pipe, we recommend coating the pipe using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to provide good protection for these steel surfaces.

Roof

The steel roof panels, and associated welds were inspected and appeared sound, however corrosion and failure of the rigging hole penetration couplings welded to the roof has caused penetrations that extend through the roof panels, allowing rainwater runoff to enter the tank.

A series of Dry Film Thickness measurements were obtained on the roof surfaces. These measurements provided a coating film thickness range from 4.5-8.8 mils and appeared to have been applied uniformly. This protective coating is below the AWWA's minimum recommendations and was found having only fair adhesion value at this time.

Adhesion loss of the protective coating was observed throughout approximately 35% of the roof, resulting in exposure of the primary coating. Coating loss throughout approximately 10% of these surfaces has resulted in exposure of the underlying steel.

No obvious fatigue (pitting) of the steel panels or deterioration of the welds was evident within these areas of steel exposure, rather mild corrosion exists at this time. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

Twenty-four rigging holes penetrate the roof panels and seventeen of these penetrations were found sealed with a threaded plug at this time.

The threaded steel coupling welded to the roof at five of the rigging hole penetrations have failed due to corrosion and are no longer present. This condition has caused a penetration to form through the roof, allowing rainwater run-off to enter the tank.

The threaded couplings welded to the roof at two rigging hole penetrations are deteriorating and have caused penetrations through these two couplings and also allow rainwater run-off to enter the tank.

A series of (6) Ultrasonic Thickness measurements were obtained on the roof at this time and were found to be:

Metal Thickness (in)
.201, .255, .226, .187, .183, .204

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

RECOMMENDATION(S): It would be our recommendation that prior to rehabilitating the roof, we recommend temporarily sealing the penetrations that extend through the roof panels in an effort to prevent rainwater run-off from entering the tank.

It is our recommendation to pressure-wash the exterior roof surfaces at 4,500 P.S.I. using an oscillating tip to remove to remove any and all coating that has lost adhesion.

It is also our recommendation to weld replacement threaded couplings to the roof at the location of the failed threaded couplings and to re-coat the exterior roof surfaces using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior welded steel roof surfaces.

Vent

A steel vent assembly is located within the center of the roof, having a 10" inside diameter and stands 24" tall.

A 24" outside diameter steel cap and a metal screen having 4-mesh was found securely installed over the vent penetration in the roof at this time.

A series of Dry Film Thickness measurements were obtained on the vent cap. These measurements provided a coating film thickness range from 3.63-7.3 mils and appeared to have been applied uniformly. This protective coating is below the AWWA's minimum recommendations yet was found having mostly good adhesion value at this time.

A series of Dry Film Thickness measurements were obtained on the vent riser. These measurements provided a coating film thickness range from 3.44-7.3 mils and appeared to have been applied uniformly. This protective coating is below the AWWA's minimum recommendations yet was found having mostly good adhesion value at this time.

Adhesion loss of the protective coating was observed throughout approximately 75% of the exterior surfaces of the vent assembly, resulting in exposure of the primary coating. Adhesion loss of the protective coating throughout less than 5% of these surfaces has resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild to moderate corrosion exists at this time. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

A series of (5) Ultrasonic Thickness measurements were obtained on the vent cap at this time and were found to be:

Metal Thickness (in)
.197, .197, .195, .192, .199

A series of (5) Ultrasonic Thickness measurements were obtained on the vent riser pipe at this time and were found to be:

Metal Thickness (in)
.361, .364, .347, .350, .306

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

RECOMMENDATION(S): It is our recommendation to install a secondary, non-corrodible metal screen having 24-mesh throughout the outside circumference of the vent and over the existing screen in an effort to prevent access to the interior of the tank.

It is also our recommendation to re-coat the exterior of the vent assembly using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior surfaces of the vent assembly.

Hatch

One, 24" by 24" steel hatch provides access to the interior of the tank through the roof and is located on the westernmost side of the tank.

This hatch was found in good working condition and secured with a lock, preventing unwanted access.

A series of Dry Film Thickness measurements were obtained on the steel hatch exterior. These measurements provided a coating film thickness range from 2.6-8.6 mils. These non-uniform measurements are below the AWWA's minimum recommendations and were found having fair adhesion value at this time. Decline (thinning) of the coating film thickness has resulted in exposure of the primary coating throughout approximately 15% of these surfaces, while adhesion loss of the protective coating throughout less than 5% of these surfaces has resulted in exposure of the underlying steel.

No obvious fatigue/deterioration of the steel was evident within these isolated areas of exposure, rather mild corrosion exists at this time. The primary coating within these areas of exposure appeared to have good adhesion value at this time.

RECOMMENDATION(S): It is our recommendation to re-coat the exterior of the hatch using a protective coating formulated for exterior exposure and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the exterior surfaces of the hatch.

The protective coating on the interior of the hatch cover and trunk appeared to have been applied uniformly and was found having mostly good adhesion value at this time. Adhesion loss of the protective coating was observed throughout less than 5% of the interior of the hatch cover and trunk, resulting in exposure of the underlying steel. No obvious fatigue (pitting) of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to re-coat the interior of the hatch cover and trunk using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the interior surfaces of the hatch cover and trunk.

A series of (4) Ultrasonic Thickness measurements were obtained on steel hatch cover at this time and were found to be:

Metal Thickness (in)
.198. .197, .200, .213

RECOMMENDATION(S): We recommend comparing these Ultrasonic Thickness measurements to original manufacturer specifications to determine whether steel loss has occurred.

INTERIOR INSPECTION:

The entire interior of this water storage tank was inspected, to include sediment accumulations, floor, manway, piping, walls and coating, overhead, overflow and aesthetic water quality.

Sediment Accumulations

A uniform layer of accumulated precipitate was found throughout the floor, averaging 1/4" in depth.

Upon completing this inspection, all precipitate was removed (vacuumed) from the floor.

Floor

After removing all accumulated precipitate, the steel floor panels, and associated welds were inspected and found appearing sound and free of obvious fatigue or failures.

A series of Dry Film Thickness measurements were obtained on the floor surfaces. These measurements provided a coating film thickness range from 7.8-30.1 mils. These non-uniform measurements meet the AWWA's minimum recommendations yet were found having poor adhesion value at this time.

Adhesion loss (blistering) of the coating was observed throughout approximately 80% of these surfaces at this time.

Approximately 60% of these coating blisters have ruptured, resulting in exposure of the underlying steel.

No obvious fatigue (pitting) of the floor panels or deterioration of the welds was evident within these areas of steel exposure, rather mild to moderate corrosion exists at this time.

Mild staining remains throughout the floor due to the accumulation of precipitate.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior floor surfaces to white or near white metal. We recommend applying a protective coating to the interior floor surfaces using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the steel floor panels and associated welds.

Manway

One, 24" inside diameter steel manway penetrates the lowest wall panel on the westernmost side of the tank, located approximately 17" above the floor and is securely installed and free of obvious leakage.

A series of Dry Film Thickness measurements were obtained on the manway lid, trunk and davit hinge. These measurements provided a coating film thickness range from 7.7-35.2 mils. These non-uniform measurements meet the AWWA's minimum recommendations yet were found having poor adhesion value at this time.

Adhesion loss (blistering) of the coating was observed throughout approximately 50% of these surfaces, while approximately 25% of these coating blisters have ruptured, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel manway lid or trunk was evident within these areas of exposure, rather mild to moderate corrosion exists at this time.

The steel davit hinge that extends from a steel pivot coupling welded to the wall to a steel coupling welded to the manway lid remains in-place, however coating loss throughout the davit hinge assembly has resulted in exposure of the underlying steel. Corrosion was evident within these areas of steel exposure, and deterioration of the davit hinge and each pivot coupling was evident, therefore caution should be used when opening the manway as the davit hinge may not support the weight of the manway lid while open.

RECOMMENDATION(S): It is our recommendation to remove the corroded components of the davit hinge and to install a replacement davit hinge. We recommend applying a protective coating to the interior surfaces of the manway using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water and to be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to provide good protection for the interior steel surfaces of the manway assembly.

Piping

One pipe penetrates the floor of this potable water storage tank.

The influent/effluent pipe penetrates the floor approximately 22" in from the wall on the westernmost side of the tank, having an 8" inside diameter and is flush with the floor.

An 8" inside diameter by 7" tall removable riser is installed above this pipe, serving as a silt stop. This pipe was free of obvious obstructions and flow was leaving the tank through this pipe at the time of this inspection.

A series of Dry Film Thickness measurements were obtained on the steel removable silt stop. These measurements provided a coating film thickness range from 3.25-47.9 mils. These non-uniform measurements meet the AWWA's minimum recommendations and were found having mostly good adhesion value at this time. Adhesion loss (blistering) of the coating was observed throughout approximately 10% of these surfaces, while approximately 5% of these coating blisters have ruptured, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

The interior surfaces of the pipe within the floor was found having moderate corrosion throughout, however no obvious fatigue/deterioration of the interior surfaces of the pipe was evident at this time.

RECOMMENDATION(S): It is our recommendation to re-coat the interior surfaces of the pipe within the floor, including the removable silt stop, using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent steel fatigue/deterioration and to provide good protection for the pipe within the floor, including the removable silt stop.

Walls and Coating

The interior walls were inspected beginning at the floor and by spiraling the circumference of the tank up to the water surface.

These steel wall panels and associated welds appeared sound, however coating loss, steel exposure and corrosion were observed throughout these surfaces at this time.

The average dry film thickness of the protective coating system applied to the interior welded steel wall panels was measured during this inspection. The dry film thickness of the coating system applied to the interior wall surfaces was found as follows (beginning at ground level):

Row	***Range of Mil Thickness***
1	14.9-59 mils
2	17.5-59 mils
3	19.6-59 mils

The American Water Works Association (AWWA) recommends a dry film thickness of 10.5 to 15.5 mils of coating film thickness be applied to the interior surfaces of welded steel potable water storage tanks to provide adequate protection for welded steel structures.

The protective coating on these steel panels and welds appeared to have been applied uniformly yet was found having poor adhesion value and no longer provides protection for the steel panels and associated welds.

Adhesion loss (blistering) of the protective coating was observed throughout approximately 90% of the interior wall panels and welds. Approximately 10% of these coating blisters have ruptured, resulting in exposure of the underlying steel.

Mild to moderate corrosion exists within these areas of steel exposure, and fatigue (pitting) of the panels and deterioration of the welds was evident throughout approximately 5% of the wall panel and weld surfaces showing steel exposure, ranging from barely detectable levels up to 1/16” in depth.

Moderate to heavy staining exists throughout the interior walls, beginning approximately at overflow level and extends down to the floor.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior wall surfaces to white or near white metal and to then re-evaluate these surfaces to conclude the overall extent of steel fatigue/deterioration and the most suitable means to re-surface the areas of steel fatigue.

It is also our recommendation to re-coat the interior wall surfaces using a 100% solids protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent further steel fatigue/deterioration and to provide good protection for the steel wall panels and associated welds.

At the time of this inspection, interior lead content samples were obtained. The results from these samples are attached herein.

Overhead

The entire overhead was inspected from the water surface.

These steel panels appeared sound, however adhesion loss of the protective coating was observed throughout these surfaces at this time.

The protective coating on these steel panels appeared to have been applied uniformly, however was found having fair adhesion value at this time.

Decline (thinning) of the coating film thickness has resulted in surface corrosion to show through the coating throughout approximately 40% of these surfaces, while adhesion loss of the protective coating throughout approximately 5% of these surfaces has resulted in exposure of the underlying steel.

No obvious fatigue (pitting) of the steel panels was evident within these areas of steel exposure rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior overhead panels to white or near white metal. We recommend applying a protective coating to the interior overhead panels using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent fatigue/deterioration of the steel and to provide good protection for the steel overhead panels.

Overflow

The overflow consists of a 6" inside diameter steel pipe that penetrates the top wall panel on the westernmost side of the tank, located approximately 20" below the junction of where the roof and walls meet. This steel pipe extends into the tank approximately 30", turns 90° up and flares out to a 16" inside diameter prior to terminating approximately 7" below the junction of where the roof and walls meet and is supported to the overhead with one welded steel support.

This overflow pipe was free of obvious obstructions at the time of this inspection.

The protective coating on this steel pipe appeared to have been applied uniformly and was found having mostly good adhesion value at this time. Adhesion loss of the coating was observed throughout approximately 20% of these surfaces, resulting in exposure of the underlying steel. No obvious fatigue/deterioration of the steel was evident within these areas of exposure, rather mild corrosion exists at this time.

RECOMMENDATION(S): It is our recommendation to abrasive blast the interior overflow pipe to white or near white metal. We recommend then applying a protective coating to the pipe using a protective coating formulated for immersion (wet contact) and having an A.N.S.I./N.S.F. 61 approval for use in structures containing potable water. We recommend this protective coating be applied in accordance with the product manufacturer's surface preparation and application recommendations in an effort to halt corrosion, prevent fatigue/deterioration of the steel and to provide good protection for this steel pipe.

Aesthetic Water Quality

The aesthetic water quality was found to be good throughout this tank, allowing unlimited visibility for this inspection.

ADDITONAL REMARKS/RECOMMENDATION(S):

It is our recommendation to install an active mixer within this structure to prevent ice cap formation and to improve overall water quality.

CONCLUSION:

It is the opinion of Underwater Solutions Inc. that this welded steel potable water storage tank appeared mostly sound, however minimal leakage was occurring through a patch welded to an exterior wall panel. Open rigging hole penetrations throughout the roof allow rainwater run-off to enter the tank at this time.

We recommend that a budget be prepared to rehabilitate the interior and exterior surfaces within two (2) years, as prolonged steel exposure and fatigue could lead to structural failure of this tank.

As always, we recommend that re-inspection and cleaning of all water storage facilities be performed in accordance with state and federal mandates, A.W.W.A. standards, and completed by an experienced and authorized inspection corporation.

UNDERWATER SOLUTIONS INC.
Christopher A. Cole, Project Manager

This report, the conclusions, recommendations and comments prepared by Underwater Solutions Inc. are based upon spot examination from readily accessible parts of the tank. Should latent defects or conditions which vary significantly from those described in the report be discovered at a later date, these should be brought to the attention of a qualified individual at that time. These comments and recommendations should be viewed as information to be used by the Owner in determining the proper course of action and not to replace a complete set of specifications. All repairs should be done in accordance with A.W.W.A. and/or other applicable standards.

