May 24, 2023

Ms. Angela Yu, Project Manager
Michigan Department of Environment, Great Lakes, and Energy
Water Infrastructure Funding and Financing Section | Finance Division
YuA@Michigan.gov

City of Iron River – Drinking Water State Revolving Fund Application

Dear Ms. Yu:

On behalf of the City of Iron River, WICKWIRE, P.C. is hereby submitting the enclosed Drinking Water State Revolving Fund Application and supporting documents.

If you have any questions, comments, or require additional information, please do not hesitate to contact Craig at 906.284.3903 or crichardson@wickwiresolutions.com.

Sincerely,

WICKWIRE, P.C.

Craig Richardson, P.E.
President

Seth Miatech
Project Engineer

Cc: Rachel Andreski, City Manager Email: citymanager@ironriver.org
WW File 22030

Https://Wickwire.Sharepoint.Com/Sites/WICKWIREP.C/Shared Documents/General/Clients/Iron_River_City/22030-2023_EGLE_DWSRF_Project_Plan/Eng/Submittal_Worksheets/22030-Iron_River_DWSRF_Cover_Letter.Docx

EGLE

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Finance Division

DRINKING WATER STATE REVOLVING FUND (DWSRF)
PROJECT PLANNING DOCUMENT SUBMITTAL FORM

Part 54, Safe Drinking Water Assistance, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Project Name: City of Iron River Water System Improvements Project

Project Description: Replacement of water main and PRV stations, repainting of elevated storage tanks and repairs, and addition of tank mixers

Legal Name of Applicant: City of Iron River
(Name of the applicant municipality bonding for the project. Ex. A county bonding on behalf of a village or township)

Applicant Address: 106 West Genesee Street

City: Iron River Zip Code: 49935 County: Iron

Applicant's Federal Employer Identification Number (EIN): 383527449

Congressional District: 1 State Senate District: 38 State House District: 110

Population served by Water Supply: 2,796 Water Supply Serial Number (WSSN): 3410

Estimated Total Project Cost: $ 1,802,000 Target Construction Start Date: 5/1/2024

Applicant Authorized Representative Name: Rachel Andreski

Title: City Manager Phone: (906) 265-4719 x100 Email: citymanager@ironriver.org

Authorized Representative Address. If same as applicant address above, check here ☑

Address: _____ City: _____ Zip Code: _____

Rachel Andreski 5/19/2023

Signature of Authorized Representative Date

State approval of the water supplier's Source Water Protection Plan including a Surface Water Intake Protection Program or Wellhead Protection Program (if applicable).

☑ Attached ☐ N/A

Completed DWSRF Priority Ranking Worksheet. Questions should be directed to the assigned DWEHD district engineer or Brandon Onan at OnanB@Michigan.gov or 616-307-6736.

☑ Attached Excel file.

Joint Resolution of Project Planning Document Adoption/Authorized Representative Designation.

☑ Attached

A final project planning document, prepared and adopted in accordance with EGLE's DWSRF Project Planning Document Preparation Guidance, must be submitted by the annual deadline as indicated on EGLE's DWSRF website for a proposed project to be considered for placement on Michigan's Project Priority List (PPL) for the upcoming fiscal year.

Please email your final project planning document and attachments with this form to your EGLE Water Infrastructure Funding and Financing Section Project Manager.

If you need this information in an alternate format, contact EGLE-Accessibility@Michigan.gov or call 800-662-9278.

EGLE does not discriminate on the basis of race, sex, religion, age, national origin, color, marital status, disability, political beliefs, height, weight, genetic information, or sexual orientation in the administration of any of its programs or activities, and prohibits intimidation and retaliation, as required by applicable laws and regulations. Questions or concerns should be directed to the Nondiscrimination Compliance Coordinator at EGLE-NondiscriminationCC@Michigan.gov or 517-249-0906.

This form and its contents are subject to the Freedom of Information Act and may be released to the public.

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING

GRETCHEN WHITMER
GOVERNOR

DANIEL EICHINGER
ACTING DIRECTOR

April 18, 2023

VIA EMAIL

Ms. Rachel Andreski, City Manager
City of Iron River
106 West Genesee Street
Iron River, Michigan 49935

Dear Rachel Andreski:

SUBJECT: Source Water Protection Plan Update – City of Iron River, WSSN 03410

Congratulations! The city of Iron River Source Water Protection Plan update is approved. The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Drinking Water and Environmental Health Division (DWEHD) commends you on your efforts and encourages you to keep the program viable by updating it every six years or as changes occur within the source water protection program.

If you have any questions, comments, or need assistance implementing your program, you may contact me by telephone at 517-203-9631; email at BerndtJ1@Michigan.gov; or by mail at EGLE-DWEHD, Environmental Health Section, Source Water Unit.

Sincerely,

Jason Berndt, Environmental Quality Specialist
Source Water Unit
Environmental Health Section
Drinking Water and Environmental Health Division

jb/ms

cc: Craig Richardson, President Wickwire Solutions
Sara Pearson, EGLE
Tom Flaminio, EGLE

RESOLUTION ADPOTING A FINAL PROJECT PLANNING DOCUMENT FOR THE CITY OF IRON RIVER'S WATER SYSTEM IMPROVEMENTS PROJECT AND DESIGNATING AN AUTHORIZED PROJECT REPRESENTATIVE

WHEREAS, the City of Iron River recognizes the need to make improvements to its existing distribution system; and

WHEREAS, The City of Iron River authorized WICKWIRE, P.C. to prepare a Project Planning Document, which recommends the replacement of 2,500 linear feet of watermain and 3 Pressure reducing valve stations, elevated storage tank paint and structural repairs, and the addition of storage tank mixers to both elevated storage tanks.

WHEREAS, said Project Planning Document was presented at a Public Hearing held on May 17, 2023 at 4:30 PM and all public comments have been considered and addressed.

NOW THEREFORE BE IT RESOLVED, that the City of Iron River formally adopts said Project Planning Document and agrees to implement the selected alternative High Priority Capital Improvements.

BE IT FURTHER RESOLVED, that the City Manager, a position currently held by Rachel Andreski, is designated as authorized representative for all activities associated with the project referenced above, including the submittal of said Project Planning Document as the first step in applying to the State of Michigan for a Drinking Water State Revolving Fund Loan to assist in the implementation of the selected alternative.

Yeas: Anthony Clements, Rodney Dood, Ronjo Leonoff and Mayor Dennis Powell.

Nays: None.

Absent: Benjamin Garcia.

I certify that the above Resolution was adopted by the City Council on May 17, 2023.

BY: Bernadette Coates — City Clerk

Name — Title

Bernadette Coates — 5-18-2023

Signature — Date

WICKWIRE
INFRASTRUCTURE SOLUTIONS + CONSULTING

City of Iron River Drinking Water State Revolving Fund Project Plan

Prepared by:

WICKWIRE, P.C.
715 Selden Road
Iron River, MI 49935
Office: 906-265-9865

Prepared for:

City of Iron River
106 West Genesee Street
Iron River, MI 49935

Table of Contents

Project Background

A. Study and Service Areas

The City of Iron River is located in Iron County, Michigan in the southwestern portion of the Upper Peninsula. The City of Iron River covers approximately 6.5 square miles and is bordered on the north and west by Iron River Township, on the west and south by Stambaugh Township, on the east by Bates Township, and on the south by the City of Caspian. Prior to consolidation in the year 2000, the City was three separate municipalities: the City of Iron River (former), the City of Stambaugh, and the Village of Mineral Hills. Throughout the project plan, the former City of Iron River will be referred to as the Central District, the former City of Stambaugh will be referred to as the South District, and the former Village of Mineral Hills will be referred to as the North District.

For the purpose of this 20-year project plan, the study area will be delineated as the City of Iron River. The project area in general can be described as moderately populated area with a limited number of commercial and industrial facilities. The City of Iron River is serviced by a water distribution system, which was originally installed beginning in the 1920's. Since the water system was originally installed, the City has completed numerous system upgrades which has replaced nearly all the City's watermain system (95.3%) which has been upgraded to ductile iron or plastic products over the past 30 years including replacement of main line valves and fire hydrants within the new piping areas. The City has two (2) elevated water storage tanks which have also been replaced over the past 20 years. The City has four (4) water supply wells which require no treatment of water and have also been upgraded over the past few decades providing reliable water to the City's customers. A map of the study area can be found in Figure 1 of Appendix A.

Since the decline in the mining industry, the timber, tourism, and health service industries have taken up most of the slack. The unemployment rate of the area is greatly affected by the seasons, with rates typically higher than the state average in the winter, and rates lower than the state average in the summer months. Median annual household incomes throughout the project area are generally classified as low to moderate. In EGLE's most recent Fiscal Year 2024 Median Household Income List, the Median Household Income for the City of Iron River was $39,775.

The socioeconomic environment is that of an aging community with a gradual population decline. The largest employers within the study area include the Trident Maritime Systems industrial facility, the Aspirus Hospital, Krist Oil, and the Iron River Care Center within the City of Iron River.

The landscape within the project area contains evidence of the rich mining history, including several abandoned mine hoists, areas of caving ground and numerous spoil piles throughout. Surface waters within the study area include Ice Lake, while flowing bodies include the Iron River, Holmes Creek, and Sunset Creek. Wetland areas are located in various parts of the study area, mainly along the flowing water bodies.

Within the City of Iron River, the US-2 and M-189 Corridors are populated with commercial and industrial facilities. Additionally, Genesee Street within the Central District and Washington Ave in the South District also contain several commercial businesses. The majority of the remaining areas within the City are residential.

The City of Iron River is zoned, and it is broken up into 9 zoning districts. The districts are R-1A, Larger Lots Residential, R-1B, Plotted Lots Residential, R-2, Multi- Family Residential, CBD, Central Business District, C-1, Local Service Commercial, C-2, General Commercial, I, General Industrial, AG/OS, Agricultural/Open Space, and G, Governmental Use. The City's Zoning Map is included in Figure 2 of Appendix A and illustrates each zoning district. The R-1A Larger Lots Residential Zone is designated for single family homes located on large lots. Zone R-1B Plotted Lots Residential is designated for families with children with smaller plotted lots. Zone R-2 Multi-Family Residential is for more intensive residential use with various types of multi-family dwellings, 2- family dwellings, boarding houses and convalescent homes or nursing homes. The commercial zoning districts are comprised of the CBD Central Business District which is designated for retail business and service uses in a downtown environment, C-1 Local Service Commercial retail businesses and service uses that serve the adjacent and surrounding neighborhoods, and C-2 General Commercial retail business and service uses which are needed to serve the City as a whole and the surrounding townships. The I General Industrial District is to accommodate research, office, and industrial uses, including wholesale activities, warehouses, and industrial operations. The AG/OS Agricultural/Open Space district is designated for areas that are to be used for farming or kept for open space. The G Governmental Use district is designated for government, civic, and recreational facilities. The predicted land use within the City is expected to remain the same throughout the 20-year project planning period. The City has space available to accommodate industrial, commercial, and residential development, however with the City's zoning policies in place it is anticipated that any future development will pose little threat to the future environment.

B. Population

Much of the service area can be characterized as developed older residential areas. Table 1 below generally shows a gradual declining population over the past forty years for all service areas reflecting the depletion of the iron mining sector of the area’s economic base. While no projections for population exist at the city/township level, projections for Iron County indicate a decrease in population over the next 20 years. This rate of population decrease can be expected throughout all of the municipalities in the county.

Table 1: Population					
Year	City of Iron River	City of Caspian	City of Gaastra	Iron River Township	Iron County
1950	4,048	1,608	575	NA	17,692
1960	3,754	1,493	582	2,025	17,184
1970	2,684	1,165	479	1,398	13,813
1980	2,426	1,038	404	1,445	13,625
1990	2,095	1,031	376	1,398	13,175
2000	1,929	997	339	1,317	13,138
2010	3,029	906	347	1,016	11,817
2020	2,796	830	321	1,052	11,631
2030	NA	NA	NA	NA	10,653
2040	NA	NA	NA	NA	10,328

Source: U.S. Census Bureau

Note: The population growth for the City of Iron River between 2000 and 2010 can be attributed to the consolidation of the City of Iron River, the City of Stambaugh, and the Village of Mineral Hills in the year 2000.

C. Existing Environment Evaluation

1. Cultural and Historic Resources

The project area can be described as an area rich in historical features, mainly due to the extensive mining which took place in the late 1800's and early 1900's. The area was once a bustling economic center in which nearly 50 mines once operated. There are over 35 State Historic Sites located within the project area. Some of these include Iron River Town Hall, the Iron County Fair Exhibition Hall, the Munro – M.A. Hanna Mining Company Office Building, and the Central School. All the State Historic Sites are noted for their importance to the history of the city of Iron River and are to be preserved throughout the entirety of this project. There were no other sites to be preserved found near the City of Iron River when searching the State Historical Preservation Office, the Tribal Historic Preservation Office, or the Local Historic Societies.

2. The Natural Environment

i. *Air Quality*

The air quality in the City of Iron River has an average annual Air Quality Index of 27 which is suitable for most of the population. The proposed project is not projected to influence the air quality in the surrounding area during construction and is not projected to attract new users, commercial or residential. Therefore, the air quality index is not estimated to change with the project.

ii. *Wetlands*

Wetlands in the project area reside in the river and creek basins that run through the City limits, and near Ice Lake and other lakes that border the city limits. The area consists of emergent, forested, and scrub-shrub wetlands. Forested wetlands include both deciduous and evergreen trees over 20 feet tall in the areas further from the rivers, streams, and lakes. Scrub-shrub wetlands contain trees less than 20 feet tall where the groundwater can be found near the surface water level of the rivers and streams. Emergent wetlands can be found near the rivers, lakes, and streams and have plants with roots in wet soil and soft stems. A map of the wetland areas can be found in Figure 3 of Appendix A.

iii. *Great Lakes, Coastal Zones, and Coastal Management Areas*

There are no Great Lakes or other major shore lands or coastal zones within the project area.

iv. *Floodplains*

The Iron River, Sunset Creek, and Holmes Creek run through portions of the City of Iron River. The city participates in the FEMA Floodplain Insurance Program. A map is included in Figure 4 of Appendix A that indicates the floodplain areas within the city.

v. *Natural or Wild and Scenic Rivers*

There are no rivers located in the City of Iron River that are part of the National Wild and Scenic River System.

vi. *Major Surface Waters*

Flowing surface waters in the city limits include the Iron River as its largest flowing body of water followed by Holmes Creek and Sunset Creek. Stagnant bodies of water in the project area include Ice Lake as the one major lake, along with several other unnamed mining ponds within the city limits.

vii. *Topography*

Relief in the general project area is gently rolling to moderately steep. The project area is situated on fairly level terrain at an elevation ranging from 1480 to 1650 feet (USGS DATUM).

viii. Geology

The major bedrock types in the project area are Middle Precambrian and are dominantly the Michigamme slate and associated formations including greywacke, greenstone, and quartzite deposits. Extensive iron formations are common throughout the area and were mined extensively throughout the late 1800's and early 1900's. Outcrops of bedrock occur at various locations in the project area; however, the majority of the area is covered with glacial drift as much as 200' thick.

ix. *Soil Types*

The soils in Iron County were formed during the time of Pleistocene glaciations and are mostly of fine texture. Although the underlying bedrock did influence the development of present-day soils, glacial debris gathered up, ground transported and dumped, forming the dominant parent material of these soils. This glacial veneer contains a great variety of mineral materials arranged in many topographic expressions under all conditions of drainage and modified by long term variations in cover and climate. A myriad of different soil types has evolved from the heterogeneous glacial parent materials and the individual conditions governing soil profile development.