1 *Tank Identification Plate*

2 *Tank Identification Plate*

3 *Steel Patch Welded Over A Weld Found Without Leakage*

4 *Steel Patch Welded To A Wall Panel Having Minimal Leakage*

5 *Steel Patch Welded Over A Weld Found Without Leakage*

6 *Exterior Wall Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion*

7 ***Exterior Wall Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

8 ***Exterior Wall Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

9 ***Exterior Wall Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

10 ***Exterior Wall Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

11 ***Exterior Wall Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

12 ***Exterior Wall Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion***

13 *Exterior Wall Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion*

14 *Exterior Wall Having Coating Fatigue, Exposed Primary Coating, Exposed Steel And Corrosion*

15 *Tank Exterior Having Accumulated Mildew*

16 *Manway Having Exposed Primary Coating, Exposed Steel And Corrosion*

17 *Ladder And Safety Cage Having Exposed Primary Coating, Exposed Steel And Corrosion*

18 *Ladder And Safety Cage Having Exposed Primary Coating, Exposed Steel And Corrosion*

19 ***Ladder Extending From The Vent Having Exposed Steel And Corrosion***

20 ***Ladder Extending From The Vent Having Exposed Steel And Corrosion***

21 ***Overflow Pipe Having Exposed Primary Coating, Exposed Steel And Corrosion***

22 ***Unobstructed And Screened Overflow Pipe***

23 ***Roof Having Exposed Primary Coating, Exposed Steel And Corrosion***

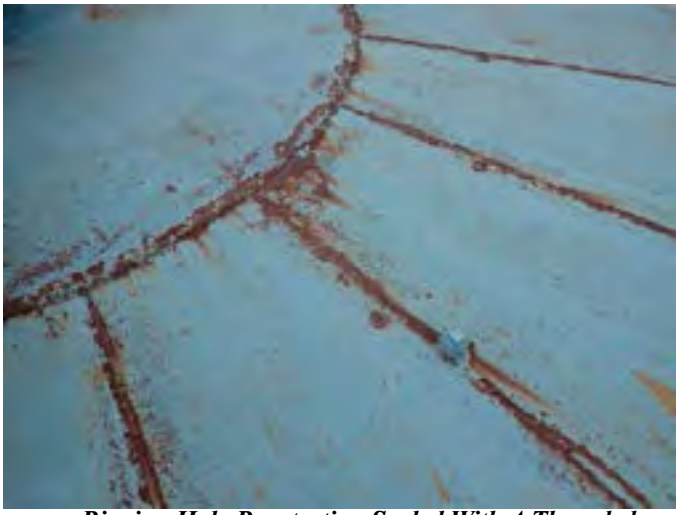
24 ***Roof Having Exposed Primary Coating, Exposed Steel And Corrosion***

25 ***Roof Having Exposed Primary Coating, Exposed Steel And Corrosion***

26 ***Roof Having Exposed Primary Coating, Exposed Steel And Corrosion***

27 ***Roof Having Exposed Primary Coating, Exposed Steel And Corrosion***

28 ***Roof Having Exposed Primary Coating, Exposed Steel And Corrosion***

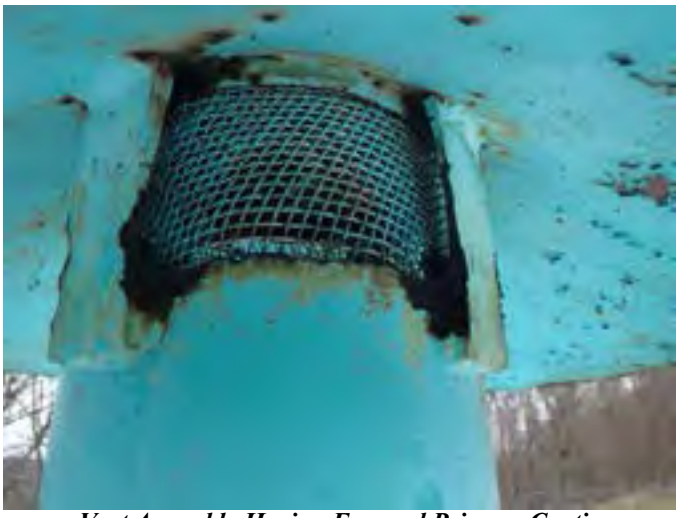


29 ***Rigging Hole Penetration Sealed With A Threaded Plug***

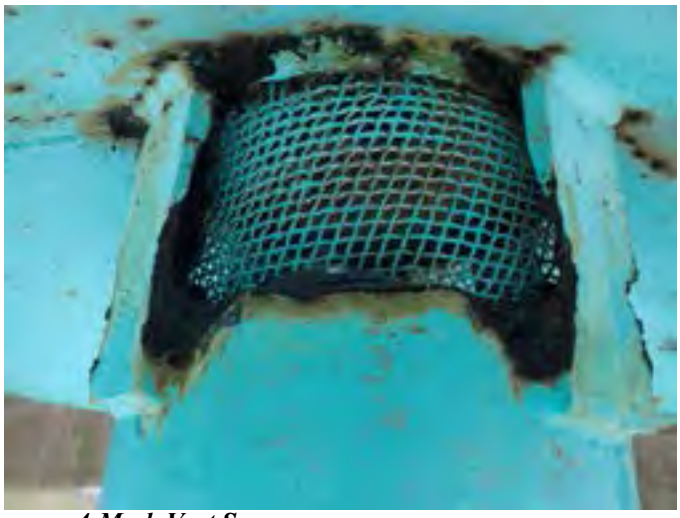
30 ***Deteriorating Rigging Hole Coupling***

31 *Open Rigging Hole Penetration Within The Roof*

32 *Vent Assembly Having Exposed Primary Coating, Exposed Steel And Corrosion*



33 *Vent Assembly Having Exposed Primary Coating, Exposed Steel And Corrosion*



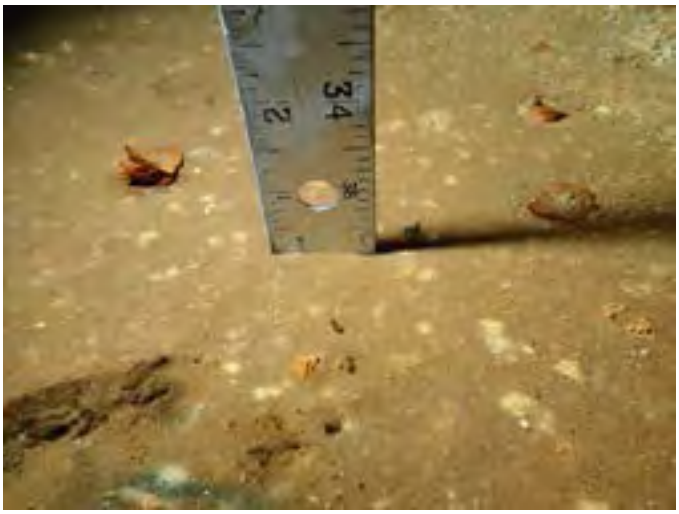
34 *4-Mesh Vent Screen*

35 *Interior Of The Hatch Cover Having Exposed Steel And Corrosion*

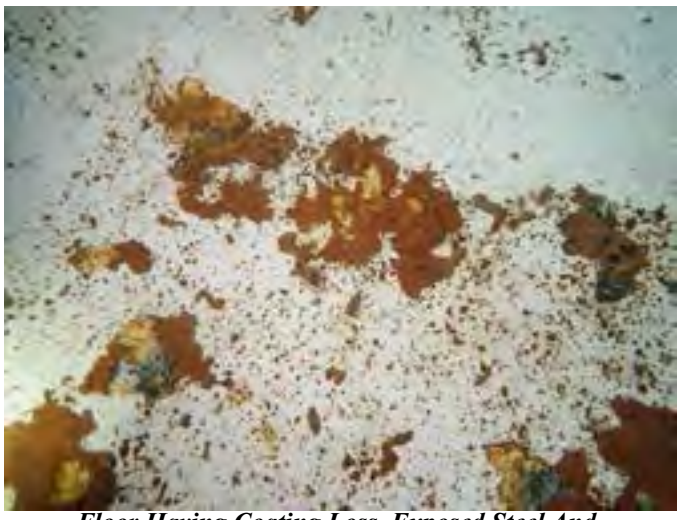
36 *Interior Of The Hatch Trunk Having Exposed Steel And Corrosion*

37 ***Exterior Of The Hatch Cover Having Exposed Primary Coating, Exposed Steel And Corrosion***

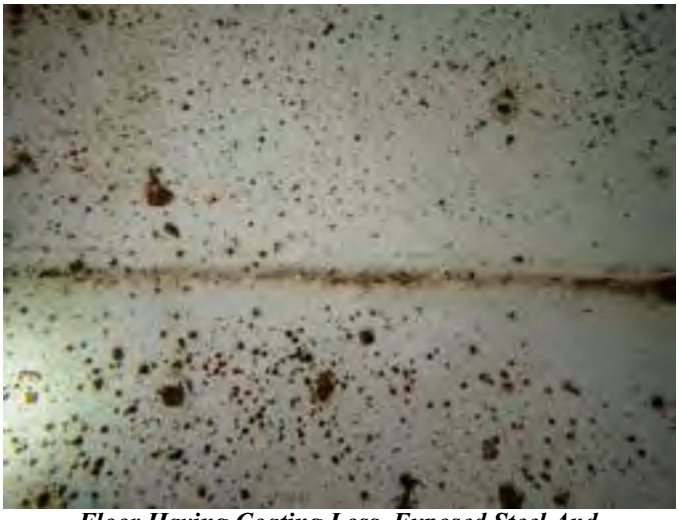
38 ***Closed Access Hatch Secured With A Lock***



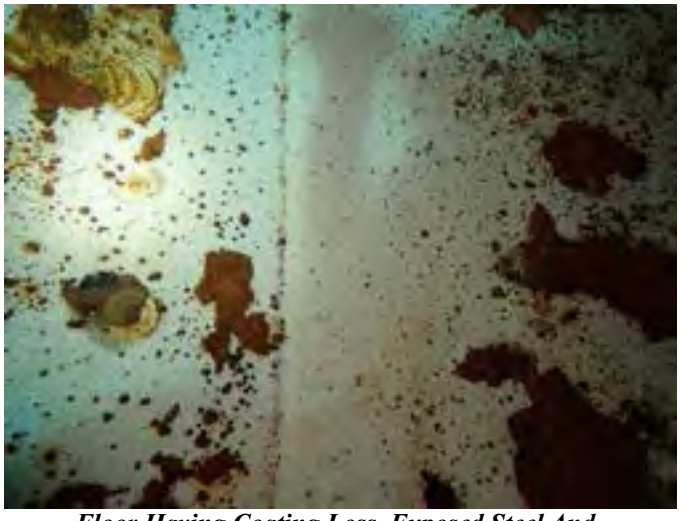
39 ***Layer Of Precipitate***



40 ***Floor Having Coating Loss, Exposed Steel And Corrosion***



41 ***Floor Having Coating Loss, Exposed Steel And Corrosion***



42 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

43 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

44 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

45 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

46 ***Floor Having Coating Loss, Exposed Steel And Corrosion***

47 ***Manway Having Coating Loss, Exposed Steel And Corrosion***

48 ***Manway Davit Hinge Assembly Exposed Steel, Corrosion And Deterioration Of The Steel***

49 ***Manway Davit Hinge Assembly Exposed Steel, Corrosion And Deterioration Of The Steel***

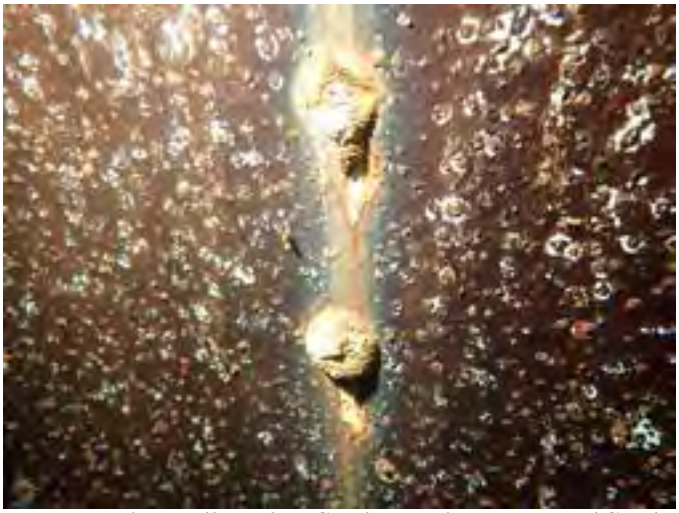
50 ***Manway Davit Hinge Assembly Exposed Steel, Corrosion And Deterioration Of The Steel***

51 ***Removable Slit Stop Riser Having Exposed Steel And Corrosion***

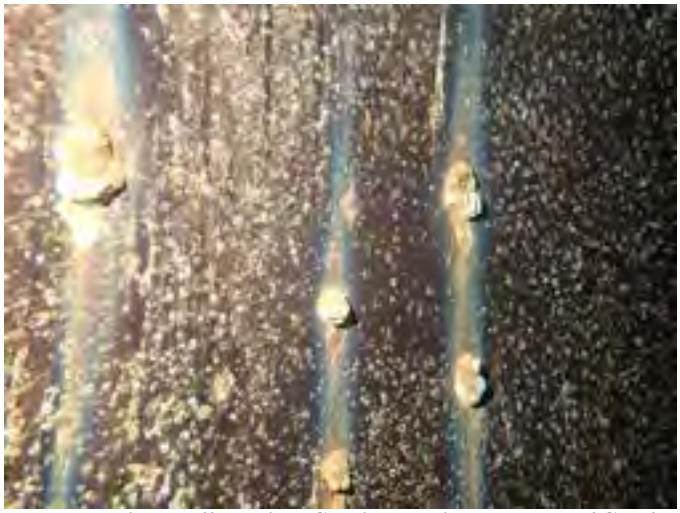
52 ***Interior Of The Pipe Within The Floor Having Corrosion***