The soils of Iron County are predominantly deep, loamy types, but range from deep, sandy soils to loamy soils over gravel and sand. The soil types found in the planning area are varied, with Stambaugh silt loam, Udorthents, and Wabeno units being most common. Stambaugh silt loams with slopes from 2 to 18 percent occur on outwash plains and stream terraces and have a moderately slow permeability on the upper part and rapid on the lower part. The soil types in the study area are for the most part not favorable to septic tank absorption fields or waste disposal areas. The Stambaugh silt loams are generally favorable for building site developments and some areas, due to frost heave, are unfavorable for road construction. The Udorthents and Wabeno soils vary but are generally not favorable to building site developments or roads. These types of soils can be developed but special precautions must be taken during design stages and an increase in maintenance can be expected. Soil survey maps of the project are included in Figures 5 through 7 of Appendix A. The USDA Soil Report for the Project Area can also be found in Appendix A.

x. *Agricultural Resources*

Agriculture plays a minor role in the economy of the project area. Several factors that limit the crop production are the short growing season and limited local markets. There is no Prime Farmland located within the project area. Soil survey maps of the project area are included in Figures 5 through 7 of Appendix A. As shown in these maps there are no prime farmlands in the project area and it is expected that no prime farmlands will be affected by the proposed project.

xi. *Fauna and Flora*

The surrounding area is rich in wildlife, both in number and species. Representative species of wildlife in the immediate area include rabbit, whitetail deer, squirrels, and songbirds. The only known endangered species in the area is the Grey Wolf, Canis Lupis. However, with the

projects proximity to the town and the fact that it is all within previously constructed areas, disturbances to the wolf habitat are not expected.

Over 90 percent of the total land area in Iron County consists of second growth forest on cut over land and burned over areas. Northern hardwoods dominate the County. Representative species, which exist in the area include various pine, hemlock, balsam, aspen, birch, and maple. Most of the residential area is built-up and sparsely vegetated and are covered with various grass species. There are no known occurrences of listed natural plant communities in the project area.

D. Existing System

Prior to the year 2000, the current City Limits was comprised of three (3) separate municipalities: the City of Iron River (former), City of Stambaugh and the Village of Mineral Hills. When these communities consolidated in 2000, they also combined their staff and utilities now operating as a single unit. The City of Iron River can be generally described as moderately populated with a limited number of commercial and industrial customers. According to the 2020 Census, the population of Iron River was 2,796. The City of Iron River is serviced by a water distribution system, which was originally installed beginning in the 1920's. Since the water system was originally installed, the City has completed numerous system upgrades replacing nearly all the City's watermain system (95.3%) installing ductile iron or plastic products over the past 30 years. These upgrades include replacement of main line valves and fire hydrants within the new piping areas. The City has two (2) elevated water storage tanks which have also been replaced over the past 20 years. The City has four (4) water supply wells which require no treatment of water and have also been upgraded over the past few decades providing reliable water to the City's customers.

The components that make up the water system are described in detail in the following sections. Maps of the City's water system are found in Appendix A, Figures 8 through 10.

1. Distribution System Piping

The City's water distribution system consists of approximately 209,500 feet of piping. This piping is made up primarily of 6-inch to 12-inch ductile iron, with some 6-inch to 12-inch HDPE, and PVC pipe all installed within the last 15 years. There is a small percentage of ductile iron piping that was installed in the 1970's and 1980's. There is approximately 12,030 linear feet of old 4-inch to 12-inch cast iron pipe remaining in the water system which experiences breaks and contains inoperable valves. The sections of 4-inch and 6-inch cast iron piping are primarily located in the northern part of the former Village of Mineral Hills and on Division Street and are to be replaced this year under the City's 2023 MEDC WRI Water System Improvements project. There is a 2,500 linear foot section of 12-inch cast iron along Highway US-2 between 9th Avenue and Homer Road. It is recommended that this cast-iron piping be replaced as soon as possible to prevent water main breaks and replace inoperable valves and old fire hydrants. This section of 12-inch cast iron pipe along Highway US-2 would be replaced in this EGLE DWSRF project.

Table 2 below summarizes the type and approximate amount of watermain piping currently in the City's water distribution system, and figures 8 through 10 of Appendix A show the distribution system piping layout, broken up by diameter, material, and age respectively.

Table 2: Existing Watermain Piping					
Size	**Cast Iron (feet)**	**HDPE (feet)**	**PVC (feet)**	**Ductile Iron (feet)**	**Totals (feet)**
4-inch	4,030	140		210	**4,380**
6-inch	5,580	290		60,615	**66,485**
8-inch		1,020	680	82,050	**83,750**
10-inch				44,725	**44,725**
12-inch	2,420	215		7,505	**10,140**
TOTALS ➔	**12,030**	**1,665**	**680**	**195,105**	**209,480**

2. Water Storage

i. Hunter Tank

The Hunter Tank is a 200,000-gallon pedosphere elevated water storage tank constructed in 1995 by CBI Niacon. It has a base elevation of 1,704 feet, overflow elevation of 1,800 feet, and minimum tank elevation of 1,775 feet. This tank was repainted on both the interior and exterior in 2010 and has an expected paint life of 20 years. Other repairs and improvements made during the tank painting include:

- Replacement of the mud valve and expansion joint
- Installation of a screened flap gate on the overflow
- Riser pipe jacketed insulation
- Cathodic protection system (CORRPRO)
- Electrical system improvements
- Temperature probe connected to Supervisory Control and Data Acquisition (SCADA) system
- New stainless-steel vent system
- Spray-on foam insulation on the base cone interior

ii. Stambaugh Tank

The Stambaugh Tank is a 200,000-gallon pedosphere elevated water storage tank constructed in 2000 by Maguire Iron. It has a base elevation of 1,624 feet, overflow elevation of 1,751 feet, and minimum tank elevation of 1,730 feet. This tank has not had any maintenance work performed since it was constructed.

3. Production Wells

Water is supplied to the City via four (4) groundwater wells located within the City limits. These well sites are labeled Wells No. 1, 2, 4, and 5. It is noted that Well No. 3 was no longer used and abandoned several years ago. In 2022, the City commissioned WICKWIRE, P.C. to update their wellhead protection program. This updated, comprehensive WHPP will continue to aid the City in identifying and protecting its water resources and help to avoid groundwater contaminations that may affect drinking water supplies, deal with contaminations that arise, and plan for new or

additional wells in the event that additional capacity is needed due to development or a contamination of the existing water supply. EGLE's letter of approval of the Wellhead Protection Plan is included in Appendix B. The locations of these wells can be seen in Appendix A, Figures 8 through 10 and a summary of the characteristics of each well site along with recent upgrades and improvements are as follows.

i. Wells No. 1 and No. 2

Well No. 1 and Well No. 2 are the former City of Stambaugh wells. They were constructed in 1938 and 1962 respectively. Well No 1 is a 100 horsepower (HP) pump rated to pump at 700 gallons per minute (gpm) at 300 feet of Total Dynamic Head (TDH), while Well No. 2 is a 75 HP pump rated to pump 700 gpm at 300 feet TDH. The well houses were upgraded in 2000 to include soft-starts, chlorine pumps, as well as generator receptacles for back-up power. In 2012 upgrades to these well houses included the installation of magnetic flow meters tied to the City's SCADA system. The most recent improvements include replacement of the pump control valve in Well No. 2 and in the near future, replacement of the pump control valve in Well No. 1.

ii. Well No. 4

Well No 4 is located on Fourth Avenue just south of Franklin Street. The well was constructed in the early 1970's and has undergone several changes since this time. The most recent upgrades to this Well was in 2010 when the City replaced the existing pump with a new vertical turbine pump capable of 750 gpm at 400 feet of Total Dynamic Head (TDH). In conjunction with the well pump replacement, a soft-start motor starter was installed to reduce the severe water hammer issue produced by the pump starting and stopping. This well was also sonar blasted and the screen was mechanically cleaned during the 2010 upgrades. This vertical turbine well pump is equipped with a 100 Hp motor and backup power is provided by a generator receptacle to be powered by the City's portable generator. A new transmission main was constructed from this well to supply the Hunter Tank system. Doing so provided the Hunter System with mechanical reliability while reducing one of the City's three (3) separate water systems. In 2012, all well house mechanical piping was replaced along with the installation of a magnetic flow meter connected to the City's SCADA system. Most recently, in 2014, the pump control valve was replaced since the old valve was at the end of its useful life.

iii. Well No. 5

Well No. 5 is located on Hunter Road west of River Avenue. The well was constructed in 1995 by Kleiman Pump and Well Drilling. The maximum pumping capacity of this well is unknown but original well pump testing confirmed the capacity is in excess of 1,000 gpm. In 2012, this well was upgraded with a new 100 HP submersible well pump capable of 700 gpm at 379 feet of TDH. These improvements also included upgrading the pump discharge line to an 8-inch line from the well to the well house as well as the interior well house piping and upgrading the flow control valve and magnetic flow meter. The well house is equipped with a generator receptacle to provide back-up power from the City's portable generator during power outages.

4. Pressure Districts

The City's Water System has four (4) pressure districts, the Hunter High Pressure District, Hunter Low Pressure District, Stambaugh High Pressure District, and Stambaugh Low Pressure District. The boundaries of these pressure districts are illustrated on the water system drawings included in Figures 8 through 10 of Appendix A. The Hunter Low Pressure District is supplied by a single pressure reducing valve (PRV) (Mineral Hills) station located on Mineral Avenue and services the former Village of Mineral Hills area. The hydraulic grade line (HGL) for this PRV station is 1,750 feet. This PRV Station was constructed in 2010 and is in very good condition. The Stambaugh Low Pressure District is supplied by 7 PRV Stations being Upper Riverside (HGL: 1,710), Stambaugh Avenue (HGL: 1,700), Washington Avenue (HGL: 1,700), Riverton Avenue (HGL: 1,700), Adams Street (HGL: 1,680), Ice Lake/Lalley Road (HGL: 1,680), and Hunter/River Avenue (HGL: 1,680). The Stambaugh Low Pressure District is primarily supplied by the Upper Riverside PRV Station which was constructed in 2010 and is in very good condition. The remaining PRV Stations supply needed fire flows as required. In 2012, the Stambaugh Avenue, Riverton Avenue, and Washington Avenue PRV Stations were completed replaced are in excellent condition. In 2014, the City rebuilt the Adams Street, Ice Lake/Lalley Road, and Hunter/River Avenue PRV Stations. In EGLE's most recent Sanitary Survey Letter to the City from October 10, 2022, it was determined that the Adams Street, Ice Lake/Lalley Road, and Hunter/River Avenue PRV Stations have deteriorated since being rebuilt and are now prone to flooding. These PRV Stations would be replaced in this EGLE DWSRF project. The Sanitary Survey Letter is included in Appendix B.

5. Flow Control Valve

In 2012, an automated flow control valve was installed to allow the Hunter Tank to fill the Stambaugh Tank via gravity. This was done to allow the City to consolidate their separate water systems to save on sampling and permitting costs and allow for the future abandonment of production wells if the need ever arises. The function of this valve is controlled by the City's Supervisory Control and Data Acquisition (SCADA) System and the valve fills the Stambaugh Tank from the Hunter Tank in rotation with Wells 1 & 2. The flow rate is controlled at this structure with a plug valve and is metered with a CLA-VAL metering flow control valve, and flow readings are transmitted to the City's SCADA System for recording and reporting purposes. This structure also contains manual bypass piping and a backup PRV which opens when the Stambaugh Tank reaches its low water level in the event of a power failure at the vault or production well sites.

6. Supervisory Control and Data Acquisition (SCADA) System

The 2012 Water System Improvements Project completed by the City also included upgrades to the City's SCADA System. The system consists of a master site located at the Department of Public Works (DPW) Facility and seven (7) slave sites. At each slave site, there is a Programmable Logic Controller (PLC) and touch-screen color display which allows the City to monitor all water system components and make setting changes at any site. Located at the DPW master site is the single dialer system which contacts DPW staff if an alarm is triggered by the SCADA system resulting in fast response time. The master site collects, trends, and prints daily reports of data relating to pump run time, pumping rates, tank levels, water temperature in tanks, flow control valve flow rate and valve position, and water meter readings. These reports are reviewed by City staff each day and filed for future reference, if needed. Included in Figures 11 and 12 of Appendix C is the control Panel Schematic P&ID design plans.

7. Water Demand

The City of Iron River's water systems currently serves 1,856 EDUs. Based on well pumping records over a three (3) year period, the combined water systems pump an average of 307,000 gallons per day (gpd) which equates to an average usage rate of 215 gpm. On peak usage days, the combined water systems pump as much as 758,000 gpd which requires a peak day average pumping rates in excess of 530 gpm which is considered the firm pumping requirement (capacity) for the entire City.

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) rules require a community's water system to be able to satisfy the system's firm pumping capacity with the largest pump out of service which is referred to as mechanical reliability. Mechanical reliability can be accomplished by having either multiple wells for each system capable of supplying the firm capacity, or the ability for another water system to automatically supply the system's firm capacity. The City currently has excess firm pumping capacity available at all four (4) production wells and meets EGLE's requirement for mechanical reliability.

E. Need for the Project

1. Elevated Water Storage Tank Improvements

The City's most recent Sanitary Survey Letter, found in Appendix B, identified deficiencies in the Elevated Water Storage Tanks to be corrected and consists of placing a new screen on the Hunter Tank overflow to prevent contamination, rainwater, or insects to enter the tank, adding a 24-mesh screen to the Stambaugh Tank overflow as it has no solid cover, and adding a watertight gasket and a lock to the interior hatch of both the Stambaugh and Hunter Storage Tanks. Mixers need to be added to both tanks as well to improve the overall water quality of the system. Along with these improvements, the City had St. Germain Sandblasting inspect both elevated storage tanks and develop a list of improvements that needed to be completed to the paint on the tanks. For the Stambaugh tank, both the interior wet and exterior need to be completely repainted. On the Hunter Tank, St. Germain Sandblasting also recommended the complete repainting of both the exterior and the interior wet. The repainting of both these elevated storage tanks is also included in the City's Capital Improvements Plan. A map showing

the locations of these two (2) elevated water storage tanks is included in Appendix D, Figure 13. Table 14 in Appendix D has further information on the repairs to both elevated water storage tanks. The Opinion of Probable Costs of these improvements is **$470,000**.