53 ***Interior Wall Having Coating Fatigue, Exposed Steel And Corrosion***

54 ***Interior Wall Having Coating Fatigue, Exposed Steel And Corrosion***



55 ***Interior Wall Having Coating Fatigue, Exposed Steel And Corrosion***

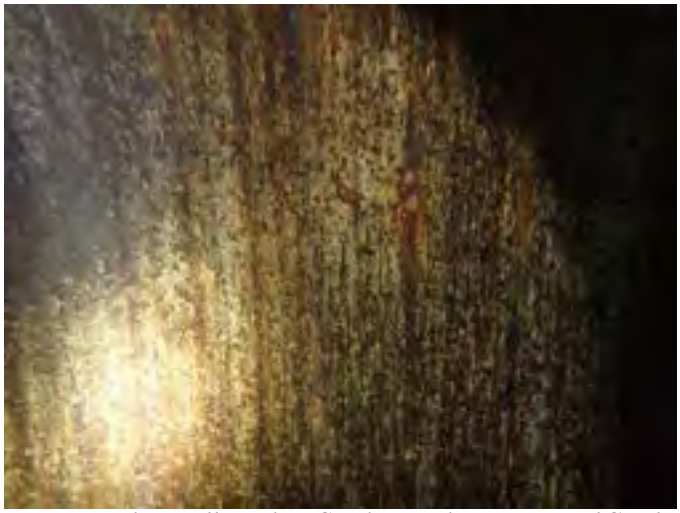


56 ***Interior Wall Having Coating Fatigue, Exposed Steel And Corrosion***

57 ***Interior Wall Having Coating Fatigue, Exposed Steel And Corrosion***

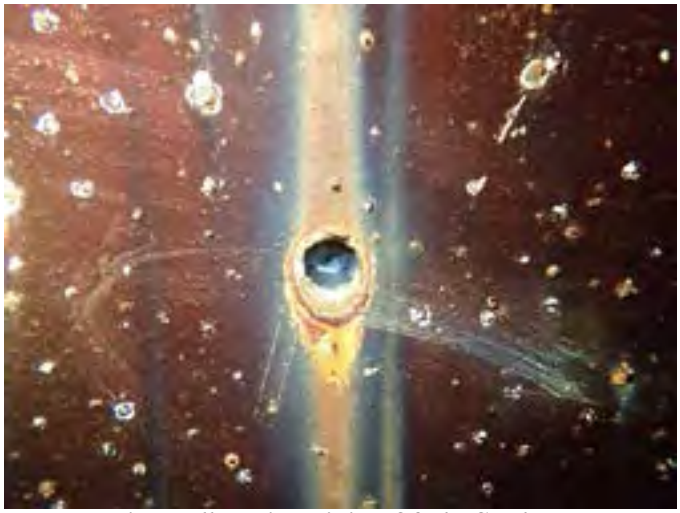
58 ***Interior Wall Having Coating Fatigue, Exposed Steel And Corrosion***

59 ***Interior Wall Having Coating Fatigue, Exposed Steel And Corrosion***



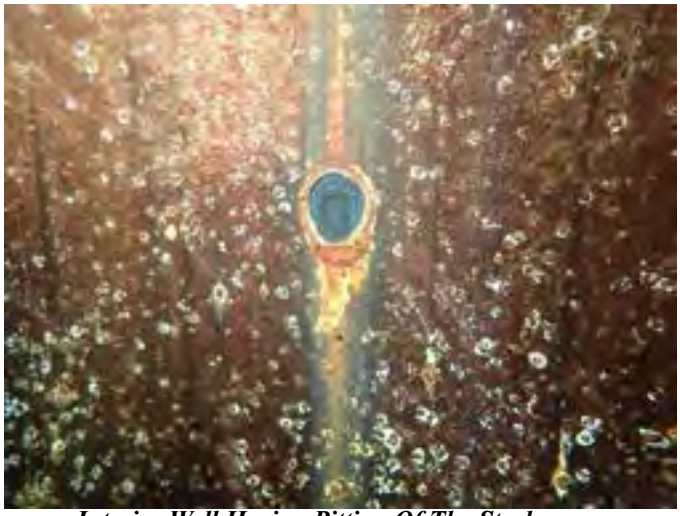
60 ***Interior Wall Having Coating Fatigue, Exposed Steel And Corrosion***

61 ***Interior Wall Having Coating Fatigue, Exposed Steel And Corrosion***



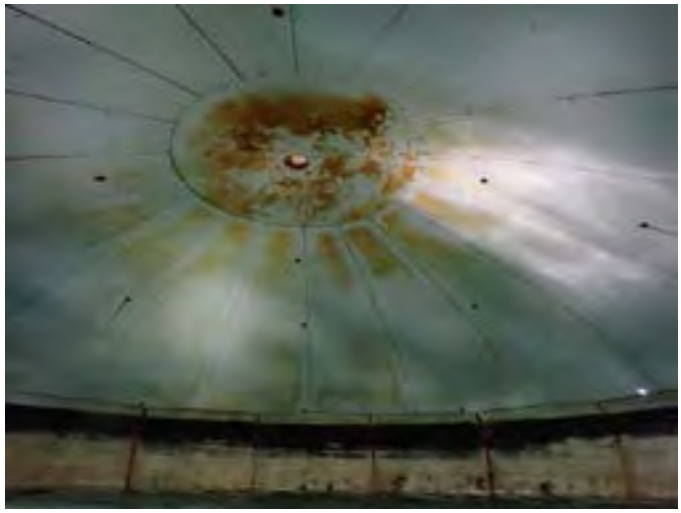
62 ***Interior Wall Having Pitting Of The Steel***

63 ***Interior Wall Having Pitting Of The Steel***



64 ***Interior Wall Having Pitting Of The Steel***

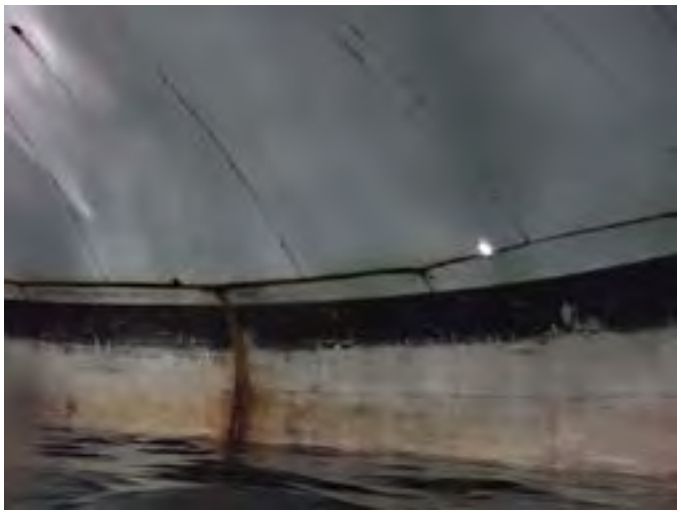
65 ***Interior Wall Having Pitting Of The Steel***



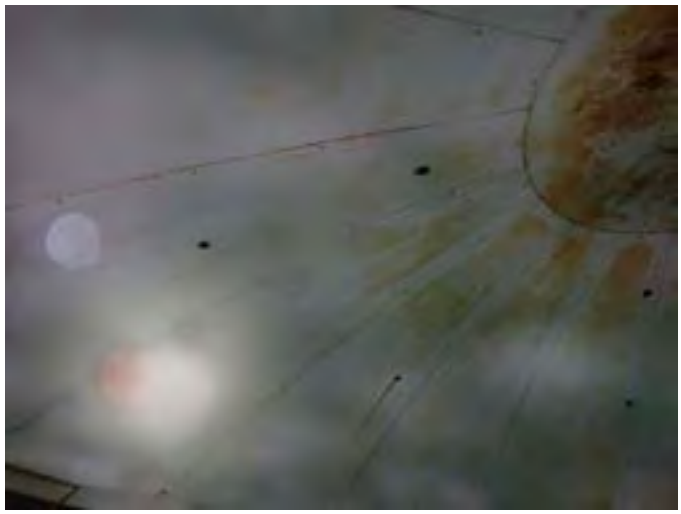
66 ***Overhead Having Surface Corrosion Showing Through The Coating***

67 ***Overhead Having Exposed Steel, Corrosion And An Open Rigging Hole Penetration***

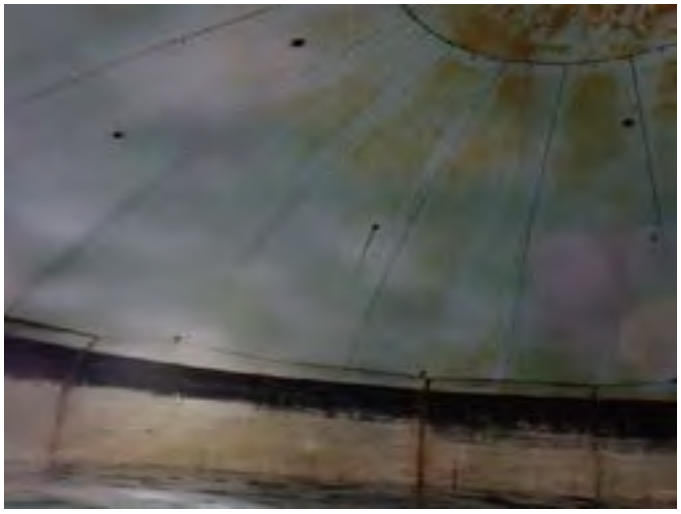
68 ***Overhead Having Exposed Steel, Corrosion And An Open Rigging Hole Penetration***



69 ***Overhead Having Exposed Steel, Corrosion And An Open Rigging Hole Penetration***



70 ***Overhead Having Surface Corrosion And Exposed Steel***



71 ***Overhead Having Surface Corrosion And Exposed Steel***

72 ***Overflow Pipe Having Exposed Steel And Corrosion***

73 ***Overflow Pipe Having Exposed Steel And Corrosion***

74 ***Overflow Pipe Supported To The Overhead***

75 ***Unobstructed Overflow Pipe***

76 ***Discharge From Cleaning***

APPENDIX E
Hydraulic Water Model Data

Hydraulic Modeling Information

For

Water System Evaluation
Village of Wellsburg, Chemung County, New York

I. Hydraulic Water Model Development

The hydraulic water model described here was developed to better the operation of the Village of Wellsburg water system. The water system was modeled with Innovyze's InfoWater Suite, which utilizes an enhanced version of the EPANET analysis engine as developed and distributed by the U.S. Environmental Protection Agency, Risk Reduction Engineering Laboratory (EPANET 2000). This software utilizes gradient algorithms and is used to simulate a distribution network with its various loops; elevations; user demands; fittings; pipes of various sizes, age and composition; water storage tanks; water sources; and pumping stations. Hydraulic model network mapping is included in Figure 1.

Various data are required to develop a model of the water systems. A description of the required data utilized in the development of the Village's hydraulic model is presented below.

A. Links

Links within the hydraulic model simulate the various watermains found throughout the distribution system. These links convey the flow as it moves from one node to another within the hydraulic model. The model simulates the pipe as a single entity including all segments of watermain and the associated fittings. A link in the model must represent a single stretch of watermain that contains uniform composition, diameter, and pipe age. These values are manually entered by the model builder during the construction of the model.

1. Configuration, Diameter, Type and Age

The configuration of the Village's water distribution system includes watermain diameter, composition, and age that were obtained from design mapping supplied by Village Staff and the water operator.

Refer to Appendix A of the *Wellsburg Municipal Water Study* (January 2021) for a copy of the water system configuration map. The water system model reflects all available information gathered with respect to wells, valve locations, hydrant locations, tank locations, booster pump station locations, watermain configuration, and watermain size.

2. Friction Losses

As water flows through the various pipes within a water distribution system, friction losses occur that result in a reduction of system pressures (i.e. decrease in hydraulic grade). For purposes of this analysis, the Hazen-Williams equation was used to estimate friction head loss within the distribution system. Utilization of this formula requires the estimation of the Hazen-Williams coefficient, also known as a C-factor, which is a measure of the internal surface roughness. The Wellsburg Water System consists primarily of ductile iron pipe whose internal roughness remains largely unchanged as it ages. There are some sections of asbestos cement pipe, whose surface roughness is also relatively constant throughout its lifetime. There are some older segments of cast iron pipe, whose C-factors were selected based on the best available knowledge of the age of the pipe within the system. The pipe input data is included in Table 1.

3. Minor Losses

Minor losses are head losses that occur at fittings and other appurtenances within a water distribution system (i.e. valves, etc.) These minor losses are a direct result of turbulence within the flow of water as it moves through the various fittings and obstructions. Typically with older water distribution systems, these losses are negligible compared to the head losses due to friction. Furthermore, head losses provided for a particular stretch of watermain may not be constant over time depending upon the flow pattern. Therefore, minor losses were not incorporated into the model.

B. Nodes

The water model consists of various types of nodal elements that commonly include pump stations, tanks, valves and interconnections of pipes (junctions). Nodes interconnected together with the previously described links form a complete network. Critical operating and boundary conditions are associated with the nodes as described below.

1. Junctions

Junction nodes are points placed at the intersection of two or more pipes, at points of water consumption, and at points where pipe attributes (i.e. diameter, composition, etc.) change. A ground elevation must be associated with each junction. Water demand is also entered at the junctions nearest to the point of consumption. Not all junctions will have an associated water demand. If the hydraulic model is to be used in simulating the water system for extended periods, a stepwise demand pattern must be applied describing how the demand changes through a 24-hour period. The data entry requirements are described in greater detail below.

a. Elevations

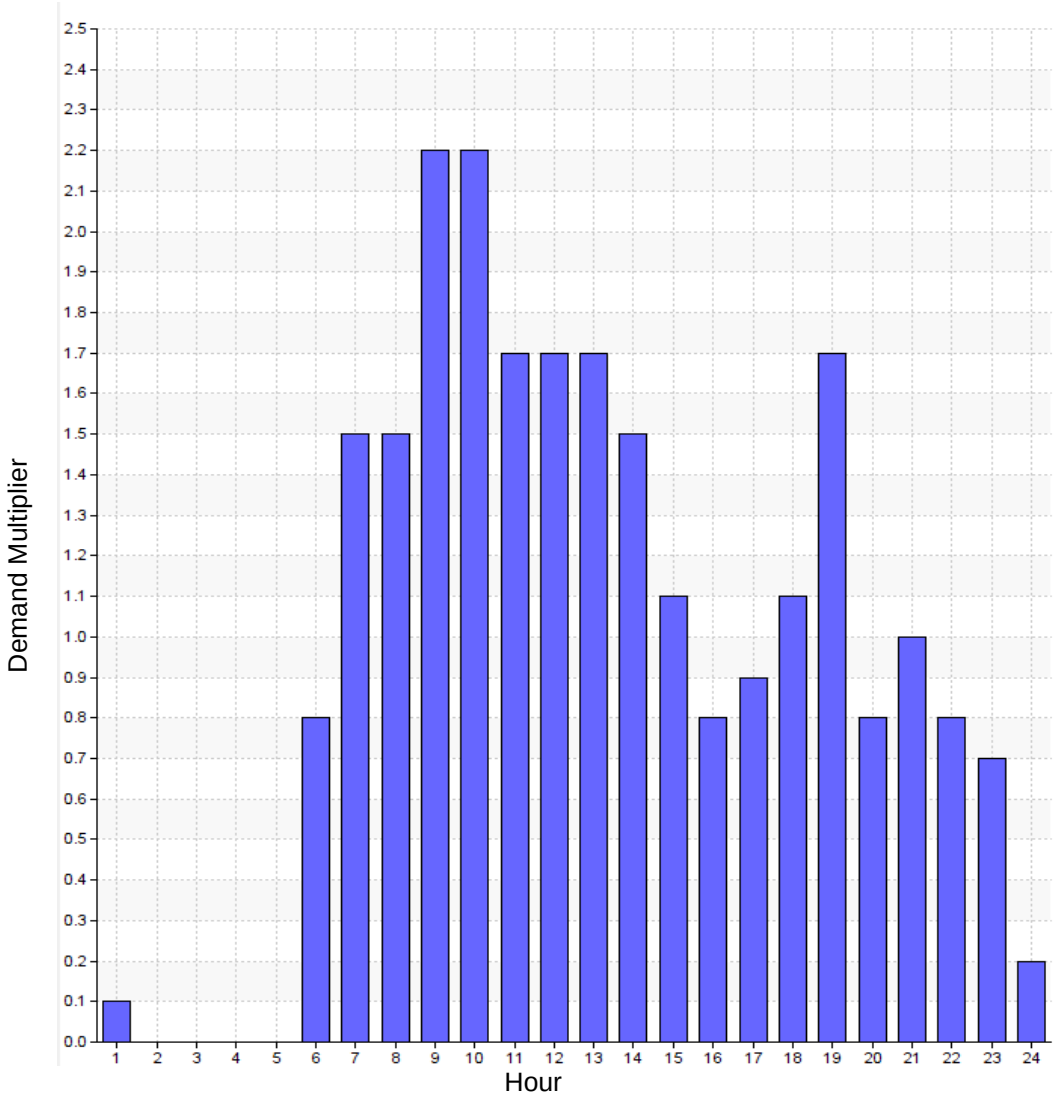
Ground elevations are essential data for the hydraulic model as it influences system pressures at a given location. Elevations for the junctions were obtained from existing topography from the original system design along with elevation data obtained from the NYSGIS Clearinghouse. Input elevation data is given in Table 2.

b. Water Demand

Water demands (and their associated fluctuations over time) impact pressure, available flow, direction of flow, and water age within the Village's water distribution system. As such, the allocation of the overall water use across the distribution system is an important component of the development of the hydraulic model. The goal is to generally match actual water use across the system.

c. Use Pattern

To model the instantaneous water consumption of the various users over time, a number of generic stepwise demand patterns were developed and applied to each daily demand. The stepwise pattern mimics typical daily fluctuations in water use. For example, a typical stepwise demand pattern was utilized to simulate residential water demands over the course of a 24-hour period in absence of actual metered hourly water use data. The residential stepwise demand pattern utilized is shown graphically below.