2. Pressure Reducing Valve (PRV) Repairs

The City's most recent Sanitary Survey Letter identified deficiencies in several PRV stations. The stations are substandard and prone to flooding which represents a risk of introducing sanitary hazards and extended service interruptions. To combat this, the City needs to completely replace three PRV stations to return these conditions to acceptable levels. A map showing the locations of these three (3) PRV stations to be replaced is included in Appendix D, Figure 13. Table 13 in Appendix D has further information on the PRV stations to be replaced. The Opinion of Probable Costs of these improvements is **$225,000**.

3. Water Distribution System Piping

The City's Water System Asset Management Plan identified approximately 2,500 feet of old 12-inch diameter cast-iron watermain that needs to be replaced along the US-2 corridor which supplies water and fire protection to Trident (formerly Oldenburg Group), a major commercial manufacturer in the City. Cast-iron pipe is prone to breaking during the winter months and contains inoperable valves and fire hydrants. This project would replace this 2,500 feet of 12-inch diameter cast-iron pipe with ductile-iron pipe, which would improve the functionality of this piping and negate any future pipe breaks or failures. A map showing the location of this 2,500 foot run of pipe to be replaced is included in Appendix D, Figure 13. Tables 12 and 13 in Appendix D have further information on the watermains and associated valves and hydrants to be replaced. The Opinion of Probable Costs of these improvements is **$691,000**.

F. Projected Future Needs

1. High Priority Capital Improvements

In 2017, the city contracted an engineering firm to create a Water System Asset Management Plan through EGLE's SAW Grant Program. This plan included a 20-year capital improvement and maintenance plan. This plan assessed the criticality of these improvements and determined which improvements the City needed to complete as soon as possible. These Criticality Ratings are based on a scale of 1 to 5, with 5 being the most critical. High criticality indicates that the system component is essential to the operation of the system and/or serves a critical customer or part of the system. Low criticality ratings indicate that the system component would cause minor disruptions if a failure were to happen.

i. Proposed Capital Improvements

The following were suggested improvements to the City's Water System that were recommended to be completed in the next 20 years after the asset management plan was complete.

1) Watermain Replacement

Upon completion of the existing water system inventory and condition assessment, it was discovered that the City had approximately 10,900 linear feet of watermain that was rated as a condition of 5 and approximately 1,400 linear feet of watermain that was rated as a condition of 4 and needed to be replaced as soon as possible.

2) Fire Hydrant and Valve Replacement

Upon completion of the existing water system inventory and condition assessment, it was discovered that the City had two (2) fire hydrants and eight (8) main line valves that were rated as a condition of 4 or 5 which were recommended to be replaced and 27 fire hydrants and 33 main line valves that were near the end of their useful life and also recommended to be replaced.

3) Water Supply Well Repair/Replacement

Upon completion of the existing water system inventory and condition assessment, it was discovered that the City had one (1) pump control valve in Well No. 1 and one (1) well pump motor in Well No. 4 that were near the end of their useful life and were recommended to be replaced over the next 10 years.

4) Elevated Water Storage Tank Repairs

Upon completion of the existing water system inventory and condition assessment, it was discovered that the City's Stambaugh Tank's interior and exterior paint were near the end of their useful life and were being recommended to be replaced and that the City's Hunter Tank interior and exterior paint and cathodic protection system, and the Stambaugh Tank's cathodic protection system were near the end of their useful life and recommended to be replaced as well.

5) Current State of Capital Improvements

Since the creation of this capital improvements plan in 2017, the City has completed several improvements to their water system. Upon the completion of the City's 2023 MEDC WRI Water Improvements project beginning in the spring of 2023, and the completion of this project, the City's water system would be totally up to date with the Capital Improvements Plan.

New Water Supply Well Procedures

There are no new water supply wells being implemented as part of this project.

Analysis of Alternatives

A. No Action

Failing to take the actions called for in the proposed project could likely result in sections of the City's water system failing. Repairing these critical sections prior to their failure can reduce the consequences of the replacement, from a construction timeframe and financial standpoint, and reduce the risk of contamination. By not implementing the proposed replacements to the system, there is a higher probability of failures occurring in the selected areas or elsewhere in the system as a result of the repairs being neglected.

B. Optimum Performance of Existing System

The City is currently operating an effective water system that uses basic equipment to distribute water to its users. The equipment in place is an economically efficient option, making adding new and additional equipment to the system a costly move. It has been shown over time that the current system operates effectively using the City's procedures and its staff on hand. Their staff is educated on the system and are properly trained to monitor and maintain its operation.

Most of the systems piping has been replaced since the 1980s. The last remaining outdated pipe is the section along US-2 near Trident (formerly Oldenburg Group), that is to be replaced in this project, along with the three PRV Stations and the upgrades to the two water tanks. The rest of the system is updated and in good operating condition with remaining useful life. The proposed project areas are the most critical to the system's well-being as they are outdated and in need of replacement and repair. The pipe layout broken up by diameter, material, and age can be seen in Appendix A, Figures 8 through 10.

C. Regionalization

The City of Iron River and the surrounding communities underwent a thorough hydraulic study through the EGLE AP Grant program in 2022, which analyzed the feasibility of decommissioning a given community's water tanks and/or wells and combining the two communities' systems. This study was intended to reduce costs for the users while maintaining compliance with system specifications. All possible combinations that had existing connections were analyzed. The City of Iron River has one interconnection to the City of Caspian, one interconnection to Bates Township, one interconnection to Stambaugh Township, and two interconnections to Iron River Township. The City of Iron River and the City of Caspian are interconnected near the intersection of Spruce Street and N. 1st Street. The City of Iron River and Bates Township are interconnected along S. Ice Lake Road. The City of Iron River and Stambaugh Township are interconnected along Hiawatha Road. The City of Iron River's interconnection to Iron River Township's Nash System is along US-2, and the City of Iron River's interconnection to Iron River Township's Ryden System is along Homer Road. In all of the City's possible interconnection scenarios, the City of Iron River would be providing water to the surrounding communities. Layouts of all of the City's interconnections can be seen in Appendix E, Figures 14 through 18.

1. City of Caspian

In an effort to evaluate the option of regionalization of the local communities' water systems, the study analyzed all scenarios in which the communities combined their water systems using these interconnections.

Decommissioning only the City of Caspian's well produces monetary savings from eliminating associated costs from well operation and well site maintenance. This scenario would need additional infrastructure such as a control valve to be installed to regulate the water inflow to the Caspian Tank because the tank would then be filled by Iron River City's Stambaugh Tank. In this scenario, system pressures remain the same because the Caspian tank is still in operation. Iron River City tanks oscillate more frequently because of the increased demand from Caspian but still maintains normal operations. Eliminating the Caspian well lowers fire flow capability in Caspian only slightly.

Decommissioning both the City of Caspian's well & tank produces monetary savings from eliminating associated costs from operating and maintaining the two sites. No changes to the system are needed because of existing connections. All of Caspian's water would be supplied from Iron River City. In this scenario, system pressures increase slightly by 1 or 2 psi. Iron River City tanks and wells oscillate online more frequently due to the additional demand from Caspian but still maintain normal operations as in the previous scenario. However, this scenario may prove to be unsustainable for Caspian's industrial locations due to significant losses of fire flow capability from removing the tank. At the node of intersection Museum Dr and Brady Ave shows a 1,600 gpm loss in available fire flow. It may be desirable for these areas to attain as high as a fire flow as possible. Model results show the current state available fire flow for the same intersection previously mentioned to be at 2,800 gpm. The loss of fire flow in this critical industrial area makes the connection of the City of Iron River's and the City of Caspian's water systems unsustainable.

2. Bates Township

Decommissioning Bates Township's Otto Well produces monetary savings from eliminating associated costs of well operations and well site maintenance. This scenario would need additional infrastructure such as a control valve to be installed to regulate the water inflow of the Otto Tank since the tank would be filled by Iron River City's Hunter Tank. In this scenario, system pressures are maintained due to the Otto Tank continuing operation. Iron River City tanks oscillate slightly more frequently due to increased demand. Bates Township's existing fire flow is relatively poor due to friction loss from long networks of small diameter piping with the current state showing between 250-500 gpm available fire flow. Taking the Otto Well offline makes the fire flow slightly less capable compared to the existing scenario because the Well can only supply its designed flow (250 gpm). The overall fire flow does significantly increase when connected to Iron River City's system with 1 connection and better fire flow can be realized if all 3 connections are made with Iron River City. For example, the South Ice Lake Road connection nodes increase by 1,000 gpm.

Decommissioning Bates Township's Otto well & tank produces monetary savings from eliminating associated costs from operating and maintaining the two sites. No changes to the

system are needed because of existing connections. A portion of the water would then be supplied from Iron River City Hunter Tank. In this scenario, system pressures drop slightly and remain in a safe range above the 35-psi minimum requirement. Nodes along Sunset Lake Road drop by 5 psi. Iron River City provides the system with reliable pressure and water volume for the increased demand. Bates Township's existing fire flow is relatively poor due to long networks of small diameter piping. The overall fire flow significantly decreases when the Otto tank is removed from the system while connected to Iron River City's system with 1 connection. Nodes along Sunset Lake Rd lose 800 gpm of available fire flow (1,300 gpm to 500 gpm). Due to this dramatic decrease in fire flow, this makes the connection of the City of Iron River's and Bates Township's water systems unsustainable.

3. Stambaugh Township

Stambaugh Township's No. 1 Water System currently operates in a standalone position. Models indicated that there are areas of low pressures dropping near or below the 35-psi threshold along Stromberg Road, Meadowview Road, Baumgartner Road, and the Southwestern portion of M-73. Opening the connection between Stambaugh Township and Iron River City on Hiawatha Road increases Stambaugh Township's systems pressures only slightly. Tanks and wells continue to operate as before, and areas previously stated experiencing pressures dropping near or below the 35-psi threshold continue to do so. Fire Flow analysis has not been conducted for Stambaugh Township because they are not obligated to provide water in fire events. However, fire flow analysis is observed for adjacent connecting systems who are obligated to provide fire flow. In this scenario, no significant change in fire flow for Iron River City is observed. Due to the opening of the connection between Stambaugh Township and the City of Iron River not alleviating the problems that exist in Stambaugh Township's Water System, this scenario is not a viable option.

4. Iron River Township

For all the following scenarios, fire flow analysis is not conducted specifically for Iron River Township because they are not obligated to provide water in fire events. However, fire flow analysis is evaluated for adjacent connected systems that are obligated to provide fire flow.

Opening the connections between Iron River Township and Iron River City increases pressures to unsustainable values for Iron River City's high-pressure district and other areas within the system. PRV's would need to be installed at appropriate locations to mitigate the excess pressures for these areas. Fire flows increase for the Hunter Low Pressure District in Iron River City. Due to the increase in pressures for the City of Iron River's high-pressure district and other areas within the system, this scenario is unsustainable.

Decommissioning Iron River Township's Ryden well & tank produces monetary savings by eliminating the associated costs from operating and maintaining the two sites. No changes to the system are needed because of existing connections. System demands will be supplied by Iron River City. System pressures are lowered to more sustainable values but are still high. Iron River City Tanks maintain normal operation. Minimal to no additional fire flow is experienced for Iron River City. Due to the pressures in the City of Iron River still being high, this is not a viable option.

Decommissioning Iron River Township's Nash well & tank produces monetary savings by eliminating the associated costs from operating and maintaining the four sites. No changes to the system are needed because of existing connections. Other tanks in the system will supply demands. Additional fire flow is experienced for Iron River City in certain areas due to the Ryden Tank. This scenario proves to be unsustainable because system pressures drop near or below the 35-psi minimum threshold near the Nash tank area.

Decommissioning Iron River Township's Beechwood well & tank produces monetary savings by eliminating the associated costs from operating and maintaining the four sites. No changes to the system are needed because of existing connections. Other tanks in the system will supply demands. Fire flows would be reduced in the Beechwood System due to the 4-inch diameter piping interconnecting the Beechwood to the Ryden System. Pressures in the Beechwood System would be decreased by approximately 10-psi due to the Ryden Tank being 20-feet lower than the Beechwood Tank, making this scenario unsustainable.

Decommissioning Iron River Township's Ryden and Nash wells & tanks produces monetary savings by eliminating the associated costs from operating and maintaining the four sites. No changes to the system are needed because of existing connections. System demands will be supplied by Iron River City. No additional fire flow is added to Iron River City. This scenario proves unsustainable due to system pressures near the Nash Tank dropping below the 35-psi minimum threshold. Iron River City Tanks maintain normal operation but begin to oscillate more frequently due to increased demand.

D. High Priority Capital Improvements

This alternative involves completing the paint and structural repairs to the two water tanks, adding storage tank mixers to both tanks to improve water quality, replacing the 3 pressure reducing valves, and replacing the 12-inch cast-iron watermain piping near Trident along US-2 as previously discussed. This alternative introduces upgrades to multiple crucial parts of the City's system. The water tank repairs keep the City's water supply system in good condition while other improvements keep distribution operating efficiently. The addition of the mixers to the water tanks also improves water quality for the whole system. The total cost for this alternative is estimated to be **$1,802,000**.

E. Monetary Evaluation

A present worth cost analysis was performed on both the No Action and High Priority Capital Improvements alternative for evaluation. For the evaluation, a planning period of 20 years was assumed based on the Project Plan Guidance provided by EGLE. All construction and mitigation costs were included, and a discount rate used to calculate present worth was obtained from Federal Office of Management and Budget (OMB) Appendix C of OMB Circular A-94. Calculation results can be found in Tables 3 and 4 below.

Table 3 – High Priority Capital Improvements		
EPA Discount Rate		0.40%
Planning Period (yrs)		20
High Priority Capital Improvements		
Total Project Cost (Capital Cost) ==>	$	1,802,000
Subtotal Present Worth:	**$**	**1,663,721**
Salvage Value at End of Planning Period:	$	743,267
Present Worth of Salvage Value:	$	686,231
TOTAL PRESENT WORTH OF ALTERNATIVE ==>	**$**	**1,115,769**
EPA Discount Rate		0.40%
Planning Period (yrs)		20

Table 4: No Action		
EPA Discount Rate		0.40%
Planning Period (yrs)		20
Optimum Performance		
Total Project Cost (Capital Cost) ==>	$	0
Subtotal Present Worth:	**$**	**0**
Salvage Value at End of Planning Period:	$	0
Present Worth of Salvage Value:	$	0
TOTAL PRESENT WORTH OF ALTERNATIVE ==>	**$**	**0**
EPA Discount Rate		0.40%
Planning Period (yrs)		20

The total project costs for each alternative were estimated using costs from similar items/projects from previous years while accounting for inflation. This included costs of materials, construction, construction contingencies, application, engineering, planning, and legal/bonding costs. The present worth of each alternative was used to determine the salvage value of the project at the end of the 20-year planning period. The present worth calculation table can be seen in further detail in Appendix F, Table 15.

1. User Costs

The High Priority Capital Improvements project alternative will increase the City's resident and "other" water customer's monthly charge if not funded through the DWSRF. The results of each alternative's impact on the City's monthly charges if no funding is received can be seen in Table 5 below. A copy of the table used in these calculations, Table 16 can be found in Appendix F.

Table 5: Monthly Charge Increase for Each Alternative		
Alternative	**Project Cost**	**Monthly Charge / EDU**
High Priority Capital Improvements	$ 1,802,000	$ 34.14
No Action	-	$ 29.25
Optimum Performance	-	$ 29.25

2. Implementability

The estimated project scope, along with a summary of the DWSRF program was presented during city council meetings where the public had an opportunity to comment prior to advancing with the project plans. The project was approved, and there were no public comments in disagreement. The City of Iron River has the legal authority, managerial capability, and the financial means to build, operate, and maintain the system during and following the project.

The goal of this project is to move forward with construction using funding received from the DWSRF program. Additional funds will be taken from the City's account for the water system project if they are available. The areas of the project protruding into areas of other uses, such as businesses and private lands, will have plans allowing continued access for limited interruption. The proposed project construction will not require managing by the City and all required intermunicipal agreements will be established prior to the project start.

F. Environmental Evaluation

Table 6, seen below, lays out the environmental evaluation for each of the Project Alternatives. All alternatives have potentially both positive and negative impacts to the environment, but these impacts are both avoidable and minor.

Table 6 – Environmental Evaluations of Project Alternatives		
Alternative	**Positive Impacts**	**Negative Impacts**
High Priority Improvements	System will be more reliable and less susceptible to outbursts, contamination, flooding, etc; Construction areas will be restored.	Disturbing ground in previously constructed areas; Exposed work area can be susceptible to contamination during runoff periods; More ground will be disturbed in this alternative due to the larger scope of work.
Long Term System Upgrades	System will be more reliable and less susceptible to outbursts, contamination, flooding, etc; Construction areas will be restored.	Disturbing ground in previously constructed areas; Exposed work area can be susceptible to contamination during runoff periods.
High Priority Pipe Replacement	Minimizes the potential to experience pipe bursts (localized soil flooding); construction areas will be restored; Less ground will be disturbed in this alternative due to the smaller scope of work.	Disturbing ground in previously constructed areas; Exposed work area can be susceptible to contamination during runoff periods.
No Action	No ground disturbances; No new vegetation introduced by restoration.	High probability for localized flooding from bursting pipes; Leaking.
Optimum Performance of Existing Facilities	No ground disturbances; No new vegetation introduced by restoration.	High probability for localized flooding from bursting pipes; Leaking.

G. Technical Considerations

All alternatives will comply with Act 399 and will meet the standard recommended guidelines found in the “Recommended Standards for Waterworks” published be the Great Lakes and Upper Mississippi Board of State Sanitary Engineers. Following construction, system reliability will demonstrate sufficient pumping capacity, stand-by power, wells and treatment facility units, and storage volume.

H. New/Increased Water Withdrawals

There are no new/increased water withdrawals associated with the alternatives listed. The population of resident and other usage demand is not projected to increase, therefore new withdrawals are not necessary.

Selected Alternative

A. Design Parameters

The project design will improve various aspects of the City's water system and will utilize the guidelines from; ASTM, AWWA, ANSI, and Michigan Safe Drinking Water Act for the design process. Distribution system pressures will follow parameters found in the guidelines provided by these entities. Minimum system pressures of 35 psi during normal operating conditions and 20 psi during emergencies will be met during the design. Minimum pipe diameters will be analyzed for each respective section and placed according to proper standards.

This project design will remove and replace a 2,500 linear foot segment of the City of Iron River's distribution system piping, 3 pressure reducing valve stations, and will include various structural and painting improvements on the elevated storage tanks. These storage tank improvements include sealing all unprotected openings, adding mixers to both storage tanks, and making repairs to the paint on the interior and exterior of both storage tanks. It was determined through EGLE's latest Sanitary Survey Letter to the City and through tank inspections performed by St. Germain Sandblasting that these repairs on the tanks are necessary. The pipe being replaced is an approximately 2,500 linear foot segment of 12-inch cast-iron pipe along US-2 near Trident from 9th Avenue to Homer Road.

There are a total of eight PRV stations in the City of Iron River. Five of those PRV stations have been rebuilt in the last 12 years and are in good condition. Three of those were repaired in 2014, but have since deteriorated and would be replaced in this project. The three PRV stations getting replaced can be seen below in Table 7:

Table 7: PRV Locations

PRV Station ID	Location Description
PRV No. 2	Hunter Road/River Avenue
PRV No. 3	Lalley Road/Ice Lake Road
PRV No. 4	Adams Street

B. Useful Life

The weighted useful life of the entire proposed project is approximately 36.15 years based on the information regarding useful life provided through the DWSRF planning preparation guide, including useful lives for each portion of the system and the weighted useful life equation. The loan terms are 20 years so the assets financed exceed the loan terms and should all qualify for funding. The water main life expectancy is approximately 40-60 years, the PRV Stations', valves', and hydrants' life expectancy is approximately 40-60 years, the structural improvements to the storage tanks as a life expectancy of approximately 40 years, and the paint on the water tower has a life expectancy of approximately 20 years. Documentation on the useful life of the project is included in Appendix F.

C. Project Maps

Project maps showing the location of the system's wells, elevated storage tanks, PRVs, routes, lengths, materials, ages, and sizes of the system's watermains, and the locations of the proposed work can be seen in Figure 13 of Appendix D.

D. Water and Energy Efficiency

The selected alternative will provide updates to both elevated storage tanks. It will also replace a deteriorated 2,500-foot section of watermain and three deteriorated pressure reducing valve stations. The current facilities are aged and can cause leaks and contamination. These breaks and leaks that happen with deteriorated equipment greatly reduce the water and energy efficiency within the system. By making these repairs the City's system would be less prone to breaks and leaks and its water and energy efficiency would increase.

E. Schedule for Design and Construction

The estimated schedule for the selected project alternative is shown below in Table 8:

Table 8: Estimated Project Schedule

Year	Estimated Start	Estimated Duration
DWSRF Project Plan/Submittal	June 2023	4 Months
DWSRF Acceptance	Fall 2023	NA
Funding Commitment	Fall 2023	NA
Project Design	Winter 2023/2024	5 Months
Preliminary Engineering/Permitting/Plan Approval	Winter 2023/2024	2 Months
Project Letting/Bidding	Spring 2024	1 Month
Contract Awarded	Spring 2024	NA
Construction Begin	Spring 2024	2-4 Months
Project Completion/Close Out	Fall 2024	1 Month

F. Cost Summary

Table 9 below lists the costs associated with project planning, design, and construction. A more detailed breakdown can be found in Table 17 of Appendix F.

Table 9: Estimated Project Costs	
Items	**Cost**
Construction	$1,386,000
Administration / Legal / Engineering / Contingencies	$416,000
Total	**$1,802,000**

The City of Iron River currently charges a minimum monthly water rate of $29.25 per month for 4,000 gallons of usage. An additional $7.31 charge is then added for each additional 1,000 gallons used after the initial 4,000 gallons. The minimum monthly cost accounts for all associated expenses for the system including the City's operating and maintenance (OM&R), pension, clerical, and water line fund. The City has 1,856 equivalent dwelling units (EDU). An equivalent dwelling unit is a measurement of demand on district facilities equivalent to a typical single-family dwelling.

If the City were to receive no DWSRF grant funding and the project was instead loan-funded, the City would repay the project loan over the next 20-years by increasing each resident's monthly water usage bill. The bill would increase $4.89 per month per residence. This is assuming no additional commodity charges and no population growth. The calculation can be seen below in Table 10 using the average resident usage rate of 4,000 gallons. This number identifies the increase in the monthly water bill per resident if this project received no funding.

Table 10: Increase in Resident Monthly Water Service Charge					
Project Cost	**Current Monthly Charge / EDU**	**EDU's**	**Project Useful Life**	**Increase per month**	**Projected Total Monthly Charge / EDU**
$1,802,000	$29.25	1,856	36.15 Years	**$4.89**	**$34.14**

G. Overburdened Community

An Overburdened Community Status Determination Worksheet provided by EGLE is included in Appendix G. According to the Overburdened Statues guidelines, the City does qualify as an overburdened community based on their current and projected debt service, median household income, and user rates.

H. Implementability

The City of Iron River will be the sole entity for maintaining and funding the project. This project proposal is aimed to validate the system for funding through the EGLE DWSRF in order to receive funding to aid the City in completing this water system improvements project. The project scope was presented to the City's public during the city meeting required by the DWSRF guidelines. There were no objections from the public during the meeting and the project was passed. This project is not part of a regional system and an intermunicipal agreement is not applicable.

I. Residuals

There are no residuals to be expected from the alternatives of this project.

J. Contamination

Contamination identified during any part of the project will be removed and handled per proper handling guidelines. Contamination will be considered during the planning and design of the project in order to mitigate its impact on the project.

Environmental and Public Health Impacts

A. Direct Impacts

1. Construction Impacts

Construction activities are planned to be of common practice for utility work. Typical construction site disturbance mitigation measures will be included in contract documents to minimize dust, noise, site contamination, and storm runoff. Digging shall be done by typical means through excavation and normal trenching methods. During trenching, the width of the trench shall be at 3 feet as per MDOT minimum trench width specifications R-83-C. The piping will have a minimum of 7 feet of cover. Most of the construction shall be done within road right-of-way. Considering that the project will be replacing existing lines, no new impacts are expected for any sensitive feature areas and there will be erosion control and environmental control guidance followed throughout the project. All required permitting will be obtained through the proper state and federal agencies prior to construction start. There is very little to no tree removal or vegetation anticipated for this project.

There is only one endangered species within the project area. The gray wolf, Canis Lupus, is an endangered species according to the US EPA Endangered Species program. The project does not anticipate any disturbances to the wolf habitat as most of the construction of mainline piping is going to be done within existing road right-of-way.

Excavation revealing water will be handled using proper procedures for dewatering and reimplementation of the water. Dewatering for this project will be minimal and will require little contamination mitigation. There are no chemicals or excessive odors that are anticipated and should not cause any issues.

2. Operational Impacts

Project construction will create short term disruption to residential areas near the construction. These areas will experience increased noise levels, dust and debris, travel restrictions, and other construction related complications. Disturbances will occur during operational hours permitted by the City of Iron River's ordinances. There will be measures to mitigate chemical/fuel spills though none are expected.

3. Traffic Impacts

The watermain to be replaced runs along the westbound lane of US-2. The eastbound lanes should encounter no interruptions. At times, the outside westbound lane may need to be closed to allow room for equipment or trucking, however, there will always be at least one westbound lane of US-2 open at all times. Necessary permits needed through MDOT will be acquired if there is a lane closure on US-2. If there are lane closures during construction, short-term traffic congestion and delays may occur. This could slightly increase the risk of accidents in the construction area. Proper signage and traffic control devices will be used to mitigate these issues. There may be some short-term impacts to the project areas due to the requirement of heavy construction equipment causing some noise pollution.

Construction Haul Routes shall follow typical roadways considering there should be no excessive equipment or truck load sizes for this project.

4. Social Impacts

The project alternative selected shall have beneficial impacts to the social environment. The construction activities through implementation of the project will create short-term jobs which will help stimulate the economy within the area. The increase in jobs will most likely mean an increase in product demand and services required for the duration of the project.

There may be a slight disruption in convenience and travel for residents and visitors of the area throughout the construction portion of the project. Project areas will be identified through signage and will be posted prior to start. Traffic mitigation will be in effect to try and lessen the inconvenience to local travelers.

There are no anticipated increases in water costs from the proposed project unless loans are required to fund the project.

B. Indirect Impacts

1. Development

There are no expected changes in the rate, density, or type of development projected in the project area following construction. The population of the City is expected to decline steadily which is likely to also minimize the businesses starting up in the area.

2. Land Use

Land use is estimated to remain the same within the project limits following project completion. The project will replace existing features without encouraging increased development.

3. Air/Water Quality

Air quality will be unaffected following construction completion. During construction, exhaust and dust can be expected but will terminate post construction. This project will have no lasting effect on the air and water quality in the area by using proper mitigation techniques.

4. Sensitive Areas

There are no sensitive natural areas in the way of the project. All areas to be constructed have been previously disturbed and contain no concerning features.

5. Aesthetic Features

With the proposed construction being in previously disturbed areas, it will not impact any aesthetic features of the area.

6. Resource Consumption

Throughout the useful life of the project, resource consumption will remain the same or slightly improve in the project area. The project is meant to replace portions of the system and improve its efficiency, while allowing the system to function the same as it always has. This increase in efficiency will slightly reduce the consumption of water and energy within the system.

C. Cumulative Impacts

The increased interruptions in traffic and noise pollution caused by this project and other possible projects in adjacent communities could create cumulative impacts. One possible cumulative impact is a deterrent against tourism in the area during the construction season due to traffic delays and interruptions and noise pollution in the area.

Aside from this, long term impacts will be felt from this project. The City's water system will be more reliable and more efficient, providing a higher quality of service to the City's residents and businesses. The project will minimize the amount of construction for the foreseeable future as the entirety of the City's 20-year capital improvements plan will be completed. This system will be safer for the surrounding environment and will require less maintenance in the years to come.

By updating a large portion of the City's system at one time, there will be less influence on local traffic for multiple years down the road as the City can then delay further projects.

Mitigation

A. Mitigation of Short-Term Impacts

In the instance where there is a possibility of adverse impacts to the project area, the Contract Documents will provide explanations and requirements for mitigation of these impacts.

1. General Construction

Depending on the project start date, higher runoff volumes and water levels may be encountered during spring construction season. The Iron River, as well as other local waterways, will flow near its high-water line and wetlands will be flooded from runoff requiring more precautions and possibly extra erosion control on the construction site. Spring construction is a common practice in this region and will not cause complications as contractors are aware of mitigation practices necessary for this time of year.