Residential Use Pattern

Multiplying an average daily (i.e. baseline) demand by the dimensionless demand multiplier generates a water demand pattern at a point in time. For instance, at 8:00 AM the consumption for a single residence having an average demand of 1 gpm is calculated as follows:

Demand at 8AM = Average Daily Demand x Demand Multiplier
Demand at 8AM = 1 gpm x 1.5
Demand at 8AM = 1.5 gpm

There are three types of use patterns in the water model: the residential model described above, the 8-hour commercial model with a constant water usage over normal working hours (multiplier is a constant 24 hours/8 hours = 3), and the 16-hour commercial model with a constant water usage over a typical 16-hour workday (multiplier is a constant 24 hours/16 hours = 1.5).

2. Storage Tanks

There are three welded steel storage tanks in the Wellsburg Water System. These are cylindrical tanks at ground level that are defined by diameter, a base elevation, a minimum water surface level above the base elevation, and a maximum water surface level above the base elevation.

Water surface elevations within storage facilities greatly influence hydraulic grades across a water system as well as water age. The following are existing tank elevations and historical tank operating elevations:

Comfort Hill Tank - 203,000-gallon
Base elevation: 1022.52 ft.
Maximum Water Level (Pump Off Level): 24.10 ft.

Front Street Tank - 209,000-gallon
Base elevation: 1021.09 ft.
Maximum Water Level (Pump Off Level): 22.51 ft.

Cowell Street Tank – 250,000-gallon
Base elevation: 1016.93
Maximum Water Level (Pump Off Level): 24.60

Because both the Front Street and Cowell Street tanks are lower in elevation than the Comfort Hill Tank, they utilize altitude control valves. The valves are modeled to close individually when their respective tanks reach their maximum water level.

3. Pump Station

The model consists of a single pump station along New York State Route 427. In the existing conditions model, the pump is constrained to come on when the water elevation in the Comfort Hill Tank is 1039.02 or lower (water level of 16.5 feet) and shuts off when the water elevation reaches 1042.02 (water level of 19.5 feet). The pump was modeled at a design point of 140 gallons per minute (gpm) at a design head of 300 feet.

II. Results

A. Existing Conditions

The existing water system largely meets the Ten State Standards requirement of no less than 20 psi of pressure normal operating conditions throughout the water system. One exception is the node located immediately downstream of the Comfort Hill Road tank, which experiences a normal operating pressure of 19.82 psi. The pressures experienced throughout the rest of the water system range from 20.30 psi to 96.12 psi. The pressure at each node under existing normal operating conditions is given in Table 4. The model shows the pump runs at 277 gpm in this scenario.

The minimum required fire flow given by the Insurance Services Office (ISO) is summarized below. As shown in Table 5, the minimum fire flow available is met with the minimum 20 psi pressure requirement at the hydrant.

Fire Flow Availability and Requirements for Existing Conditions

Flow Test Location	Model Node ID	Flow (gallons per minute) at 20 PSI		
		Needed	Available (per ISO)	Available (per Model)
Main St, opposite Front St	J148	2,250	3,400	6,450
Cowell Hill Rd & Terrace St	J636	2,250	5,000	6,218
Main St, 1st hydrant north of Doty Hill Rd	J126	1,500	6,100*	1,973
Berwick Tpke, 3rd hydrant north of Comfort Hill Rd	J106	750	1,400	1,719

*The available fire flow provided by the ISO at this location is uncharacteristically high and does not agree with the water modeling conducted as part of this study.

B. Two-Tank Analysis

In order to validate the removal of the Front Street tank as a viable design alternative, the model was run to check the following scenarios:

- Ensure that a minimum pressure of 20 psi is met under normal operating conditions, and
- Ensure that a minimum pressure of 20 psi is met when
    - The maximum 2,250 fire flow demand occurs at J148,
    - The maximum 750 fire flow demand occurs at J106,
    - The maximum 1,500 fire flow demand occurs at J126, and
    - The maximum 2,250 fire flow demand occurs at J636.

The model was modified by removing the pipe named P153 along with the Front Street Tank. Two new tanks replaced those at the Comfort Hill Road and Cowell Street sites, both with a base elevation of 1026.75. The required tank elevation was determined by finding the minimum elevation at which the required fire flows could be met. The tank size and maximum water level remained the same. The pump was found to run at the same rate of 277 gpm given the small increase in tank elevations. Therefore, no modifications to the pump house are anticipated as a result of the water tank elevation changes. No other changes were made to the existing conditions to develop the two-tank model.

Table 6 shows the normal, steady-state pressures of each node for this scenario. The pressures ranged from 21.69 to 96.37 psi.

The fire flow availability was modeled under the constraint that the minimum pressure that can be experienced at the hydrant is 20 psi. The resulting maximum hydrant flows are given in Table 7. The resulting fire flows for junctions where the ISO has designated specific requirements are summarized below.

Fire Flow Availability and Requirements for Two-Tank Model

Flow Test Location	Model Node ID	Flow (gallons per minute) at 20 PSI	
		Needed	Available flow at 20 PSI (per Model)
Main St, opposite Front St	J148	2,250	2,306
Cowell Hill Rd & Terrace St	J636	2,250	2,442
Main St, 1st hydrant north of Doty Hill Rd	J126	1,500	2,280
Berwick Tpke, 3rd hydrant north of Comfort Hill Rd	J106	750	1,672

*The available fire flow provided by the ISO at this location is uncharacteristically high and does not agree with the water modeling conducted as part of this study.

Four additional tables were generated to show that a minimum pressure of 20 psi was met at all known points within the system when the fire flow demand was imposed on the critical junctions specified by the ISO. The associated table and pressure range for each critical junction is summarized below.

Critical Junction	Imposed Demand (gpm)	Associated Node Pressure Table	Pressure Range (PSI)	
			Low	High
Main St, opposite Front St (J148)	2,250	Table 8	20.11	93.27
Cowell Hill Rd & Terrace St (J636)	2,250	Table 9	20.34	93.35
Main St, 1st hydrant north of Doty Hill Rd (J126)	1,500	Table 10	20.52	93.50
Berwick Tpke, 3rd hydrant north of Comfort Hill Rd (J106)	750	Table 11	21.43	94.48

The model shows that the minimum 20 psi operating pressure can be achieved in the two-tank model for all flow scenarios, including normal operating conditions and fire flow demands.

Figure 1
Water Model Network Map

Village of Wellsburg
Hydraulic Water Model Network Map

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

N
W E
S

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Table 1
Pipe Input Data

Pipe Input Data

	ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)
☐	P15	23.73	8.27	140.00
☐	P17	17.29	8.27	140.00
☐	P35	294.13	8.27	140.00
☐	P37	715.48	8.00	60.00
☐	P45	246.21	8.27	140.00
☐	P47	473.90	4.10	140.00
☐	P51	207.33	8.00	60.00
☐	P55	226.29	8.27	140.00
☐	P61	310.30	6.16	140.00
☐	P67	167.34	6.16	140.00
☐	P77	144.31	8.27	140.00
☐	P79	43.35	6.00	80.00
☐	P83	66.59	8.27	140.00
☐	P93	63.18	8.27	140.00
☐	P95	168.31	8.00	80.00
☐	P97	367.73	8.00	80.00
☐	P99	216.94	8.00	80.00
☐	P101	114.90	8.00	80.00
☐	P103	115.33	8.00	80.00
☐	P105	229.14	8.00	80.00
☐	P107	370.02	8.00	80.00
☐	P109	224.76	8.00	80.00
☐	P111	158.17	8.00	80.00
☐	P113	42.93	8.27	140.00
☐	P115	64.48	8.27	140.00
☐	P117	237.58	8.27	140.00
☐	P121	135.05	8.27	140.00
☐	P123	82.32	8.27	140.00
☐	P127	190.18	6.00	80.00
☐	P129	49.39	6.00	80.00
☐	P131	23.28	8.00	60.00
☐	P135	36.37	8.27	140.00
☐	P137	89.87	8.27	140.00
☐	P139	317.22	8.27	140.00
☐	P141	645.91	8.27	140.00
☐	P145	190.24	6.16	140.00
☐	P153	621.84	8.27	140.00
☐	P155	34.60	8.27	140.00
☐	P159	145.64	8.27	140.00
☐	P161	185.80	8.27	140.00
☐	P163	80.49	8.27	140.00
☐	P167	209.97	8.27	140.00
☐	P169	96.29	6.00	60.00
☐	P171	58.75	6.00	60.00
☐	P173	108.88	8.27	140.00
☐	P177	65.24	8.27	140.00
☐	P181	24.29	8.27	140.00
☐	P183	57.28	8.27	140.00
☐	P185	138.67	8.00	60.00
☐	P187	32.86	8.27	140.00
☐	P193	199.71	8.27	140.00
☐	P195	48.46	8.27	140.00
☐	P197	39.93	6.16	140.00
☐	P201	19.49	8.27	140.00
☐	P203	58.72	6.00	80.00
☐	P205	23.00	6.16	140.00
☐	P207	29.87	6.16	140.00
☐	P209	97.58	6.16	140.00
☐	P211	28.89	6.16	140.00
☐	P213	52.05	6.16	140.00
☐	P219	56.82	4.10	140.00
☐	P225	235.41	4.10	140.00
☐	P239	51.09	8.27	140.00
☐	P245	181.43	4.10	140.00
☐	P259	257.89	8.27	140.00
☐	P263	130.86	8.27	140.00
☐	P265	196.56	8.27	140.00
☐	P273	58.89	8.00	60.00
☐	P277	153.94	8.00	60.00
☐	P279	134.76	8.00	60.00
☐	P287	116.21	8.27	140.00

Pipe Input Data

	ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)
☐	P289	449.31	8.27	140.00
☐	P293	119.83	8.27	140.00
☐	P295	85.24	8.27	140.00
☐	P297	202.08	8.27	140.00
☐	P321	228.35	6.16	140.00
☐	P327	140.98	6.16	140.00
☐	P329	210.45	6.16	140.00
☐	P335	96.86	8.27	140.00
☐	P351	206.32	8.27	140.00
☐	P357	155.40	8.27	140.00
☐	P373	442.34	8.27	140.00
☐	P377	123.73	8.27	140.00
☐	P385	141.36	8.27	140.00
☐	P387	200.37	8.27	140.00
☐	P391	401.37	8.27	140.00
☐	P393	220.84	6.16	140.00
☐	P395	249.68	8.00	80.00
☐	P397	183.22	8.00	80.00
☐	P405	261.02	8.00	80.00
☐	P411	337.83	8.00	80.00
☐	P417	22.34	8.00	80.00
☐	P419	297.85	8.00	80.00
☐	P421	117.28	8.00	80.00
☐	P423	184.68	8.00	80.00
☐	P425	53.22	8.00	80.00
☐	P427	392.06	8.00	80.00
☐	P429	114.46	8.00	80.00
☐	P433	253.47	8.27	140.00
☐	P453	131.31	8.27	140.00
☐	P457	66.41	8.27	140.00
☐	P459	136.23	8.27	140.00
☐	P463	251.05	8.27	140.00
☐	P473	73.82	8.27	140.00
☐	P477	312.72	8.27	140.00
☐	P479	78.47	8.27	140.00
☐	P483	198.64	8.27	140.00
☐	P485	209.20	4.10	140.00
☐	P491	4,401.57	4.10	140.00
☐	P493	142.48	8.27	140.00
☐	P495	84.92	8.27	140.00
☐	P499	224.87	8.27	140.00
☐	P503	22.50	8.27	140.00
☐	P507	196.36	8.27	140.00
☐	P513	189.51	6.00	80.00
☐	P521	151.06	8.27	140.00
☐	P529	133.97	8.27	140.00
☐	P531	40.76	6.16	140.00
☐	P535	179.27	8.27	140.00
☐	P537	187.64	8.27	140.00
☐	P539	38.25	6.00	80.00
☐	P541	140.99	6.16	140.00
☐	P549	188.65	8.27	140.00
☐	P555	134.42	8.27	140.00
☐	P559	94.21	8.27	140.00
☐	P561	106.86	8.27	140.00
☐	P565	131.04	8.27	140.00
☐	P567	255.02	8.27	140.00
☐	P571	176.45	8.27	140.00
☐	P575	95.09	8.27	140.00
☐	P579	2,524.71	8.27	140.00
☐	P591	46.98	6.16	140.00
☐	P593	30.27	6.16	140.00
☐	P595	70.09	6.16	140.00
☐	P597	1,003.51	10.28	140.00
☐	P599	429.53	10.28	140.00
☐	P601	619.00	10.28	140.00
☐	P603	646.66	10.28	140.00
☐	P605	3,419.05	10.28	140.00
☐	P607	97.55	6.16	140.00
☐	P609	1,154.56	10.28	140.00
☐	P611	108.99	8.27	140.00