2. Traffic

Most of the mainline and valve portions of the project will occur in or near road rights-of-way where traffic control measures will be used as needed. Flagging operations and possible lane closures will be enacted during the construction in the roadways with partial width restrictions. Advanced warning signs will be used to warn traffic of obstructions ahead. Construction will take place along the westbound lane of Highway US-2, while crossing the entrances to Trident and F.A. Industrial. It will also extend slightly into the US-2/Homer Road intersection. Work will be completed while keeping at least one westbound lane of US-2 open, and allowing access for motorists to Trident, F.A. Industrial, and Homer Road.

3. Safety

All construction will comply with the safety standards of local, state, and federal laws and regulations. Standards listed by Occupational Safety and Health Administration (OSHA) should be used as minimum guidelines.

4. Dust and Noise

Measures will be taken to minimize dust and noise caused by construction to maintain a safe and controlled work site.

5. Erosion

Project construction may require a Soil Erosion and Construction Storm Water permit. Typical sediment and erosion control measures will be enacted during construction.

6. Restoration

All areas disturbed by construction processes will be returned to their original condition or an approved equivalent following completion of construction using MDOT 2020 Standards and Specifications for Construction as a guidance.

7. Utilities

All utilities will be identified and located prior to construction, as necessary. Disrupting utilities will be avoided when possible. The City will be notified when construction is in progress to allow coordination with utility companies looking to update or replace assets during this time. Short-term interference with water service lines is expected. Any long-term interference will require temporary service lines to provide service to local residences and businesses.

8. Construction Disposal

Construction disposal will not be discarded in wetlands, floodplains, or other areas where it could harm the natural environment. All disposals will be in approved locations and will utilize approved techniques.

9. Permitting

All necessary permits will be acquired from EGLE and other local authorities prior to project construction.

10. Endangered Species

There is only one endangered species within the project area. The gray wolf, Canis Lupus, is an endangered species according to the US EPA Endangered Species program. The project does not anticipate any disturbances to the wolf habitat as most of the construction of mainline piping is going to be done within existing road right-of-way.

11. River Crossings

There will be no river crossings during this project.

12. Wetlands

No wetlands are expected to be encountered during this project.

B. Mitigation of Long-Term Impacts

1. Siting Decisions

As shown in Figure 13 of Appendix D, construction will be in previously constructed areas which will limit the long-term impacts of construction. Any disturbances outside of the proposed

locations will be evaluated by the contractor and project supervisors to determine mitigation measures.

2. Operational Impacts

The project will not impact the City's water distribution service for long periods. In the case of long-term impacts, temporary services will be implemented to provide services to the City.

C. Mitigation of Indirect Impacts

1. Master Plan and Zoning

The current project scope will not impact the zoning plan of the city.

2. Ordinances

The City of Iron River's Code of City Ordinances contains restrictions for construction operations that are to be followed.

3. Staging of Construction

Construction staging will be conducted to minimize the impact to surrounding residents, businesses, and travelers to the City of Iron River.

Public Participation

The following section illustrates how the public was kept informed and involved in the project, and how their input was taken into consideration and used regarding the selection of the proposed alternative.

A. Public Meeting

The project alternatives detailed above were presented during the Iron River City Council Meeting on May 17th, 2023 at Iron River City Hall. The discussions at this meeting with city council members and the public in attendance were used in the selection of the proposed alternative. Copies of the meeting notice and meeting minutes are included in Appendix H.

B. Public Meeting Advertisement

A notice was posted in the *Iron County Reporter* on May 3rd, 2023 announcing the date and time of the meeting where discussion on all of the alternatives for the City of Iron River Water System Improvements project took place. A copy of this advertisement is included in Appendix H.

There were no written comments on the project plans during the public comment period and were therefore no revisions made to the project plans.

C. Public Meeting Summary

The public meeting to adopt the selected alternative for the City of Iron River Water System Improvements Project discussed the required items for discussion found in the DWSRF Project Planning Guidance. A written narrative outlining the required items was handed to all attendees prior to the discussion. The narrative was read aloud and then City Mayor Dennis Powell opened the floor for public comment. A copy of the information presented to the public during the meeting can be found in Appendix H.

The only Public Comment was from Mayor Powell, who asked for assurances that no water rates would be raised at this time. Craig Richardson of WICKWIRE, P.C. assured him that rates would remain the same at this time. The meeting minutes are included in Appendix H

D. Adoption of the Project Planning Document

Following the conclusion of the public hearing, the board voted to adopt a resolution in support of submitting the project plans while designating Rachel Andreski, City Manager, as the authorized representative. The High Priority Capital Improvements alternative was selected. The resolution to adopt project plans can be found in Appendix H.

Appendix A – Maps and Figures:

Figure 1: Study Area Map

Figure 2: Zoning Map

Figure 3: City of Iron River Wetlands Map

Figure 4: City of Iron River Floodplains Map

Figure 5 through 7: Soil Survey Map and Legend

Figure 8: Water System Layout By Pipe Diameter

Figure 9: Water System Layout By Material Type

Figure 10: Water System Layout By Pipe Age

Soil Survey Report

Appendix B – EGLE Sanitary Survey Letter & Wellhead Protection Plan Approval Letter

Appendix C – SCADA Schematics and P&ID Design Plans:

Figures 11 and 12: Water System P&ID

Appendix D – Water System Improvements Project Maps and Tables:

Figure 13: Water System Improvements Map

Table 11: Water Distribution Pipe Replacement

Table 12: Hydrant/Valve Replacement

Appendix E – Water System Interconnections:

Appendix F – Monetary Evaluations and Cost Summary

Appendix G – Overburdened Status Determination Documents

Appendix H – Public Participation Documents

Appendix A

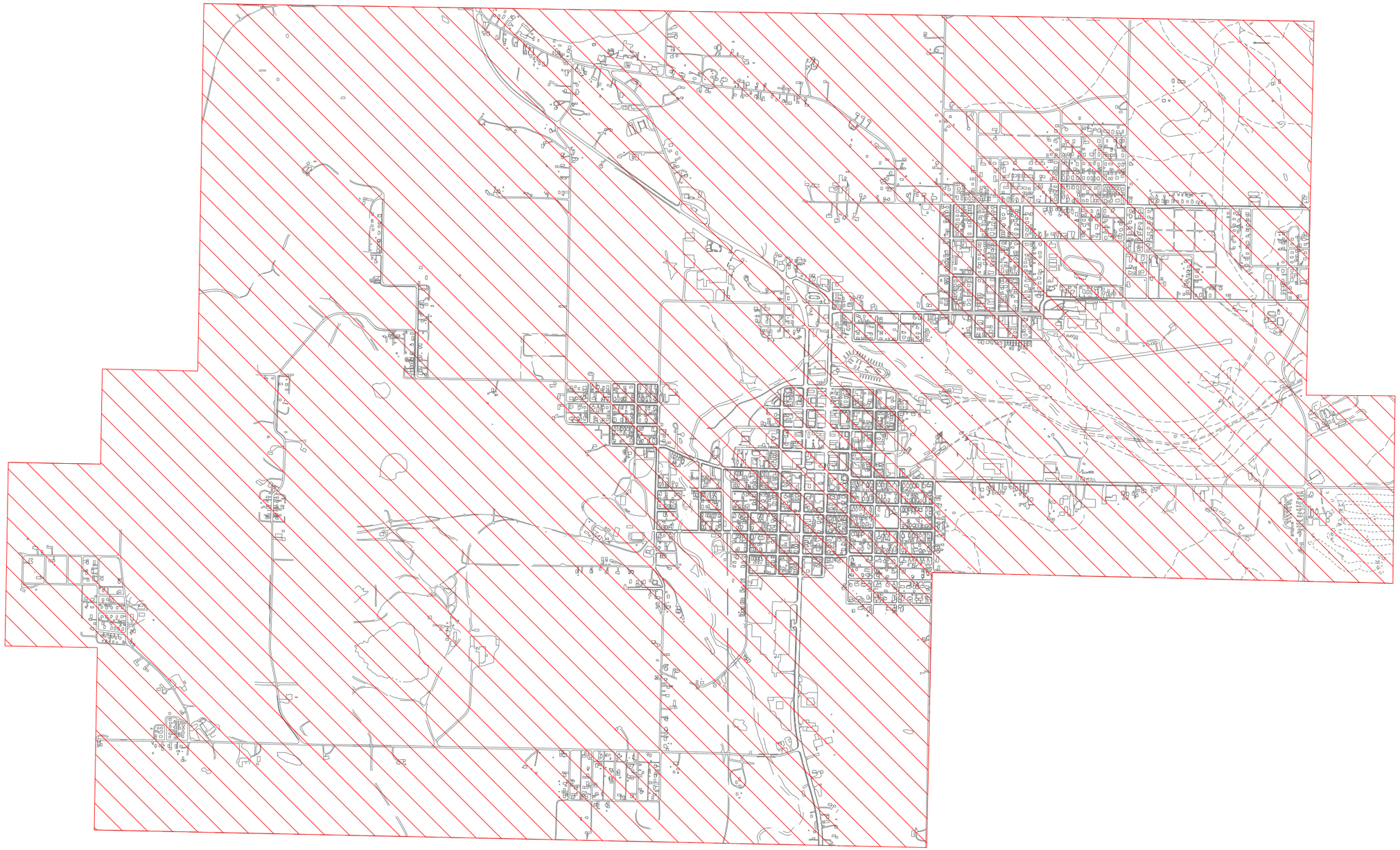
- **Figure 1: Study Area Map**
- **Figure 2: Zoning Map**
- **Figure 3: City of Iron River Wetlands Map**
- **Figure 4: City of Iron River Floodplain Map**
- **Figures 5 through 7: Soil Survey Map and Legend**
- **Figures 8: Water System Layout By Pipe Diameter**
- **Figure 9: Water System Layout By Material Type**
- **Figure 10: Water System Layout By Pipe Age**
- **Soil Survey Report**

LEGEND

EXISTING AND FUTURE SANITARY SEWER SYSTEM SERVICE AREA

N

1500 0 750 1500



EGLE DWSRF Project Plan
City of Iron River
106 W. Genesee Street
Iron River, MI 49935

STUDY AREA MAP

Attention:
0 1"
If this scale bar does not measure 1" then drawing is not original scale.

RELEASE #	DATE
DESCRIPTION	

Designed By: GWC
Checked By: CAR
Drawn By: GWC
Approved By: CAR

DWG. NO.
FIGURE 1

ZONING DISTRICT LEGEND

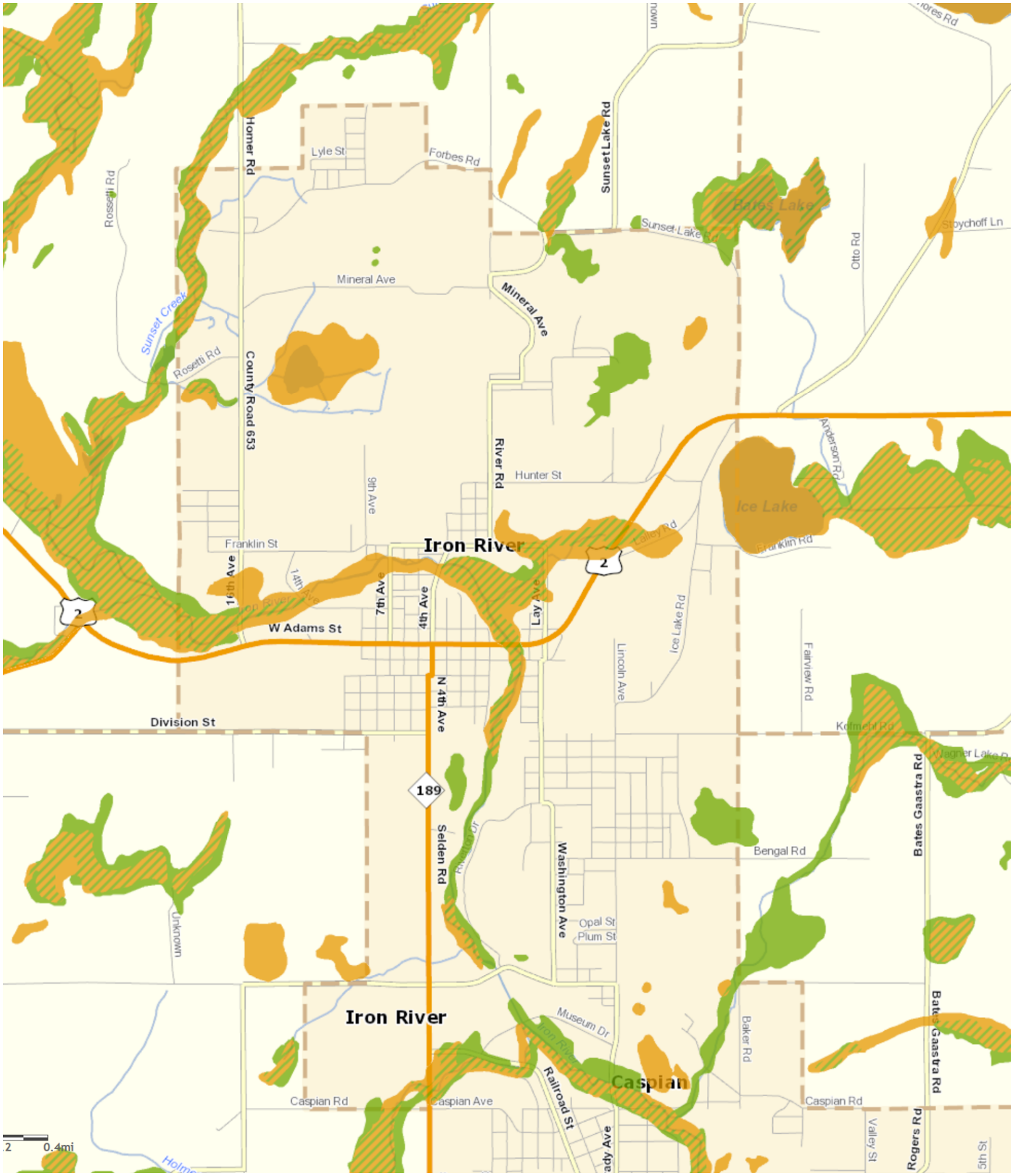
R-1A	LARGER LOTS RESIDENTIAL
R-1B	PLOTTED LOTS RESIDENTIAL
R-2	MULTI-FAMILY RESIDENTIAL
CBD	CENTRAL BUSINESS DISTRICT
C-1	LOCAL SERVICE COMMERCIAL
C-2	GENERAL COMMERCIAL
I	INDUSTRIAL
AG/OS	AGRICULTURE/ OPEN SPACE
G	GOVERNMENTAL USE

CITY OF IRON RIVER

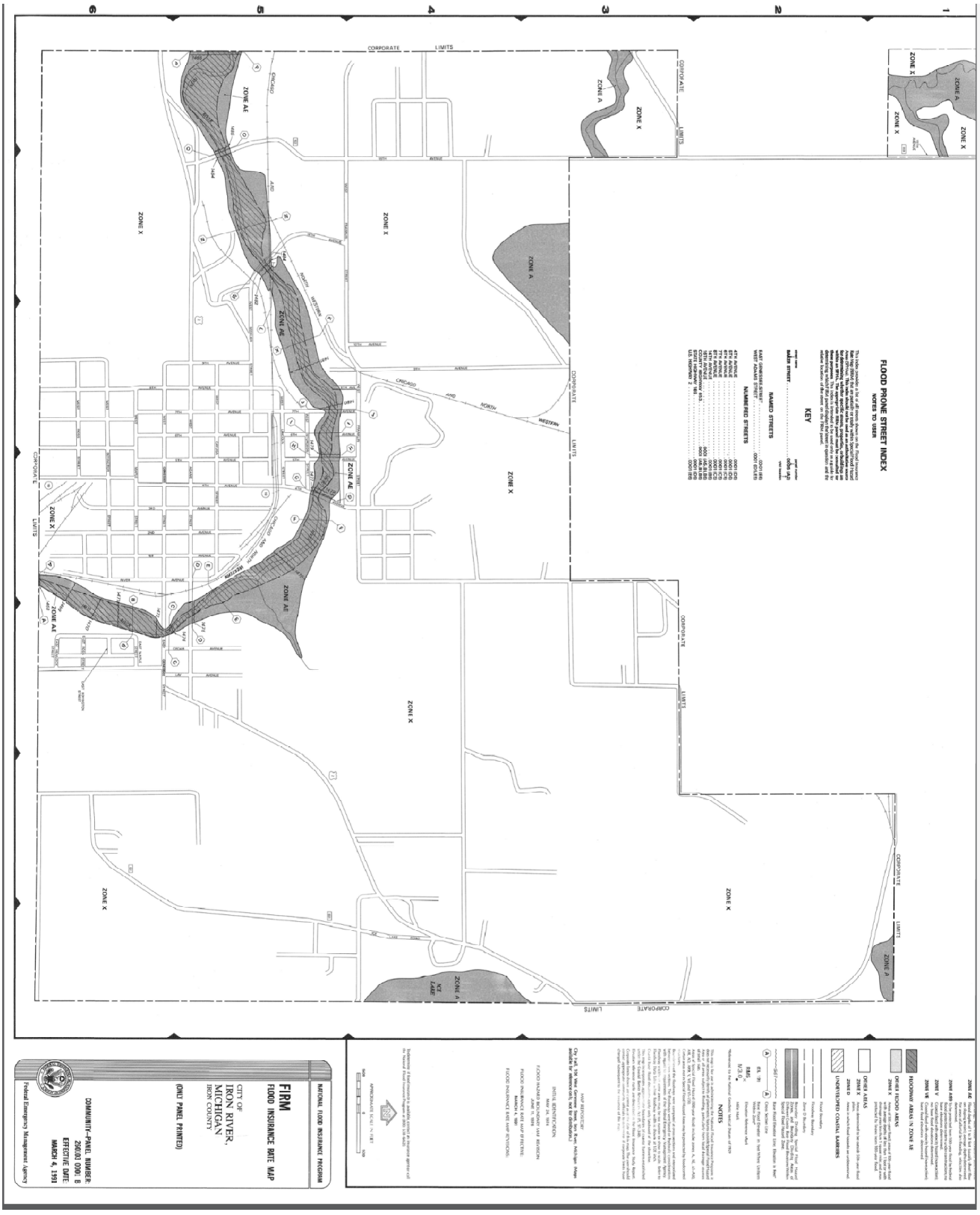
ZONING MAP

ADOPTED 2017

Figure 2



WICKWIRE	City of Iron River Wetlands Map	Drawn By	STM	02/28/23
		Checked By	CAR	03/23/23
		Figure 3		



WICKWIRE	City of Iron River Floodplains Map	Drawn By	STM	02/28/23
		Checked By	CAR	03/23/23
		Figure 4		

Custom Soil Resource Report
Soil Map

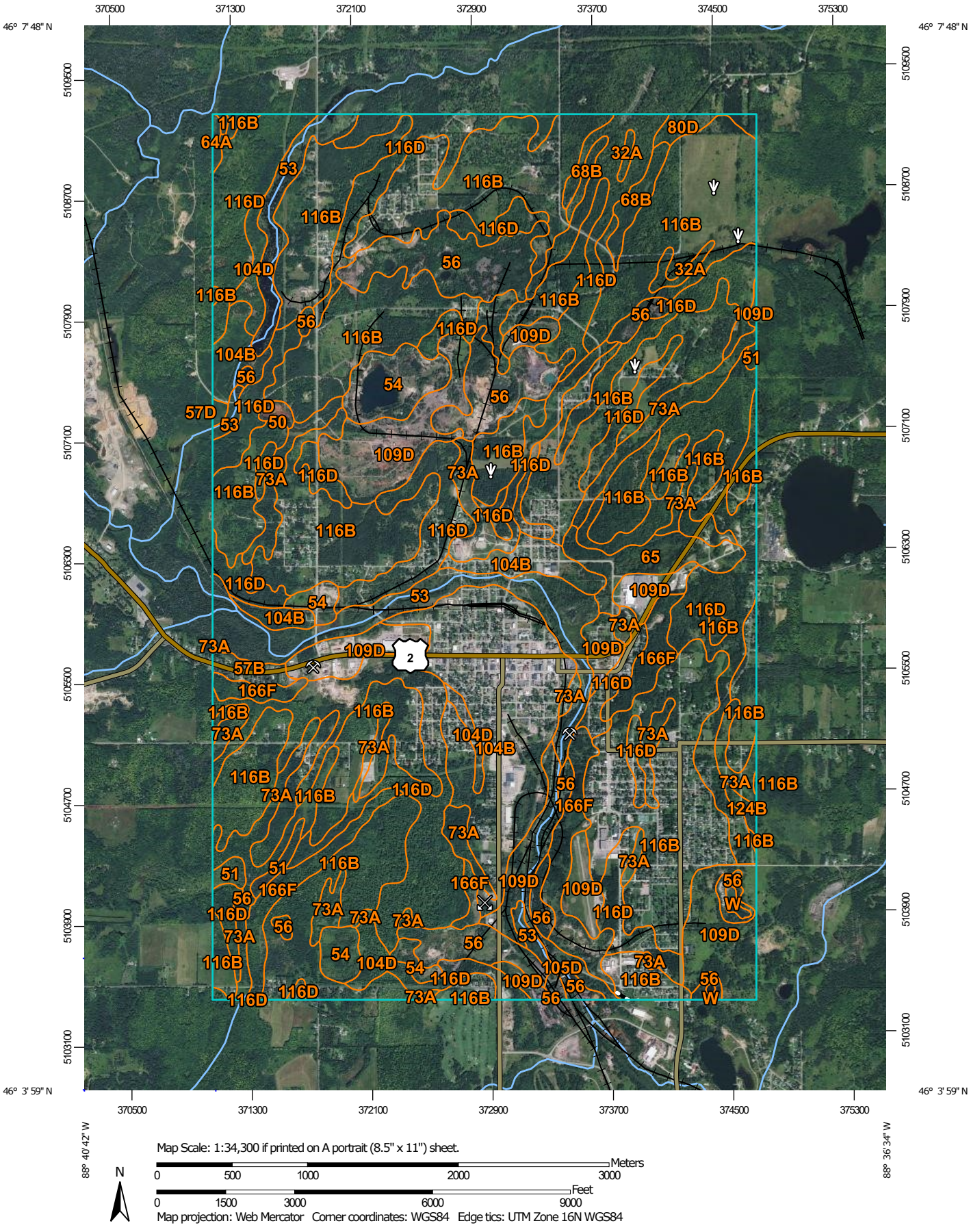


FIGURE 5

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Soil Survey Area: Iron County, Michigan
Survey Area Data: Version 20, Aug 26, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 6, 2020—Sep 11, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

FIGURE 6

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
32A	Net loam, 0 to 2 percent slopes	15.3	0.3%
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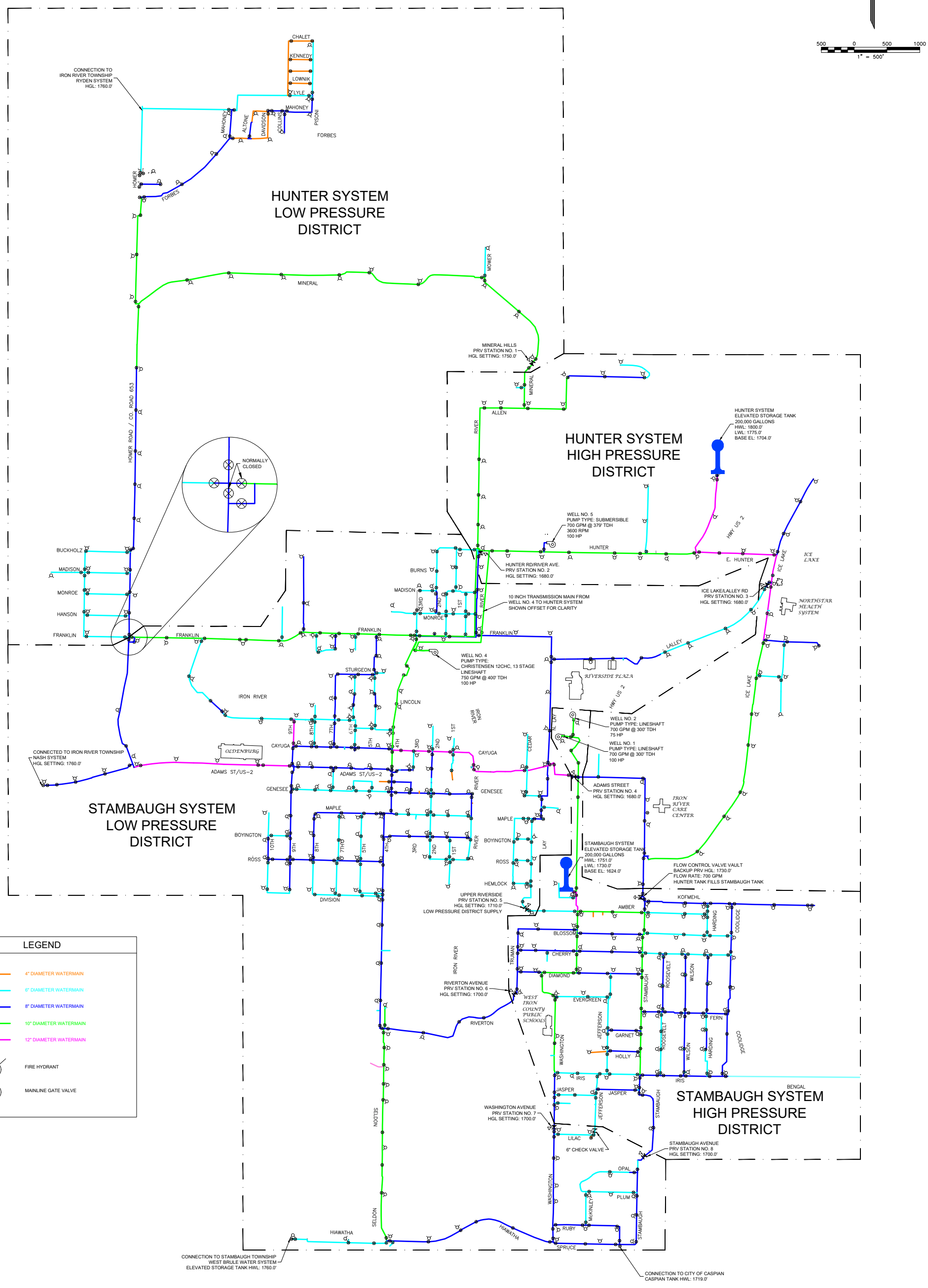
53	Waucedah-Cathro mucks, frequently flooded	225.8	4.3%
54	Pits, sand and gravel	111.5	2.1%
56	Pits and dumps, mine	294.8	5.6%
57B	Padus sandy loam, 0 to 6 percent slopes	19.0	0.4%
57D	Padus sandy loam, 6 to 15 percent slopes	3.4	0.1%
64A	Channing very fine sandy loam, 0 to 3 percent slopes	4.6	0.1%
65	Witbeck muck, 0 to 1 percent slopes, very stony	62.1	1.2%
68B	Net-Witbeck complex, 0 to 4 percent slopes, very stony	30.5	0.6%
73A	Gaastra silt loam, 0 to 3 percent slopes, stony	312.0	5.9%
80D	Pence sandy loam, 6 to 15 percent slopes	16.9	0.3%
104B	Stambaugh silt loam, 1 to 6 percent slopes	401.8	7.6%
104D	Stambaugh silt loam, 6 to 18 percent slopes, stony	50.9	1.0%
105D	Wabeno-Rock outcrop complex, 1 to 18 percent slopes, very stony	4.5	0.1%
109D	Udorthents, nearly level to rolling	395.0	7.5%
116B	Wabeno-Goodwit silt loams, 1 to 6 percent slopes, very stony	1,925.8	36.7%
116D	Wabeno-Goodman silt loams, 6 to 15 percent slopes, very stony	1,167.2	22.2%
124B	Wabeno-Net silt loams, 0 to 6 percent slopes, very stony	6.8	0.1%
166F	Soperton-Goodman silt loams, 15 to 35 percent slopes, very stony	173.0	3.3%
W	Water	5.1	0.1%

FIGURE 7



LEGEND

- 4" DIAMETER WATERMAIN
- 6" DIAMETER WATERMAIN
- 8" DIAMETER WATERMAIN
- 10" DIAMETER WATERMAIN
- 12" DIAMETER WATERMAIN
- FIRE HYDRANT
- MAINLINE GATE VALVE

Fig. 8

CITY OF IRON RIVER

WATER SYSTEM LAYOUT BY PIPE DIAMETER

Iron River MICHIGAN
Nestled in the heart of the U.P.