Pipe Input Data

	ID (Char)	Length (ft)	Diameter (in)	Roughness (Double)
☐	P613	294.76	8.27	140.00
☐	P615	244.36	8.27	140.00
☐	P619	144.93	6.16	140.00
☐	P621	44.23	6.00	80.00
☐	P625	116.09	8.27	140.00
☐	P627	67.93	6.00	60.00
☐	P635	57.82	8.00	60.00
☐	P637	362.95	8.00	60.00
☐	P641	198.38	6.00	60.00
☐	P643	34.03	6.00	60.00
☐	P647	188.87	8.27	140.00
☐	P649	136.38	8.27	140.00
☐	P655	145.75	8.27	140.00
☐	P661	250.10	8.27	140.00
☐	P667	208.73	8.27	140.00
☐	P673	36.98	8.27	140.00
☐	P681	201.87	8.27	140.00
☐	P689	242.99	10.28	140.00
☐	P695	5,825.82	10.28	140.00
☐	P697	457.90	8.27	140.00
☐	P699	3,266.74	10.28	140.00
☐	P701	280.81	8.27	140.00
☐	P705	37.20	8.27	140.00
☐	P707	19.49	8.27	140.00
☐	P711	24.32	8.27	140.00
☐	P717	257.35	6.00	80.00
☐	P719	196.66	8.27	140.00
☐	P723	93.46	8.27	140.00
☐	P725	125.53	8.27	140.00
☐	P727	218.97	8.27	140.00
☐	P729	143.06	8.27	140.00
☐	P731	262.19	6.16	140.00

Table 2
Junction Input Data – Elevations

Junction Input Data - Elevations

		ID (Char)	Description (Char)	Year of Installation	Year of Retirement	Zone (Char)	Elevation (ft)
1	☐	J16	Colwell Hill Road 1				951.77
2	☐	J22	Terrace and Smith				859.54
3	☐	J24	Terrace and East				852.09
4	☐	J26	Hydrant 28			Fire_Hydrant	844.34
5	☐	J28	Old Main Street Junction				845.28
6	☐	J30	New Main Street Split				843.21
7	☐	J32	Hydrant 26			Fire_Hydrant	840.13
8	☐	J34	Hydrant 27			Fire_Hydrant	840.49
9	☐	J36	Hydrant 25			Fire_Hydrant	839.75
10	☐	J38	New Main Street and East 5th				838.50
11	☐	J40	Terrace and 4th				842.32
12	☐	J44	New Main and 5th				837.77
13	☐	J46	Hydrant 23			Fire_Hydrant	834.83
14	☐	J48	Hydrant 21			Fire_Hydrant	833.78
15	☐	J50	Hydrant 22			Fire_Hydrant	831.90
16	☐	J52	Hydrant 20			Fire_Hydrant	833.90
17	☐	J58	Hydrant 18			Fire_Hydrant	836.01
18	☐	J60	New Main and 4th				834.99
19	☐	J62	New Main and 4th				835.20
20	☐	J64	Hydrant 17			Fire_Hydrant	832.92
21	☐	J66	Hydrant 2			Fire_Hydrant	839.82
22	☐	J68	Hydrant 14			Fire_Hydrant	829.17
23	☐	J70	New Main and Front				831.04
24	☐	J72	Hydrant 1			Fire_Hydrant	851.10
25	☐	J74	Hydrant 8			Fire_Hydrant	826.33
26	☐	J76	New Main and Front				825.43
27	☐	J80	Hydrant 10			Fire_Hydrant	823.29
28	☐	J82	Church and Front				823.13
29	☐	J84	Hydrant 11			Fire_Hydrant	823.12
30	☐	J86	Hydrant 12			Fire_Hydrant	826.54
31	☐	J88	Front and 427				828.01
32	☐	J90	Hydrant 13			Fire_Hydrant	826.02
33	☐	J92	Front and 427				830.92
34	☐	J94	Hydrant 46			Fire_Hydrant	840.98
35	☐	J96	Hydrant 45			Fire_Hydrant	834.06
36	☐	J98	Hydrant 44			Fire_Hydrant	858.79
37	☐	J100	Hydrant 43			Fire_Hydrant	855.75
38	☐	J102	Hydrant 42			Fire_Hydrant	867.31
39	☐	J104	Hydrant 41			Fire_Hydrant	898.17

Junction Input Data - Elevations

		ID (Char)	Description (Char)	Year of Installation	Year of Retirement	Zone (Char)	Elevation (ft)
40	☐	J106	Hydrant 40			Fire_Hydrant	903.79
41	☐	J108	Hydrant 39			Fire_Hydrant	899.28
42	☐	J110	Hydrant 38			Fire_Hydrant	888.40
43	☐	J112	Hydrant 31			Fire_Hydrant	880.05
44	☐	J114	Hydrant 32			Fire_Hydrant	869.57
45	☐	J116	Hydrant 33			Fire_Hydrant	849.67
46	☐	J120	Hydrant 30			Fire_Hydrant	900.95
47	☐	J122	367 and Berwick				883.11
48	☐	J124	Hydrant 34			Fire_Hydrant	886.68
49	☐	J126	Hydrant 35			Fire_Hydrant	893.43
50	☐	J128	Hydrant 36			Fire_Hydrant	867.76
51	☐	J130	Blowoff MH				921.46
52	☐	J134	Comfort Hill Reducer 1				910.65
53	☐	J136	Comfort Hill Reducer 2				890.28
54	☐	J138	Hyd 29				992.68
55	☐	J140	367 Blowoff MH				871.21
56	☐	J142	367 Split				868.68
57	☐	J144	Main St Tee 8"				824.52
58	☐	J146	New Junction				829.10
59	☐	J148	Hydrant 9			Fire_Hydrant	826.10
60	☐	J150	4th and Main 6"				835.19
61	☐	J152	4th St tee				833.37
62	☐	J164					870.95
63	☐	J182	14 Main St Mobile Homes				868.70
64	☐	J186	Dandy Mini Mart				871.38
65	☐	J188	27 Main St				872.26
66	☐	J204	71 Main St				894.16
67	☐	J208	78 Main St				891.58
68	☐	J214	84 Main St				884.79
69	☐	J216	104 Main St				882.36
70	☐	J222	119 Main St				876.23
71	☐	J228	138 Main St				852.63
72	☐	J234					849.17
73	☐	J236	162 Main St				848.14
74	☐	J238	172 Main St				846.52
75	☐	J242	202 Main St				841.92
76	☐	J260	195 Main St				842.18
77	☐	J270	217 Main St				839.26
78	☐	J276	234 Main St				836.83

Junction Input Data - Elevations

		ID (Char)	Description (Char)	Year of Installation	Year of Retirement	Zone (Char)	Elevation (ft)
79	☐	J280	242 Main St				835.74
80	☐	J282	233 Main St				837.29
81	☐	J294	3688 E 4th St				835.92
82	☐	J300	3678 E 4th St				833.94
83	☐	J304	3678 E 5th St				840.67
84	☐	J312	295 Main St				827.70
85	☐	J316	184 Terrace St, Church				860.06
86	☐	J318	111 Berwick Tpke				890.12
87	☐	J320	170 Main St, unknown				845.59
88	☐	J328	262 Church St				832.11
89	☐	J334	222 B Terrace St				851.12
90	☐	J338	167 Berwick Tpke				908.97
91	☐	J342	136 Berwick Tpke				889.78
92	☐	J358	118 Berwick Tpke				900.32
93	☐	J360	289 Berwick Tpke				858.80
94	☐	J362	304 Berwick Tpke				858.67
95	☐	J364	254 Berwick Rd				859.44
96	☐	J366	280 Berwick Tpke				855.29
97	☐	J368	314 Berwick Tpke				837.79
98	☐	J370					894.27
99	☐	J372	261 Berwick Tpke				860.80
100	☐	J376	3763 Cowell Hill Rd				959.14
101	☐	J404	Town of Ashland Cemetary				869.45
102	☐	J414	246 Terrace St				841.67
103	☐	J416	208 Terrace St				851.76
104	☐	J418	281 Terrace St				833.86
105	☐	J420	260 Main St				834.09
106	☐	J424	3607 Front St				840.09
107	☐	J426	17881 Berwick Tpke				872.21
108	☐	J432	17162 B Berwick Tpke				902.96
109	☐	J444	275 Main st				829.31
110	☐	J454	296 Main St				827.25
111	☐	J472	245 Main St				835.62
112	☐	J478	271 Main St				831.67
113	☐	J480	286 Main St				828.97
114	☐	J482	3642 W 5th St				835.34
115	☐	J496	3566 Front St				841.19
116	☐	J500	3618 Front St				828.77
117	☐	J510	3610 Front St				826.87

Junction Input Data - Elevations

		ID (Char)	Description (Char)	Year of Installation	Year of Retirement	Zone (Char)	Elevation (ft)
118	☐	J512	3645 Front St				823.47
119	☐	J522	3562 Front St				838.30
120	☐	J524	3064 Lower Maple Ave				837.41
121	☐	J526					829.34
122	☐	J534	3631 W 4th St				832.18
123	☐	J536	3635 W 4th St				831.56
124	☐	J538	3633 W 4th St				831.78
125	☐	J540	3144 Lower Maple Ave				832.86
126	☐	J542	3162 Lower Maple Ave				836.70
127	☐	J544	3192 Lower Maple Ave				837.09
128	☐	J546	3087 B Lower Maple Ave				836.44
129	☐	J548	Carriage Estates				830.64
130	☐	J550	3668 E 5th St				839.36
131	☐	J552	3415 Lower Maple Ave				828.17
132	☐	J556	3695 Front St DG				826.07
133	☐	J558	3662 Front St				823.25
134	☐	J564	250 Church St				834.37
135	☐	J568	3635 Tannery Ln				830.42
136	☐	J574	3628 Comfort Hill Road				891.30
137	☐	J576	3605 Comfort Hill Rd				905.89
138	☐	J578	3557 Comfort Hill Rd				993.80
139	☐	J582	3650 W 5th St				836.90
140	☐	J584	3617 Comfort Hill Rd				898.29
141	☐	J588	3599 Comfort Hill Rd				925.16
142	☐	J590	3674 6th St				844.94
143	☐	J592	3663 6th St Town Hall				845.28
144	☐	J598	279 Church St				828.52
145	☐	J602	296 Church St				825.00
146	☐	J610	251 Church St				834.18
147	☐	J616	239 Church st				834.56
148	☐	J622	262 Terrace St				840.96
149	☐	J624	Hydrant 15			Fire_Hydrant	827.02
150	☐	J626	3394 Lower Maple Ave				831.31
151	☐	J628	3635 Front St				824.73
152	☐	J630	Hydrant 47			Fire_Hydrant	840.25
153	☐	J632	Hydrant 3			Fire_Hydrant	842.19
154	☐	J634	Hydrant 4			Fire_Hydrant	851.84
155	☐	J636	Hydrant 5			Fire_Hydrant	859.82
156	☐	J638	Hydrant 7			Fire_Hydrant	879.11

Junction Input Data - Elevations

		ID (Char)	Description (Char)	Year of Installation	Year of Retirement	Zone (Char)	Elevation (ft)
157	☐	J640	Hyd 6			Fire_Hydrant	952.94
158	☐	J642	Hydrant 24			Fire_Hydrant	837.89
159	☐	J644	Hydrant 16			Fire_Hydrant	831.41
160	☐	J646	Hydrant 19			Fire_Hydrant	835.05
161	☐	J648	218 Main St				
162	☐	J650					

Table 3
Junction Input Data - Demand

Junction Input Data - Demands

ID (Char)	Demand 1 (gpm)	Pattern 1 (Char)	Demand 2 (gpm)	Pattern 2 (Char)	Demand 3 (gpm)	Pattern 3 (Char)	Demand 4 (gpm)	Pattern 4 (Char)	Demand 5 (gpm)	Pattern 5 (Char)	Demand 6 (gpm)	Pattern 6 (Char)	Demand 7 (gpm)	Pattern 7 (Char)
J16	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J22														
J24														
J26														
J28														
J30														
J32														
J34														
J36														
J38														
J40														
J44														
J46														
J48														
J50														
J52														
J58														
J60														
J62														
J64														
J66														
J68														
J70														
J72														
J74														
J76														
J80														
J82														
J84														
J86														
J88														
J90														
J92														
J94														
J96														
J98														
J100														
J102														
J104														
J106														
J108														
J110														
J112														
J114														
J116														
J120														
J122														
J124														
J126														
J128														
J130	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00	
J134														
J136														
J138	0.00		0.00		0.00		0.00		0.00		0.00		0.00	
J140	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J142	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J144														
J146														
J148														
J150														
J152														

Junction Input Data - Demands

ID (Char)	Demand 1 (gpm)	Pattern 1 (Char)	Demand 2 (gpm)	Pattern 2 (Char)	Demand 3 (gpm)	Pattern 3 (Char)	Demand 4 (gpm)	Pattern 4 (Char)	Demand 5 (gpm)	Pattern 5 (Char)	Demand 6 (gpm)	Pattern 6 (Char)	Demand 7 (gpm)	Pattern 7 (Char)
J164	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00	
J182	13.88	RESIDENTIAL	0.19	16HR_COMM	0.00		0.00		0.00		0.00		0.00	
J186	0.19	16HR_COMM	0.00		0.00		0.00		0.00		0.00		0.00	
J188	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00	
J204	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J208	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J214	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J216	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J222	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J228	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J234	0.19	PATN_1	0.00		0.00		0.00		0.00		0.00		0.00	
J236	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J238	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J242	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J260	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00	
J270	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00	
J276	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.38	RESIDENTIAL	0.00		0.00		0.00		0.00	
J280	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J282	0.38	RESIDENTIAL	5.21	PATN_1	0.00		0.00		0.00		0.00		0.00	
J294	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J300	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J304	0.19	RESIDENTIAL	0.19	8HR_COMM	0.00		0.00		0.00		0.00		0.00	
J312	0.56	RESIDENTIAL	0.56	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J316	0.19	16HR_COMM	0.00		0.00		0.00		0.00		0.00		0.00	
J318	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J320	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J328	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00	
J334	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J338	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00	
J342	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J358	0.19	RESIDENTIAL	0.19	8HR_COMM	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00	
J360	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J362	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J364	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J366	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J368	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J370	0.00		0.00		0.00		0.00		0.00		0.00		0.00	
J372	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J376	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J404	0.19	16HR_COMM	0.19	16HR_COMM	0.19	16HR_COMM	0.19	8HR_COMM	0.00		0.00		0.00	
J414	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J416	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J418	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL
J420	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00	
J424	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J426	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J432	0.19	8HR_COMM	0.19	8HR_COMM	0.00		0.00		0.00		0.00		0.00	
J444	0.19	PATN_1	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J454	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J472	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J478	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00	
J480	0.38	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J482	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J496	0.38	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J500	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J510	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J512	0.19	16HR_COMM	0.19	8HR_COMM	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J522	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J524	0.19	8HR_COMM	0.00		0.00		0.00		0.00		0.00		0.00	
J526														
J534	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	