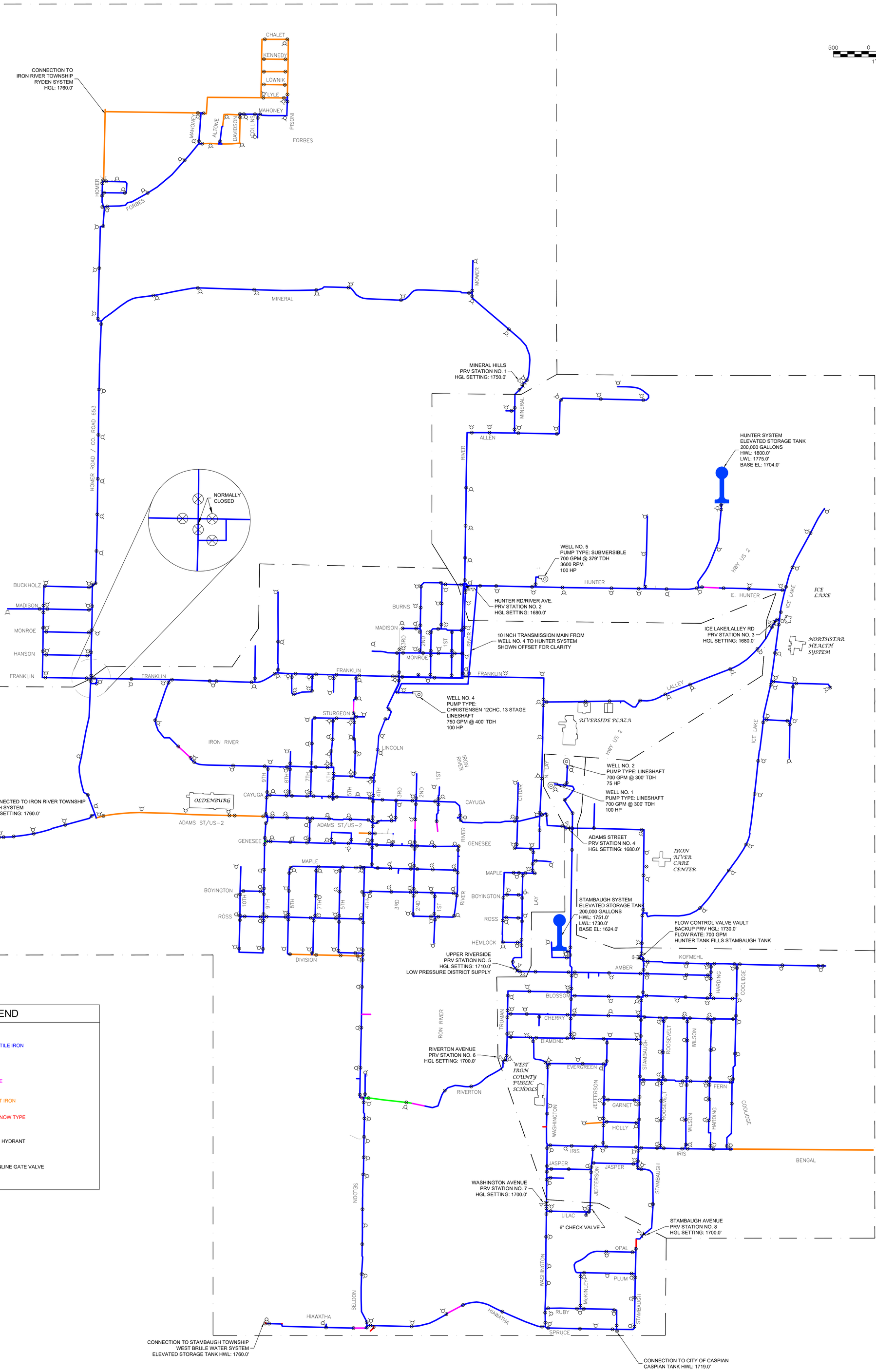


Fig. 9

CITY OF IRON RIVER

WATER SYSTEM LAYOUT BY MATERIAL TYPE

Iron River MICHIGAN
Nestled in the heart of the U.P.

500 0 500 1000
1" = 500'

CONNECTION TO IRON RIVER TOWNSHIP RYDEN SYSTEM HGL: 1760.0'

CHALET
KENNEDY
LOWNIK
LYLE
MAHONEY
PISONI
COLLINS
DAVIDSON
ALTONE
MAHONEY
FORBES
HOMER
FORBES
MINERAL
MOWER
MINERAL HILLS PRV STATION NO. 1 HGL SETTING: 1750.0'
MINERAL
ALLEN
RIVER
HOMER ROAD / CO. ROAD 653
NORMALLY CLOSED
HUNTER SYSTEM ELEVATED STORAGE TANK 200,000 GALLONS HWL: 1800.0' LWL: 1775.0' BASE EL: 1704.0'
WELL NO. 5 PUMP TYPE: SUBMERSIBLE 700 GPM @ 379' TDH 3600 RPM 100 HP
HUNTER
HWY US 2
E. HUNTER
ICE LAKE
ICE LAKE
NORTHSTAR HEALTH SYSTEM
BUCKHOLZ
MADISON
MONROE
HANSON
FRANKLIN
FRANKLIN
HUNTER RD/RIVER AVE. PRV STATION NO. 2 HGL SETTING: 1680.0'
BURNS
MADISON
MONROE
3RD
2ND
1ST
RIVER
10 INCH TRANSMISSION MAIN FROM WELL NO. 4 TO HUNTER SYSTEM SHOWN OFFSET FOR CLARITY
ICE LAKE/LALLEY RD PRV STATION NO. 3 HGL SETTING: 1680.0'
FRANKLIN
FRANKLIN
LALLEY
WELL NO. 4 PUMP TYPE: CHRISTENSEN 12CHC, 13 STAGE LINESHAFT 750 GPM @ 400' TDH 100 HP
STURGEON
RIVERSIDE PLAZA
IRON RIVER
LINCOLN
HWY US 2
N. LAY
WELL NO. 2 PUMP TYPE: LINESHAFT 700 GPM @ 300' TDH 75 HP
WELL NO. 1 PUMP TYPE: LINESHAFT 700 GPM @ 300' TDH 100 HP
9TH
8TH
7TH
6TH
5TH
4TH
3RD
2ND
1ST
IRON RIVER
CEDAR
CONNECTED TO IRON RIVER TOWNSHIP NASH SYSTEM HGL SETTING: 1760.0'
OLDENBURG
CAYUGA
CAYUGA
ADAMS ST/US-2
ADAMS ST/US-2
ADAMS STREET PRV STATION NO. 4 HGL SETTING: 1680.0'
RIVER
GENESEE
GENESEE
IRON RIVER CARE CENTER
MAPLE
MAPLE
BOYINGTON
BOYINGTON
LAY
ROSS
ROSS
STAMBAUGH SYSTEM ELEVATED STORAGE TANK 200,000 GALLONS HWL: 1751.0' LWL: 1730.0' BASE EL: 1624.0'
HEMLOCK
FLOW CONTROL VALVE VAULT BACKUP PRV HGL: 1730.0' FLOW RATE: 700 GPM HUNTER TANK FILLS STAMBAUGH TANK
UPPER RIVERSIDE PRV STATION NO. 5 HGL SETTING: 1710.0' LOW PRESSURE DISTRICT SUPPLY
KOFMEHL
AMBER
BLOSSOM
HARDING
COOLIDGE
CHERRY
TRUMAN
DIAMOND
IRON RIVER
ROOSEVELT
WILSON
STAMBAUGH
RIVERTON AVENUE PRV STATION NO. 6 HGL SETTING: 1700.0'
WEST IRON COUNTY PUBLIC SCHOOLS
EVERGREEN
FERN
RIVERTON
JEFFERSON
GARNET
ROOSEVELT
WILSON
HARDING
COOLIDGE
WASHINGTON
HOLLY
IRIS
IRIS
JASPER
JASPER
JASPER
BENGAL
WASHINGTON AVENUE PRV STATION NO. 7 HGL SETTING: 1700.0'
JEFFERSON
STAMBAUGH
LILAC
6" CHECK VALVE
STAMBAUGH AVENUE PRV STATION NO. 8 HGL SETTING: 1700.0'
OPAL
PLUM
WASHINGTON
McKINLEY
STAMBAUGH
SELDON
HIAWATHA
HIAWATHA
RUBY
SPRUCE
CONNECTION TO STAMBAUGH TOWNSHIP WEST BRULE WATER SYSTEM ELEVATED STORAGE TANK HWL: 1760.0'
CONNECTION TO CITY OF CASPIAN CASPIAN TANK HWL: 1719.0'

LEGEND

- 1920'S - 1980'S
- 1999 - 2000
- 2001 - 2005
- 2007 - 2010
- 2012 - 2022
- UNKNOWN YEAR OF PLACEMENT
- HYDRANT
- MAINLINE VALVE

Fig. 10

CITY OF IRON RIVER

WATER SYSTEM LAYOUT BY PIPE AGE

Iron River MICHIGAN
Nestled in the heart of the U.P.

United States Department of Agriculture

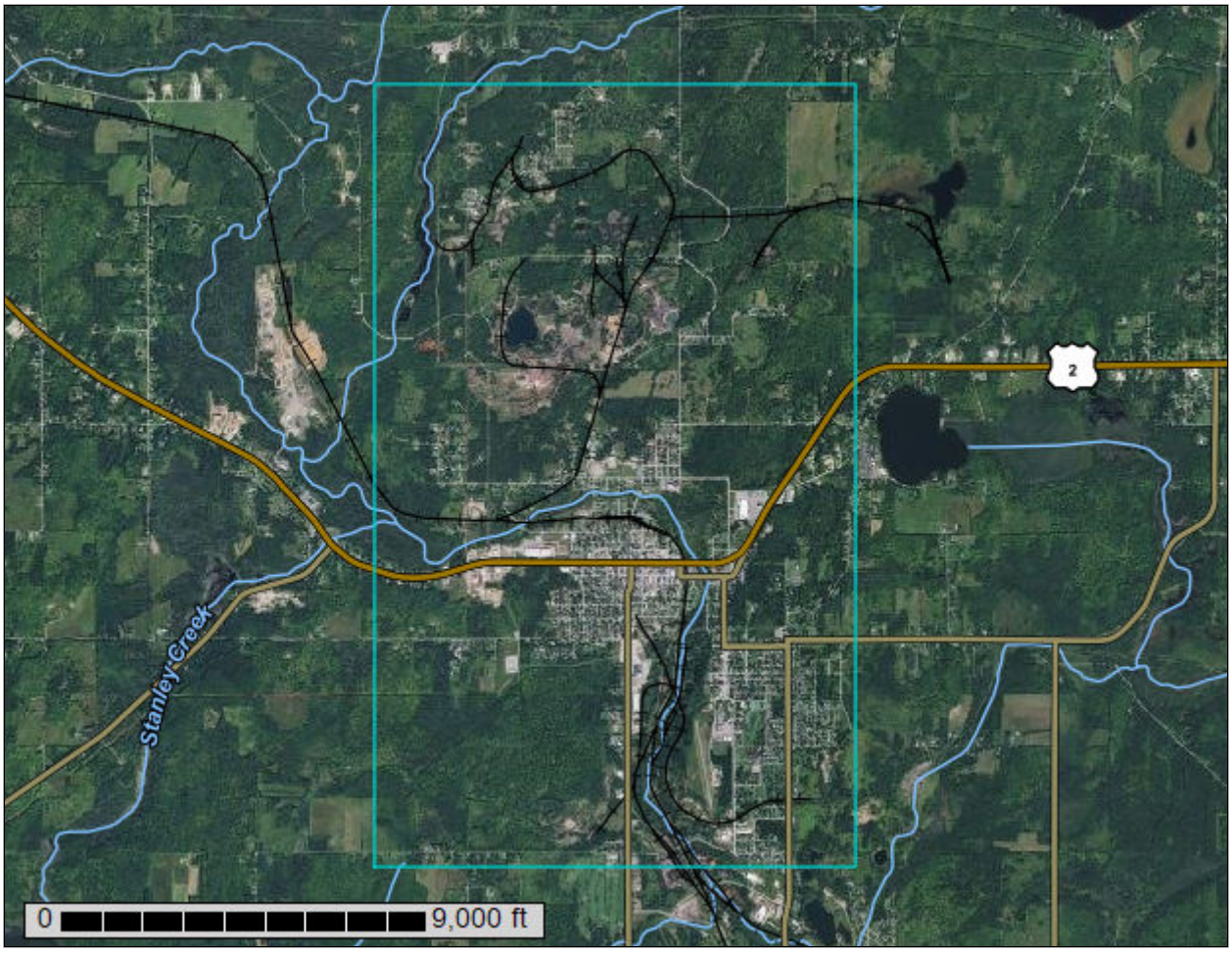
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Iron County, Michigan

City of Iron River



April 19, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

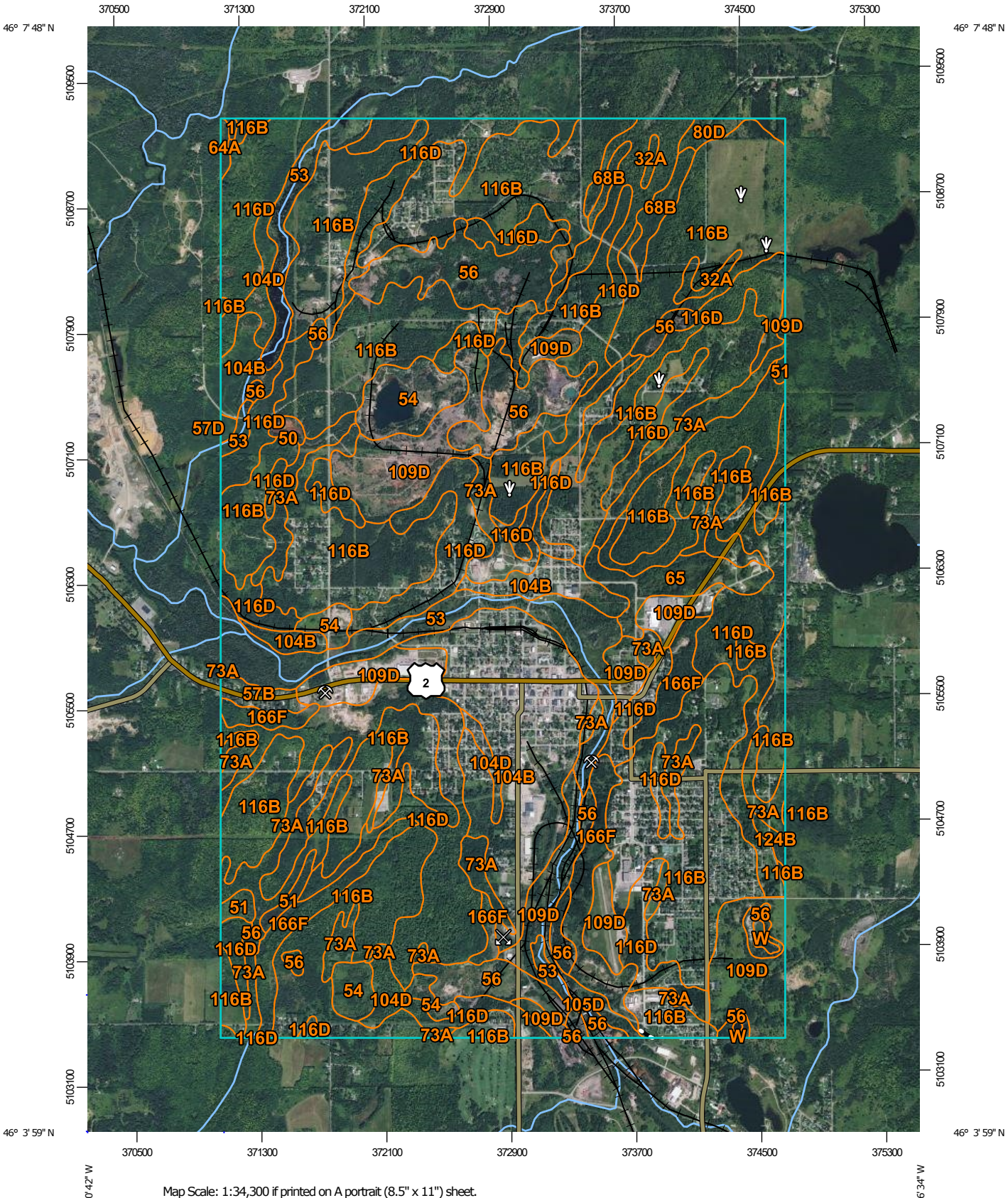
alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:34,300 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 500 1000 2000 3000