Junction Input Data - Demands

ID (Char)	Demand 1 (gpm)	Pattern 1 (Char)	Demand 2 (gpm)	Pattern 2 (Char)	Demand 3 (gpm)	Pattern 3 (Char)	Demand 4 (gpm)	Pattern 4 (Char)	Demand 5 (gpm)	Pattern 5 (Char)	Demand 6 (gpm)	Pattern 6 (Char)	Demand 7 (gpm)	Pattern 7 (Char)
J536	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J538	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J540	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J542	0.19	16HR_COMM	0.00		0.00		0.00		0.00		0.00		0.00	
J544	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J546	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J548	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J550	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J552	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J556	0.56	16HR_COMM	0.19	8HR_COMM	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00	
J558	0.19	16HR_COMM	0.19	16HR_COMM	0.19	8HR_COMM	0.00		0.00		0.00		0.00	
J564	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J568	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00	
J574	0.19	8HR_COMM	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J576	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00	
J578	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J582	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J584	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J588	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J590	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J592	0.19	8HR_COMM	0.00		0.00		0.00		0.00		0.00		0.00	
J598	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00	
J602	0.19	8HR_COMM	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00	
J610	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J616	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J622	0.38	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00	
J624	0.00		0.00		0.00		0.00		0.00		0.00		0.00	
J626	0.00	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00		0.00	
J628	0.19	8HR_COMM	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00	
J630														
J632														
J634														
J636														
J638														
J640														
J642														
J644														
J646														
J648	0.19	RESIDENTIAL	0.19	RESIDENTIAL	0.00		0.00		0.00		0.00		0.00	
J650	0.19	16HR_COMM	0.00		0.00		0.00		0.00		0.00		0.00	

APPENDIX F
Tank Life Cycle Cost Analysis

50 YEAR LIFE CYCLE ANALYSIS

AQUASTORE vs WELDED

Date **5/30/2023**

Wellsburg, NY

		0	10	15	20	25	30	35	40	45	50	55	TOTAL NET PRESENT VALUE
DESIGN CONDITIONS													
Diameter	**42**												
Height	**24**												
GLASS LINED BOLTED STEEL													
INTERIOR/EXTERIOR RESEALING													
Anode Replacements @ $500/Each (1 for every other starter sheet)			$3,750.00		$3,750.00		$3,750.00		$3,750.00		$3,750.00		
Twenty Year Overall Maintenance					**$15,000.00**				**$15,000.00**				
Total LF of Resealing	2,090												
Percent of Total to be Resealed	**100%**												
Interior and Exterior Resealed per Maintenance Period	2,090.47												
Cost Per LF - Resealing	**$ 12.00**												
PRESENT VALUE RESEALING					$25,085.63				$25,085.63				
PRESENT VALUE RESEALING & ANODES		**$0.00**	**$3,750.00**	**$0.00**	**$43,835.63**	**$0.00**	**$3,750.00**	**$0.00**	**$43,835.63**	**$0.00**	**$3,750.00**	**$0.00**	
DISCOUNT FACTOR PER END YEAR	**2.0%** *	102%	84%	76%	69%	62%	56%	51%	46%	42%	38%	34%	
NET PRESENT VALUE		**$0.00**	**$3,137.83**	**$0.00**	**$30,090.12**	**$0.00**	**$2,111.67**	**$0.00**	**$20,249.79**	**$0.00**	**$1,421.09**	**$0.00**	**$57,010.51**
WELDED													
INTERIOR - Pressure Wash & Repaint (20-year Cycle)													
Anode Replacements @ $500/Each			$3,750.00		$3,750.00		$3,750.00		$3,750.00		$3,750.00		
Twenty Year Overall Maintenance					**$15,000.00**				**$15,000.00**				
Total Surface Area	**5,937**												
Cost per SF	**$ 30.00**												
TOTAL 20 YEAR RECOATING INTERIOR		$0.00	$0.00	$0.00	$178,101.76	$0.00	$0.00	$0.00	$178,101.76	$0.00	$0.00	$0.00	
EXTERIOR - Sandblast & Paint (20-year cycle)													
Total Surface Area	**4,552**												
Cost per SF	**$ 30.00**												
TOTAL 20 YEAR RECOATING EXTERIOR		$0.00	$0.00	$0.00	$136,551.76	$0.00	$0.00	$0.00	$136,551.76	$0.00	$0.00	$0.00	
PRESENT VALUE INTERIOR/EXTERIOR		**$0.00**	**$3,750.00**	**$0.00**	**$333,403.52**	**$0.00**	**$3,750.00**	**$0.00**	**$333,403.52**	**$0.00**	**$3,750.00**	**$0.00**	
DISCOUNT FACTOR PER END YEAR	2.0% *	102%	84%	76%	69%	62%	56%	51%	46%	42%	38%	34%	
NET PRESENT VALUE		**$0.00**	**$3,137.83**	**$0.00**	**$228,858.43**	**$0.00**	**$2,111.67**	**$0.00**	**$154,015.17**	**$0.00**	**$1,421.09**	**$0.00**	**$389,544.20**

AQUASTORE VS. WELDED DIFFERENCE IN NET PRESENT VALUE **$332,533.69**

APPENDIX G
Water System Improvements Map

Village of Wellsburg

Figure 2. Water System Layout

N
W E
S

Feet
0 750 1,500 3,000 4,500 6,000

proposed Front Street pipe replacement

proposed Old Main Street pipe replacement

Front Street Tank

Comfort Hill Road Tank

Cowell Street Tank

NEW YORK STATE
PENNSYLVANIA

Legend

- Existing Water Tank
- Elmira Metering Station
- Wellsburg Pump Station

Pipe

- 4 inch
- 6 inch
- 8 inch
- 10 inch

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

APPENDIX H
Annual Drinking Water Quality Reports
Elmira Water Board & the Village of Wellsburg

261 W. Water Street
Elmira, NY 14901
Annual Drinking Water Quality Report
2022
(Issued February 2023)
PWSID #NY0701008

Dear Elmira Water Board Customers:

This publication contains a summary of the quality of the water provided to you during the past year. Federal and state requirements set the measuring standards by which we are evaluated. In 2022, the EWB met or exceeded all federal and state requirements

Why Water Conservation is Part of "Going Green"

Only 3% of the world's water is fresh water, and of this 2/3 is stored in ice caps and glaciers. That leaves only 1% of the world's water available for drinking. "Going green" means protecting our water against the constant threat of pollution and conserving our usage.

Save Energy:

Reduce usage of hot water, washing machine, dishwasher, etc; if possible, replace existing high energy consuming appliances.

Save the Environment:

Landscape with plants that require little water, water the lawn less frequently (before dawn/after sunset); try catching rain water for outdoor use. Look for nontoxic alternatives for household products. Avoid using garbage disposals (try to compost food waste); putting food waste, oils, and grease down the drain burdens waste water treatment plants and affects aquatic life and water quality downstream.

Save Money:

Water conservation will lower your water bill, sewer tax, and energy costs.

We are fortunate to have an abundant local water supply; future generations will judge us on how we protected and preserved it.

EWB Statistics	
Average Daily Distribution System Use	5.0 Million Gallons
Total Water Produced	1.8 Billion Gallons
Population Served - approximate	54 Thousand
Unaccounted For Water	22.4%
Accounts	17,315
Average Annual Residential Use	44,102 Gallons
Average Annual Residential Bill	$354.85
Miles Of Water Main	225 Miles
Number Of Hydrants	1,227

Drinking Water Sources

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activities. Contaminants that may be present in source water include: microbial, inorganic, pesticides and herbicides, organic, chemical, and radioactive.

In order to ensure that tap water is safe to drink, the state and the EPA prescribe regulations which limit the amount of certain contaminants in water provided by public water systems. The State Health Department's and the EPA's regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

Since 1889 the primary source of water for the EWB has been the Chemung River, in 2022, 63% of our raw water came from the river. Wellfields, Foster Island #40 & #41 contributed 21 % and Hudson Street #1A, contributed 15 % of 2022's source water. The first EWB water source (circa 1872) was the Hoffman Reservoir, which is now used on a standby basis and provided 1% of our raw water in 2022.

Instead of using any one source alone, all raw (untreated) water from the river, wells, and reservoir are blended to provide a better water product. We treat the blended water by adding poly aluminum chloride, which causes natural contaminants like silt and germs to coagulate and settle out before filtration. We add chlorine to destroy any viruses, bacteria or organisms that may survive the settling process. We add fluoride for dental health, then add caustic soda and phosphate to help prevent corrosion of household plumbing.

Lead Discussion

Lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Elmira Water Board is responsible for providing high quality drinking water and removing lead pipes, but cannot control the variety of materials used in plumbing components in your home. You share the responsibility for protecting yourself and your family from the lead in your home plumbing. You can take responsibility by identifying and removing lead materials within your home plumbing and taking steps to reduce your family's risk. Before drinking tap water, flush your pipes for several minutes by running your tap, taking a shower, doing laundry or a load of dishes. You can also use a filter certified by an American National Standards Institute accredited certifier to reduce lead in drinking water. If you are concerned about lead in your water and wish to have your water tested, contact the Elmira Water Board at 607-732-2277. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available at http://www.epa.gov/safewater/lead.

Harmful Algae Blooms Discussion

In recent years some cities have experienced toxic blue green algae blooms. We tested our water during the hot summer months and found no traces of algae.

Elmira Water Board Directory	
Mark D. LaDouce, General Manager	733-9179
Main Office Monday through Friday 9:00 PM to 4:00 PM Customer Service & Billing Information	733-9179
David McCarty, Chief Water Treatment Operator	732-2277
Filtration Plant 24/7 Water Quality Questions & To Report An Emergency	732-2277
Elmira Water Board Website	www.elmirawaterboard.org
Public Elmira Water Board Meetings 1 Fountain Drive, Elmira, NY Call Main Office for dates and times	733-9179
Other Important Water Numbers	
Chemung County Health Department To answer water questions	737-2019
Chemung County Health Department Website **(click on the environmental tab to view the drinking water page)**	www.chemungcountyhealth.org
Environmental Protection Agency Safe Drinking Water Hotline	1-800-426-4791

Information on Contaminants and Their Potential Health Effects

Important Education Information if you are Immunocompromised or have an Infant:

Although our drinking water meets or exceeds state and federal regulations, some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons are especially at risk. Such persons can be for example: persons with cancer undergoing chemotherapy; persons who have undergone organ transplants; persons with HIV/AIDS or other immune system disorders; the elderly and infants can be particularly at risk of infections. These people should seek advice about drinking water from their health care providers. Environmental Protection Agency (EPA)/Center for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the the EPA's Safe Drinking Water Hotline (1-800-426-4791). Please call our office if you have questions.

All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (1-800-426-4791). As a precautionary measure, all customers are urged to flush their cold water taps each morning 30 seconds to 2 minutes to remove contaminants that may come from house water lines.

Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites, which can cause symptoms such as nausea, cramps, diarrhea, and associated headaches. Filtration and disinfection are the best methods for guarding against microbiological contaminants, although a 100% removal or inactivation cannot be guaranteed. We at the Elmira Water Board have installed adequate filtration and disinfecting equipment for proper and effective treatment of our water.

2022 Water System Improvements

- Replaced 1,525 ft. of water mains of various sizes & materials
- Replaced/Installed 24 system valves, and 53 hydrants
- Replaced 145 lead services, terminated 15 lead services.
- Continued conversion of meter read system to radio-read
- Continued meter replacements

2023 Water System Planned Improvements

- Continue lead service line replacements.
- Well Redevelopment
- Replace large water mains on East Water Street
- Continue conversion of meter read system to radio-read
- Continue meter replacement

Fluoride Treatment Discussion

The EWB is one of many systems in NYS that provides drinking water with a controlled, low level of fluoride for consumer dental health protection. The United States Centers for Disease Control (CDC), recommends a dosage of 0.7 mg/l (parts per million). To ensure that the fluoride supplement in your water provides optimal dental protection, the State DOH requires that we monitor fluoride levels on a daily basis.

Detected Substances

In 2022, we tested for over 200 contaminants. The table that follows shows the substances that were detected. None of these contaminants exceeded the regulated levels established by the EPA and NYS.

To obtain more information on the details of the non-detected contaminants and source water results, please visit our website **www.elmirawaterboard.org** or the Steele Memorial Public Library downtown Elmira branch for a copy of the Recent Analytical Results and Sample Plan for the distribution system.

Source Water Assessment Summary
Elmira Water Board #NY0701008
January 19, 2005

The NYS DOH has completed a source water assessment for the Elmira Water Board, based on available information. Possible and actual threats to multiple drinking water sources were evaluated. The state source water assessment includes a susceptibility rating based on the risk posed by each potential source of contamination and how easily those contaminants can move about. The susceptibility rating is an estimate of the potential for contamination of the source water, it does not mean that the water delivered to consumers is, or will become, contaminated. See page 2 of this report for a list of the contaminants that have been detected. The source water assessments provide resource managers with additional information for protecting source waters into the future.

The assessment found an elevated susceptibility to contamination for the surface water sources, the Chemung River and Hoffman Reservoir. The amount of agricultural lands in the assessment area results in elevated potential for protozoa and pesticides contamination. While there are some facilities present, permitted discharges do not likely represent an important threat to source water quality based on their density in the assessment area. However, it appears that the total amount of wastewater discharged to surface water in this assessment
area is high enough to further raise the potential for contamination (particularly for protozoa). There are no noteworthy contamination threats associated with other discrete contaminant sources. Finally, it should be noted that relatively high flow velocities make river and reservoir drinking water supplies highly sensitive to existing and new sources of microbial contamination.

The assessment of the five active wells found them to have a medium-high to high susceptibility to microbials, nitrates, industrial solvents, and other industrial contaminants. These ratings are due primarily to the close proximity of industrial/commercial facilities that discharge wastewater into the environment and low intensity residential activities in the assessment area.

Please note that water from all the sources is blended and treated at the filtration plant to provide disinfection and to remove contaminants. There are also wellhead protection rules in place for the wells, and watershed protection rules for the Hoffman Reservoir. These rules give legal authority to forbid activities and discharges that could cause gross contamination in these sources.

Giardia Discussion

Giardia is a microbial pathogen often found in rivers and lakes. Giardia is removed/inactivated through a combination of filtration and disinfection. During 2017, we tested 9 samples of mixed river and well water collected before disinfection and filtration. Low levels of Giardia were reported in 2 of 9 source water samples. Note that our filtration plant is designed and operated to meet State and Federal standards for the removal of Giardia and similar pathogens. Ingestion of Giardia may cause Giardiasis, an intestinal illness. Symptoms may be absent, or mild to severe diarrhea can occur. Fever is rarely present. Occasionally some individuals will have chronic diarrhea over several week or a month, with significant weight loss. Giardiasis can be treated with anti-parasitic medication. Individuals with weakened immune systems should consult with their health care providers about what steps would best reduce their risk of Giardiasis. Individuals who think that they may have been exposed to Giardiasis should contact their health care providers immediately. The Giardia parasite is passed in the feces of an infected person or animal and may contaminate water or food. Person to person transmission may also occur in day care centers or other settings where hand washing practices are poor.

Water Chemistry Definitions, Terms, & Abbreviations

Action Level (AL): The concentration of contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.

"<" = less than

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLG as possible.

Maximum Contaminant Level Goal (MCLG): The level of contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a disinfectant in drinking water below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

"N/A" not applicable: Not related to the matter described.

Nephelometric Turbidity Unit (NTU): Measure of the clarity of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

Parts per million (ppm): Corresponds to one part of liquid in one million parts of liquid.

Parts per billion (ppb): Corresponds to one part of liquid in one billion parts of liquid.

pH units: A measure of acidity or alkalinity of the water.

Picocuries per liter (pCi/L): A measure of the radioactivity in water.

Treatment Technique (TT): A required process intended to reduce the level of contaminant in drinking water.

Table of Detected Contaminants

Contaminant	Violation Yes/No	Date of Sample	Level Detected		Units of Measure	MCLG	Regulatory Limit (MCL)	Likely Source of Contamination
Inorganic Contaminants:								
Barium	no	**3/25/2022**	**0.06**		ppm	2	2	Erosion of natural deposits
Nickel	no	**3/25/2022**	**1**		ppb	n/a	n/a	Naturally occuring
Chloride	no	**In 2022: daily**	**99 High 51 Low 75 Average**		ppm	n/a	250	Naturally occurring; use of road salt
Lead - sampled at customer faucets	no	**July 2020**	***90th % 4.3**	**High 23.1 Low <1**	ppb	0	AL=15	Corrosion of household plumbing systems
*90th Percentile: Out of 30 samples tested 90% of the samples had a lead concentration of 4.3 ppb or less with 2 samples exceeding the 15 ppb action level (AL)								
Copper - sampled at customer faucets	no	**July 2020**	***90th % .06**	**High .22 Low .005**	ppm	1.3	AL=1.3	Corrosion of household plumbing systems
*90th Percentile: Out of 30 samples tested 90% of the samples had a copper concentration of .06 ppm or less with 0 samples exceeding the 1.3 ppm action level (AL)								
Fluoride	no	**In 2022: daily**	**.79 High .39 Low .68 Average**		ppm	n/a	2.2	Water additive which promotes strong teeth
Nitrates	no	**3/25/2022**	**1.32**		ppm	10	10	Runoff from fertilizer use
***Sodium**	no	**3/25/2022**	**28.5**		ppm	n/a	no designated limits	Naturally occurring; use of road salt
*Sodium: Water containing more than 20 ppm of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 ppm of sodium should not be used for drinking by people on moderately restricted sodium diets. Sodium in excess could cause problems for individuals with hypertension.								
NewYork State allows us to test for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. For this reason some of our data, through representative, is more than one year old.								
Disinfection By-Products:								
Total Organic Carbon (TOC) Source	no	**In 2022: monthly**	**High 3.19 Low 1.54 Average 2.4**		ppm	n/a	n/a	Naturally occurring organic materials from decaying leaves & plants
Total Organic Carbon (TOC) Treated	no	**In 2022: monthly**	**High 3.08 Low 1.08 Average 2.08**		ppm	TT	TT	Source same as above, treated samples measure the effectiveness of our water treatment process
Total Trihalomethane (TTHM) *LRAA (Locational Running Annual Average): average of last 4 quarters	no	**In 2022: 3/18, 6/20, 9/19, 11/21**	**Quarterly Individual Samples High 62 Low 33**	**Highest*LRAA at 8 sites 62**	ppb	n/a	*RAA Quarterly Average 80	By-product of drinking water chlorination needed to kill harmful organisms; formed when source water contains large amounts of organic matter
Haloacetic Acids (HAA) *LRAA (Locational Running Annual Average): average of last 4 quarters	no	**In 2022: 3/18, 6/20, 9/19, 11/21**	**Quarterly Individual Samples High 29 Low 11**	**Highest Quarterly Average at 8 sites 23**	ppb	n/a	*LRAA Quarterly Average 60	By-product of drinking water chlorination needed to kill harmful organisms
Microbiological Contaminants:								
***Turbidity after purification plant**	no	**In 2022: every 4 hours**	**100% of 2,190 results < 0.3**		ntu	n/a	TT=0.3	Soil runoff
Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system.								
Turbidity at customer tap	no	**In 2022: daily**	**High 3.1 Low 0.04 Average 0.1**		ntu	n/a	TT=5	Suspended particles in water from piping
Chlorine	no	**In 2022: daily**	**High 1.24 Low .02 Average .75**		ppm	MRDLG 4.0	MRDL 4.0	Level of disinfectant necessary for control of microbial contaminants
*** Total Coliform Bacteria**	no	**Tested for in 2022: daily**				0	TT: no positive results in the entire year of 2022	
***We routinely collect 60 samples each month/720 per year. In 2022, no samples were found positive. We are required to monitor your drinking water for specific contaminants on a regular basis. Results of regular monitoring are an indicator of whether or not your drinking water meets health standards. During 2022, we did not complete all monitoring or testing in the month of February for total coliform samples, having collected 59 instead of 60 samples.**								
****E.coli**	**no**	**Tested for in 2022: daily**				**0**		In 2022, no samples were found to be positive for E. Coli
Orthophosphate	no	**In 2022: daily**	**High 1.39 Low .86 Average 1.01**		ppm	n/a	TT=0.5-5.0	Water additive for corrosion control
pH	no	**In 2022: daily**	**High 7.9 Low 7.4 Average 7.7**		pH units	n/a	TT=>7.4	A pH value below 7 can release metals like lead from household plumbing, while a level above 7 reduces corrosion
Alkalinity	no	**In 2022: daily**	**High 145 Low 72**		ppm	n/a	TT=>39	Water additive for corrosion control
Radioactive Contaminants:								
Gross beta	no	**5/20/2019**	**1.63**		pCi/L	n/a	New York 50 pCi/L to be the level of concern	Erosion of natural deposits
Special Testing: The table below is the continuation of monitoring under EPA UCMR 4. EPA requires testing for new contaminants to help decide if they should be regulated. The contaminates that were tested for and detected can be found in the table below. The samples were collected quarterly in 2020 from the distribution system. You may obtain the complete monitoring results by calling Kaden Cole, Analytical Chemist, Filtration Plant of the Elmira Water Board at 607-732-2277 or viewing the results on the Elmira Water Board website.								
Location/Analyte	***Violation Yes/No***	***Date of Sample***	***Level Detected***		***Units of Measure***	***MCLG***	***Regulatory Limit (MCL)***	***Likely Source of Contamination***
Distribution System: Haloacetic Acid 4 unregulated compounds	***no***	***in 2020: 3/16/2020, 6/15/2020, 9/21/2020, 12/21/2020***	***Quarterly Individual Low .42***		***ppb***	***n/a***	***n/a***	***By-product of drinking water chlorination needed to kill harmful organisms***
In 2022, over 3,000 total water samples were taken with no violations found!								

Annual Drinking Water Quality Report for 2022

Village of Wellsburg Water Department

3663 Sixth Street Wellsburg NY 14894
Public Water Supply ID# NY0701010

To comply with State regulations, the Village of Wellsburg will be annually issuing a report describing the quality of your drinking water. The purpose of this report is to raise your understanding of drinking water and awareness of the need to protect our drinking water sources. Last year, your tap water met all State drinking water health standards. This report provides an overview of last year's water quality. Included are details about where your water comes from, what it contains, and how it compares to State standards.

If you have any questions about this report or concerning your drinking water, please contact our licensed water system operator, Mike Steck, at (607) 565-2594. If you wish to learn more, please attend any of our regularly scheduled Village Board meetings. The meetings are held at 7:00 p.m. the second Monday of each month at the Ashland Town Hall.

Where does our water come from?
In general, the sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and can pick up substances resulting from the presence of animals or from human activities. Contaminants that may be present in source water include: microbial contaminants; inorganic contaminants; pesticides and herbicides; organic chemical contaminants; and radioactive contaminants. In order to ensure that tap water is safe to drink, the State and the EPA prescribe regulations, which limit the amount of certain contaminants in water provided by public water systems. The State Health Department's and the FDA's regulations establish limits for contaminants in bottled water which must provide the same protection for public health.

We purchase our water from the Elmira Water Board. The water is a blend of river and well water that is treated and filtered. Elmira is one of the many drinking water systems in New York State that provides drinking water with a controlled, low level of fluoride for consumer dental health protection. Fluoride is added to your water by the Elmira Water Board before it is delivered to us. According to the United States Centers for Disease Control, fluoride is very effective in preventing cavities when present in drinking water at a properly controlled level. To ensure that the fluoride supplement in your water provides optimal dental protection, the State Department of Health requires that the Elmira Water Board monitor fluoride levels on a daily basis. Results are reported in the table below.

Elmira also adds phosphate and controls the alkalinity (pH) in the finished water to prevent corrosion of household plumbing. The goal is to limit the amount of lead that can be leached from residential piping that contains soldered or brass fittings.

Our water system serves about 630 people through 250 service connections. During 2022, we did not experience any shortage of our source water.

Are there contaminants in our drinking water?

As the State regulations require, we routinely test your drinking water for contaminants that can sometimes get into the water after we buy it from Elmira. These contaminants include: total coliform, asbestos, lead and copper, and disinfection byproducts called Total Trihalomethanes and Haloacetic Acids. Elmira tests the water for additional contaminants at their treatment plant, including turbidity, inorganic compounds, nitrate, nitrite, volatile organic compounds, synthetic organic compounds and naturally occurring radioactive contaminants. The table below shows the most recent test results for compounds detected in your drinking water.

It should be noted that all drinking water, including bottled drinking water, may be reasonably expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791) or the Chemung County Health Department at 737-2019.

We are required to present the following information on lead in Drinking Water

Lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Village of Wellsburg is responsible for providing high quality drinking water and removing lead pipes, but cannot control the variety of materials used in plumbing components in your home. You share the responsibility for protecting yourself and your family from the lead in your home plumbing. You can take responsibility by identifying and removing lead materials within your home plumbing and taking steps to reduce your family's risk. Before drinking tap water, flush your pipes for several minutes by running your tap, taking a shower, doing laundry or a load of dishes. You can also use a filter certified by an American National Standards Institute accredited certifier to reduce lead in drinking water. If you are concerned about lead in your water and wish to have your water tested, contact Village of Wellsburg at 607-271-9129. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available at *http://www.epa.gov/safewater/lead*.

Do I need to take special precautions?

Although our drinking water met or exceeded state and federal regulations, some people may be more vulnerable to disease causing microorganisms or pathogens in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice from their health care provider about their drinking water. EPA/CDC guidelines on appropriate means to lessen the risk of infection by Cryptosporidium, Giardia and other microbial pathogens are available from the Safe Drinking Water Hotline (800-426-4791).

Is our water system meeting other rules that govern operations?

During 2022, we were cited by the Health Department because we were late in submitting our 2021 AWQR by May 31, 2022. We corrected the violation in June 2022 when we delivered the AWQR.

Contaminants Detected during 2022 (or most recent test)

New York State allows us to test for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. For this reason, some of our data, though representative, is more than a year old.

Definitions used in the table:

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible. (**MRDL,** the Maximum Residual Disinfectant Level, applies to chlorine residual)	**Milligrams per liter (mg/L):** Corresponds to one part of liquid in one million parts of liquid.
Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety. (**MRDLG means** Maximum Residual Disinfectant Level Goal)	**Micrograms per liter (ug/l):** Corresponds to one part of liquid in one billion parts of liquid.
Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.	**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contamination.
Action Level (AL): The concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.	**Nephelometric Turbidity Units (NTU):** A measure of water cloudiness.
Picocuries per liter (pCi/L): A measure of radioactivity in water.	**Not Applicable** (**N/A**)
Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.	**Not Detected (ND):** The contaminant was not found by the laboratory sample.

Contaminants detected by Elmira Water Board	Violation Yes/No	Date of Sample	Level Detected	Units of Measure	MCLG	Regulatory Limit (MCL)	Likely Source of Contamination
Barium	no	3/25/2022	0.06	ppm	2	2	Erosion of natural deposits
Nickel	no	3/25/2022	1	ppb	N/A	N/A	Naturally occurring
Fluoride	no	In 2022: daily	High .79 Low 0.39 Average 0.68	ppm	n/a	2.2	Water additive which promotes strong teeth
Gross beta activity	no	5/20/2019	1.6	pCi/L	n/a	NY State considers 50 pCi/L to be the level of concern	Decay of natural radioactive deposits
Nitrates	no	3/25/2022	1.32	ppm	10	10	Runoff from fertilizer use
***Sodium**	no	3/25/2022	28.5	ppm	n/a	no MCL	Naturally occurring; use of road salt
*Sodium: Water containing more than 20 mg/L of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 mg/L of sodium should not be used for drinking by people on moderately restricted sodium diets. Sodium can make high blood pressure worse.							
Total Organic Carbon (TOC) Source	no	In 2022: monthly	High 3.19 Low 1.54 Average 3.3	ppm	n/a	n/a	Naturally occurring organic materials from decaying leaves & plants
Total Organic Carbon (TOC) Treated	no	In 2022: monthly	High 3.08 Low 1.3 Average 1.08	ppm	TT	TT	Source same as above, treated samples measure the effectiveness of the water treatment process
***Turbidity after purification plant**	no	In 2022 ; every 4 hours	100% of 2,190 results < 0.3	ntu	n/a	TT=0.3	Soil runoff
*Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system.							
Detected contaminants in Village of Wellsburg testing							
Total Trihalomethanes (TTHM)	no	In 2022: 2/16 5/25, 8/16, 11/16	Quarterly Samples Range 36-72	Highest *LRAA 72	ug/L	n/a	*LRAA Quarterly Average 80	By-product of drinking water chlorination needed to kill harmful organisms; formed when source water contains organic matter

Haloacetic Acids (HAA)	no	In 2022: 2/16, 5/25, 8/16, 11/16	Quarterly Samples Range <2-13.0	Highest *LRAA 12	ug/L	n/a	*LRAA Quarterly Average 60	
*LRAA (Locational Running Annual Average): average of last 4 quarters								
Chlorine	no	In 2022: monthly	High 0.4 Low 0.0	Average 0.3	mg/L	MRDLG 4.0	MRDL 4.0	Level of disinfectant necessary for control of microbial contaminants
Copper at customer taps 10 samples	no	7/20/2022	*90th % 0.28	High 0.29 Low .002	mg/L	1.3	AL=1.3	Corrosion of household plumbing systems
Lead at customer taps 10 samples	no	7/20/2022	*90th % 1.0	High 1.0 Low ND	ug/L	0	AL=15	
*90th Percentile: Out of 10 samples from homes in the Village of Wellsburg, 90% were less than or equal to the value shown. No samples exceeded the action level (AL) for lead or copper.								

What does this information mean?

As you can see by the table, our system had no violations. We have learned through our testing that some contaminants have been detected; however, these contaminants were detected at levels below those the State allows.

{PRIVATE }Source Water Assessment:{tc \l 5 "Source Water Assessment\:"}

The NYS DOH has completed a source water assessment for the Elmira Water Board, based on available information. Possible and actual threats to multiple drinking water sources were evaluated. The state source water assessment includes a susceptibility rating based on the risk posed by each potential source of contamination and how easily those contaminants can move about. The susceptibility rating is an estimate of the potential for contamination of the source water, it does not mean that the water delivered to consumers is, or will become, contaminated. Contaminants that have been detected are report below. The source water assessments provide resource managers with additional information for protecting source waters into the future.

The assessment found an elevated susceptibility to contamination for the surface water sources, the Chemung River and Hoffman Reservoir. The amount of agricultural lands in the assessment area results in elevated potential for protozoa and pesticides contamination. While there are some facilities present, permitted discharges do not likely represent an important threat to source water quality based on their density in the assessment area. However, it appears that the total amount of wastewater discharged to surface water in this assessment area is high enough to further raise the potential for contamination (particularly for protozoa). There are no noteworthy contamination threats associated with other discrete contaminant sources. Finally, it should be noted that relatively high flow velocities make river and reservoir drinking water supplies highly sensitive to existing and new sources of microbial contamination. The assessment of the five active wells found them to have a medium-high to high susceptibility to microbials, nitrates, industrial solvents, and other industrial contaminants. These ratings are due primarily to the close proximity of industrial/commercial facilities that discharge wastewater into the environment and low intensity residential activities in the assessment area. Please note that water from all the sources is blended and treated at the filtration plant to provide disinfection and to remove contaminants. There are also wellhead protection rules in place for the wells, and watershed protection rules for the Hoffman Reservoir. These rules give legal authority to forbid activities and discharges that could cause gross contamination in these sources. A copy of this assessment, including a map of the assessment area, can be obtained by contacting the Chemung County Health Department.

Appendix I
Capacity Development Form

CAPACITY DEVELOPMENT PROGRAM

TECHNICAL, MANAGERIAL, AND FINANCIAL EVALUATION CRITERIA
FOR: COMMUNITY PUBLIC WATER SYSTEMS

SYSTEM NAME: Wellsburg Village

COUNTY: Chemung **PWSID #:** NY0701010

COMPLETED BY: WRL **DATE:** 4/12/2023

Technical Capacity

A. System Infrastructure

1. Does the system have as-built plans, drawings, or maps of its facilities including source, treatment, storage, and distribution?

   [X] Yes [ ] No [ ] Not Applicable

   If the system lacks certain plans, please specify:

   _____

   _____

2. Does the system have exact location measurements of all main valves and service shut-offs?

   [X] Yes [ ] No [ ] Not Applicable

3. Can the system's pumping, storage and distribution facilities meet current normal and peak demands and required distribution pressures?

   [X] Yes [ ] No [ ] Not Applicable

4. Does the system have a water conservation plan?

   [ ] Yes [X] No [ ] Not Applicable

5. Are all customers on the water system metered?

   [ ] Yes [X] No [ ] Not Applicable

6. Is the system equipped with "master" meters that measure the amount of water the system produces or purchases for each source of water?

   [X] Yes [ ] No [ ] Not Applicable

B. Source Water Evaluation

1. Does the system have a copy of its Source Water Assessment?

   ☐ Yes ☐ No ☒ Not Applicable

2. Has a yield analysis been done for the system's source?

   ☐ Yes ☐ No ☒ Not Applicable

3. Does the system have a description of the existing source-pumping capacity and the system's raw and finished water storage capacity?

   ☐ Yes ☐ No ☒ Not Applicable

4. For groundwater systems, does your system have a wellhead protection program in place?

   ☐ Yes ☐ No ☒ Not Applicable

C. Technical Knowledge

1. Has an evaluation of the water system facilities been conducted with respect to its ability to reliably meet current and proposed State and Federal drinking water regulations?

   ☒ Yes ☐ No ☐ Not Applicable

   If system can't meet regulations, please specify:

   _____

   _____

2. Does the system have monthly water production records or treatment records that show daily and monthly water production for <u>each source</u> used by the system?

   ☒ Yes ☐ No ☐ Not Applicable

3. Has an evaluation been conducted to document the condition and remaining service life of existing facilities?

   ☒ Yes ☐ No ☐ Not Applicable

4. Has the system been cited within the past two years for failing to sample and report test results?

   ☐ Yes ☒ No ☐ Not Applicable

5. Has the system been cited within the past two years for operating deficiencies as a result of a sanitary survey or other inspection conducted by the DOH?

   ☐ Yes ☒ No ☐ Not Applicable

6. If you answered *"Yes"* to Questions 4 or 5, has corrective action been taken to correct all deficiencies?

☐ Yes ☐ No ☒ Not Applicable

D. Certified Operators

1. Does the water system have a certified water operator(s) and designated an operator in responsible charge?

☒ Yes ☐ No

2. If the water system does not have a state-certified water treatment operator, or lacks the necessary number of operators to safely and reliably operate the system, does the system have a plan to acquire the services of a (additional) state-certified operator?

☐ Yes ☐ No ☒ Not Applicable

Managerial Capacity

A. Staffing and Organization

1. What type of training/continuing education did system personnel attend within the last two years (please specify)?

AWWA training NY Rural Water, and continuing education credits to maintain licensure are met.

2. Who is responsible for policy and operational decisions for the water system *(name and title)*?

Henry Jerzak, Mayor

3. Who is responsible for ensuring compliance with state regulatory requirements *(name and title)*?

Mike Steck, Water Operator

4. Who is responsible for approving expenditures *(name and title)*?

Henry Jerzak, Mayor

5. *For systems that contract for system operation or management*: Does the system have a valid (signed) contract that summarizes the duties and responsibilities the contractor must provide to the system?

☐ Yes ☐ No ☒ Not Applicable

B. Ownership

1. *If the system is under temporary ownership*, has a future owner been found for the water system?

   ☐ Yes ☐ No ☒ Not Applicable

   If *"Yes"*, who will the future owner be?

   _____

2. *For systems that use, but do not own, land or facilities that are essential to water system operation:* Is there a valid long-term contract (i.e., lease) between the water system and the owner of the land or facilities essential to the operation of the system?

   ☐ Yes ☐ No ☒ Not Applicable

3. *For systems with a single proprietor:* Does the system have a contingency plan for continuing system operation in the event the owner becomes incapable of carrying out his/her responsibilities?

   ☐ Yes ☐ No ☒ Not Applicable

C. Consolidation/Restructuring

1. Has the system examined the feasibility of:
   a) Incorporating with an existing water system in the immediate proximity?

   ☐ Yes ☐ No ☒ Not Applicable

   b) Selling ownership to an existing water system?

   ☐ Yes ☐ No ☒ Not Applicable

   c) Contracting for the management or operation of the system with an existing system or satellite management/operations agency?

   ☐ Yes ☐ No ☒ Not Applicable

D. Emergency/Disaster Response Plans

1. Has the system developed an Emergency Response Plan?

   ☒ Yes ☐ No ☐ Not Applicable

2. Does the Emergency Response Plan:

   a) Designate responsible personnel in the event of an emergency?

   ☒ Yes ☐ No ☐ Not Applicable

b) Provide for emergency phone and radio capabilities?

[X] Yes [ ] No [ ] Not Applicable

c) Describe public and health department notification procedures?

[X] Yes [ ] No [ ] Not Applicable

3. Does the system have any emergency contract agreements under which it operates (e.g., emergency water interconnections and alternative sources)?

[X] Yes [ ] No [ ] Not Applicable

E. Water System Policies

1. Does the system have a *written* System Operations Manual or Policy?

[X] Yes [ ] No [ ] Not Applicable

F. Record Keeping

1. Does the system keep water utility records including: financial, regulatory, facility, operations and maintenance, data quality, Annual Water Quality Reports, and correspondence with the NYS Department of Health and/or local Health Departments (and where appropriate, the NYSPSC)?

[X] Yes [ ] No [ ] Not Applicable

Financial Capacity

A. Budget Projection – Revenues and Expenses

1. Does the system have a water budget?

[X] Yes [ ] No [ ] Not Applicable

2. Are the system's annual water revenues sufficient to cover the annual water expenses as well as anticipated capital improvements?

[X] Yes [ ] No [ ] Not Applicable

3. Are the system's water rates, when combined with other revenue sources, sufficient to cover all listed expenditures for the water system?

[X] Yes [ ] No [ ] Not Applicable

4. Does the system retain budget information for at least two years?

[X] Yes [ ] No [ ] Not Applicable

B. Reserves

1. Does the system have a reserve account (or funds within a reserve account) dedicated to:

a) Financing the emergency replacement of critical facilities in the event of their failure?

[X] Yes [ ] No [ ] Not Applicable

b) The maintenance of cash flow in the event of an unexpected funding shortfall?

[X] Yes [ ] No [ ] Not Applicable

2. If the system has a reserve account, how does it determine the amount to put into the account?

____ Fixed Amount ____Percentage of Revenues ____Percentage of Expenses
__X__Other (please specify) funds remaining in excess of expenditures

3. If the system has a reserve account, what type(s) of reserve account(s) does it have?

_____Operation and Maintenance _____Capital Projects _____Debt Service
__X__Other (please specify) the reserve account funds anything that is required

C. Capital Improvement Plan

1. How do you finance operation and maintenance costs (Check all that apply)?

__X__Rates collected from ratepayers _____Rental fees
_____Other business revenue _____Personal capital
_____Surcharges _____Reserve account
_____Other (Please specify) _____

2. How did you finance your LAST major repair or improvement?

_____Commercial bank loan ____Bonds
_____ DWSRF ____Other State or federal loan/grant program
_____Surcharge ____Personal Capital
_____Reserve Account ____Revenue from other business
__X__Other (Please specify) USDA loan

3. What options do you have for financing your NEXT major repair or improvement?

_____Commercial bank loan	____Bonds
_X_____DWSRF	____Other State or federal loan/grant program
_____Surcharge	____Personal Capital
_____Reserve Account	____Revenue from other business
_X_____Other (Please specify) WIIA, USDA, CDBG	

D. Water System Rates

1. Does the water system management review user fee, user charge, or rate system at least once every two years?

☒ Yes ☐ No ☐ Not Applicable

2. What is the frequency of billing (e.g., 12, 6, or 4 times per/year)? 12 times/year

3. Where applicable, what are the system's water rates?
$38 flat fee plus 0.0018 cents per gallon consumed

4. What are rates based on?

_____Capital Improvement Plan and Annual Budget
_____Annual Budget Only
_____Cash on Hand
_X_____Last year's expenses
_____Not sure
_____Other (Please specify_____)

5. What was the date of the last rate increase? -
June 2016

END OF DOCUMENT

Appendix J
Smart Growth Form

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

Smart Growth Assessment Form

This form should be completed by an authorized representative of the applicant, preferably the project engineer or other design professional.[1]

Section 1 – General Applicant and Project Information

Applicant: Village of Wellsburg Project No.: HUNT 2678-009

Project Name: Water System Improvements

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

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

The Village of Wellsburg is seeking to make improvements to their water system including replacement of two (2) 250,000-gallon water storage tanks, replacement of prematurely deteriorating watermain along Main Street and Front Street, and establishment of a backup water supply.

Section 2 – Screening Questions

A. Prior Approvals

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

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

B. New or Expanded Infrastructure

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

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

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

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

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

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

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

Section 3 –Smart Growth Criteria

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

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

   Explain your response: This project improves the existing Village of Wellsburg Water System.

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

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

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

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

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

   Explain your response and reference any applicable plans:

   This project is located within the Village limits that includes the main street and central business district.

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

☐Yes ☑No

Explain your response and reference any applicable plans:

The municipality does not have an existing Comprehensive Plan, Waterfront Plan, Revitalization Plan, nor Brownfield Oppurtunity Area. The project consistent with the County and State Planning Documents.

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

☑Yes ☐No

Explain your response:

Municipal water infrastructure protects and preserves the state's resources. The new meters will help identify leaks in the system and preserve the water source.

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

☑Yes ☐No

Explain your response:

Municipal water infrastructure fosters compact development within a service area.

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

☐Yes ☐No ☑N/A

Explain your response:

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

☑Yes ☐No

Explain your response and reference any applicable plans:

The project will require coordination with state and local government for project approval and permits.

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

☑Yes ☐No

Explain your response and reference any applicable plans:

The Preliminary Engineering Report was a community based planning activity and results were shared at public meeting with the community.

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

☑Yes ☐No ☐N/A

Explain your response:

Reliable municipal infrastructure assist with providing the necessary resources to support the predictability in building and meeting land use codes.

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

☑Yes ☐No

Explain your response and reference any applicable plans:

This project will add energy efficient pumps, along with controls minimize energy usage.

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

☑Yes ☐No

Explain your response and reference any applicable plans:

The project design will consider floodplains and will be designed in accordance.

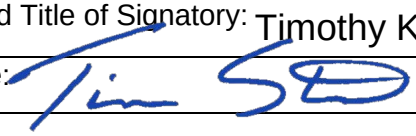
Section 4 – Miscellaneous

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

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

Section 5 – Signature

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

Applicant: Village of Wellsburg	Phone Number:
Name and Title of Signatory: Timothy K. Steed, PE, Director Site/Civil	
Signature: 	Date: 06/15/2023

Appendix K
Engineering Report Certification

Engineering Report Certification

During the preparation of this Engineering Report, I have studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity to be finances with secured funds from the Community Development Block Grant.

In my professional opinion, I have recommended for selection, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account the cost of constructing the project or activity, the cost of operating and maintaining the project or activity over the life of the project or activity, and the cost of replacing the project and activity.

Title of Engineering Report: Wellsburg Municipal Water Study, Village of Wellsburg, Chemung County, New York.

Date of Report: February 2021/Revised July 2023

Professional Engineer's Name: Timothy. K. Steed, PE, Director of Civil Engineering

Signature: 

Date: August 11, 2023