Feet: 0 1500 3000 6000 9000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

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- Area of Interest (AOI)

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- Soil Map Unit Lines
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- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

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- Aerial Photography

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73A	Gaastra silt loam, 0 to 3 percent slopes, stony	312.0	5.9%
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166F	Soperton-Goodman silt loams, 15 to 35 percent slopes, very stony	173.0	3.3%
W	Water	5.1	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Totals for Area of Interest		**5,253.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Iron County, Michigan

32A—Net loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2nb1g
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Net and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Net

Setting

Landform: End moraines, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, dip, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Modified loamy eolian deposits over loamy or sandy gravelly till

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: loam
E - 5 to 8 inches: gravelly silt loam
Bhs - 8 to 9 inches: very gravelly loam
Bs1 - 9 to 17 inches: gravelly silt loam
2Bs2 - 17 to 25 inches: gravelly fine sandy loam
2Bx - 25 to 41 inches: gravelly sandy loam
2C - 41 to 80 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 15 to 30 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Tsuga-Maianthemum-Coptis (TMC)
Hydric soil rating: No

50—Histosols and Aquents, 0 to 1 percent slopes, ponded

Map Unit Setting

National map unit symbol: 2n889
Elevation: 600 to 1,800 feet
Mean annual precipitation: 25 to 34 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Histosols, ponded, and similar soils: 60 percent
Aquents, ponded, and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Histosols, Ponded

Setting

Landform: Marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

Oa - 0 to 51 inches: muck
C - 51 to 80 inches: variable

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 20.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Ecological site: R092XY002WI - Mucky Swamps
Hydric soil rating: Yes

Description of Aquents, Ponded

Setting

Landform: Marshes
Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy or loamy alluvium

Typical profile

C - 0 to 80 inches: variable

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Ecological site: R092XY007WI - Wet Loamy or Clayey Lowlands
Hydric soil rating: Yes

51—Lupton-Cathro-Humaquepts complex

Map Unit Setting

National map unit symbol: fyst
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 38 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 70 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Lupton and similar soils: 40 percent
Cathro and similar soils: 37 percent
Humaquepts and similar soils: 23 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lupton

Setting

Landform: Swamps on till plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Highly decomposed woody organic material

Typical profile

Oa1 - 0 to 20 inches: muck

Oa2 - 20 to 80 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: A/D
Ecological site: F093BY002MI - Mucky Swamps
Other vegetative classification: Tsuga-Thuja-Sphagnum (TTS)
Hydric soil rating: Yes

Description of Cathro

Setting

Landform: Swamps, depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over loamy drift

Typical profile

Oa1 - 0 to 6 inches: muck
Oa2 - 6 to 31 inches: muck
Cg - 31 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Ecological site: F093BY002MI - Mucky Swamps
Other vegetative classification: Tsuga-Thuja-Sphagnum (TTS)
Hydric soil rating: Yes

Description of Humaquepts

Setting

Landform: Lake plains, moraines, outwash plains
Parent material: Till

Typical profile

Oa - 0 to 15 inches: muck
C - 15 to 80 inches: variable

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Ecological site: F093BY004MI - Wet Lowlands
Other vegetative classification: Tsuga-Thuja-Sphagnum (TTS)
Hydric soil rating: Yes

53—Waucedah-Cathro mucks, frequently flooded

Map Unit Setting

National map unit symbol: fytr
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Waucedah, frequently flooded, and similar soils: 55 percent
Cathro, frequently flooded, and similar soils: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Waucedah, Frequently Flooded

Setting

Landform: Flood plains

Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium

Typical profile

Oa - 0 to 10 inches: muck
Cg1 - 10 to 36 inches: fine sandy loam
Cg2 - 36 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: OccasionalRareFrequentNone
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 10 percent
Available water supply, 0 to 60 inches: Very high (about 12.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A/D
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus-Mentha-Carex (FMC)
Hydric soil rating: Yes

Description of Cathro, Frequently Flooded

Setting

Landform: Swamps, depressions, drainageways
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Herbaceous organic material over loamy drift

Typical profile

Oa1 - 0 to 6 inches: muck
Oa2 - 6 to 31 inches: muck
Cg - 31 to 80 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: OccasionalRareNoneFrequent
Frequency of ponding: Frequent

Calcium carbonate, maximum content: 30 percent
Available water supply, 0 to 60 inches: Very high (about 16.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Ecological site: F090AY002WI - Mucky Swamp
Other vegetative classification: Fraxinus-Mentha-Carex (FMC)
Hydric soil rating: Yes

54—Pits, sand and gravel

Map Unit Setting

National map unit symbol: fyv6
Elevation: 600 to 1,800 feet
Mean annual precipitation: 25 to 34 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits, sand and gravel: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits, Sand And Gravel

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

56—Pits and dumps, mine

Map Unit Setting

National map unit symbol: fyw6
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Pits and dumps, mine: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pits And Dumps, Mine

Setting

Landform: Lake plains, moraines, outwash plains

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

57B—Padus sandy loam, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: 2tny2
Elevation: 600 to 1,830 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Padus and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Padus

Setting

Landform: Hillslopes, eskers, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over stratified sandy and gravelly outwash

Typical profile

A - 0 to 2 inches: sandy loam
E - 2 to 3 inches: sandy loam
Bs - 3 to 19 inches: sandy loam
E/B - 19 to 26 inches: sandy loam
B/E - 26 to 38 inches: sandy loam
2C - 38 to 79 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum-Tsuga/Maianthemum (ATM), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Minor Components

Pence

Percent of map unit: 10 percent
Landform: Hillslopes, eskers, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY013WI - Sandy Upland
Other vegetative classification: Low AWC, adequately drained (G090AY002WI), Acer saccharum-Tsuga/Maianthemum (ATM)
Hydric soil rating: No

Tipler

Percent of map unit: 5 percent
Landform: Hillslopes, flats
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, rise
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Mod AWC, adequately drained (G090AY005WI), Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum-Tsuga/Maianthemum (ATM), Acer saccharum/Viola-Osmorhiza (AViO)
Hydric soil rating: No

Worcester

Percent of map unit: 2 percent
Landform: Hillslopes, flats
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Mod AWC, high water table (G090AY004WI), Tsuga/Maianthemum-Coptis (TMC)
Hydric soil rating: No

Stambaugh

Percent of map unit: 2 percent
Landform: Hillslopes

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Dryopteris (ATD), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

Padus, stony

Percent of map unit: 1 percent
Landform: Hillslopes, eskers, kames
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve, crest
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum-Tsuga/Maianthemum (ATM), Mod AWC, adequately drained (G090AY005WI), Acer saccharum-Tsuga/Dryopteris (ATD)
Hydric soil rating: No

57D—Padus sandy loam, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2tny3
Elevation: 840 to 1,840 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Padus and similar soils: 83 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Padus

Setting

Landform: Hillslopes, kames, eskers
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over stratified sandy and gravelly outwash

Typical profile

A - 0 to 2 inches: sandy loam
E - 2 to 3 inches: sandy loam
Bs - 3 to 19 inches: sandy loam
E/B - 19 to 26 inches: sandy loam
B/E - 26 to 38 inches: sandy loam
2C - 38 to 79 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Mod AWC, adequately drained (G090AY005WI), Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum-Tsuga/ Maianthemum (ATM)
Hydric soil rating: No

Minor Components

Pence

Percent of map unit: 10 percent
Landform: Hillslopes, kames, eskers
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY013WI - Sandy Upland
Other vegetative classification: Low AWC, adequately drained (G090AY002WI), Acer saccharum-Tsuga/Maianthemum (ATM), Pinus/Maianthemum-Vaccinium (PMV)
Hydric soil rating: No

Padus, stony

Percent of map unit: 3 percent
Landform: Hillslopes, kames, eskers
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland

Other vegetative classification: Mod AWC, adequately drained (G090AY005WI), Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum-Tsuga/Maianthemum (ATM)
Hydric soil rating: No

Sayner
Percent of map unit: 2 percent
Landform: Hillslopes, kames, eskers
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY019WI - Dry Sandy Uplands
Other vegetative classification: Low AWC, adequately drained (G090AY002WI), Pinus/Maianthemum-Vaccinium (PMV), Acer rubrum-Quercus/Vaccinium (ArQV)
Hydric soil rating: No

Stambaugh
Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Dryopteris (ATD), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

64A—Channing very fine sandy loam, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: fywh
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Farmland of local importance

Map Unit Composition
Channing and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Channing

Setting
Landform: Till plains, stream terraces, outwash plains

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy till over sandy and gravelly outwash

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 6 inches: very fine sandy loam
E - 6 to 7 inches: fine sandy loam
Bs1 - 7 to 16 inches: very fine sandy loam
Bs2 - 16 to 24 inches: fine sandy loam
2C1 - 24 to 29 inches: gravelly sand
2C2 - 29 to 80 inches: gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A/D
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Tsuga-Maianthemum-Coptis, Vaccinium phase/ Tsuga-Maianthemum-Vaccinium (TMC-V/TMV)
Hydric soil rating: No

Minor Components

Minocqua

Percent of map unit: 5 percent
Landform: Lake plains, moraines, outwash plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Tsuga Maianthemum Coptis (TMC_1)
Hydric soil rating: Yes

65—Witbeck muck, 0 to 1 percent slopes, very stony

Map Unit Setting

National map unit symbol: fywj
Elevation: 600 to 1,970 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Witbeck, very stony, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Witbeck, Very Stony

Setting

Landform: Depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy till

Typical profile

Oa - 0 to 6 inches: muck
A - 6 to 10 inches: silt loam
Bg - 10 to 22 inches: fine sandy loam
Cg1 - 22 to 30 inches: very fine sandy loam
Cg2 - 30 to 39 inches: very fine sandy loam
Cg3 - 39 to 80 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D

Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Tsuga Thuja Sphagnum (TTS_1)
Hydric soil rating: Yes

Minor Components

Beseman
Percent of map unit: 10 percent
Landform: Bogs on till plains
Landform position (two-dimensional): Toeslope, footslope
Landform position (three-dimensional): Dip, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F090AY001WI - Poor Fen
Other vegetative classification: Picea Osmunda (PO)
Hydric soil rating: Yes

68B—Net-Witbeck complex, 0 to 4 percent slopes, very stony

Map Unit Setting
National map unit symbol: fywl
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition
Net, very stony, and similar soils: 60 percent
Witbeck, very stony, and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Net, Very Stony

Setting
Landform: End moraines, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, dip, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Modified loamy eolian deposits over loamy or sandy gravelly till

Typical profile
Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: silt loam
E - 5 to 8 inches: gravelly silt loam
Bhs - 8 to 9 inches: very gravelly loam
Bs1 - 9 to 17 inches: gravelly silt loam
2Bs2 - 17 to 25 inches: gravelly fine sandy loam
2Bx - 25 to 41 inches: gravelly sandy loam

2C - 41 to 80 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 4 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 15 to 30 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C/D
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Tsuga-Maianthemum-Coptis (TMC)
Hydric soil rating: No

Description of Witbeck, Very Stony

Setting

Landform: Depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy till

Typical profile

Oa - 0 to 6 inches: muck
A - 6 to 10 inches: silt loam
Bg - 10 to 22 inches: fine sandy loam
Cg1 - 22 to 30 inches: very fine sandy loam
Cg2 - 30 to 39 inches: very fine sandy loam
Cg3 - 39 to 80 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water supply, 0 to 60 inches: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w

Hydrologic Soil Group: B/D
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus-Impatiens (FI)
Hydric soil rating: Yes

73A—Gaastra silt loam, 0 to 3 percent slopes, stony

Map Unit Setting

National map unit symbol: fywt
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Gaastra, stony, and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gaastra, Stony

Setting

Landform: Lake plains, moraines
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Talf, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy lacustrine deposits

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 4 inches: silt loam
E - 4 to 6 inches: silt loam
Bs - 6 to 14 inches: silt loam
E' - 14 to 22 inches: silt loam
Bt - 22 to 37 inches: silt loam
BC - 37 to 51 inches: silt loam
C - 51 to 80 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None

Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Acer-Viola-Osmorhiza, Circaea-Impatiens phase/ Tsuga-Maianthemum-Coptis (AVO-CI/TMC)
Hydric soil rating: No

Minor Components

Witbeck, stony

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus-Impatiens (FI)
Hydric soil rating: Yes

80D—Pence sandy loam, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2tnyy
Elevation: 590 to 1,870 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Pence and similar soils: 83 percent
Minor components: 17 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pence

Setting

Landform: Hillslopes, kames, eskers
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy glaciofluvial deposits over stratified sandy and gravelly outwash

Typical profile

A - 0 to 3 inches: sandy loam
E - 3 to 8 inches: sandy loam
Bs - 8 to 15 inches: gravelly sandy loam
2BC - 15 to 21 inches: gravelly coarse sand
2C - 21 to 79 inches: stratified sand to very gravelly coarse sand

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F090AY019WI - Dry Sandy Uplands
Forage suitability group: Low AWC, adequately drained (G090AY002WI)
Other vegetative classification: Low AWC, adequately drained (G090AY002WI), Acer saccharum-Tsuga/Maianthemum (ATM)
Hydric soil rating: No

Minor Components

Padus

Percent of map unit: 10 percent
Landform: Hillslopes, kames, eskers
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Mod AWC, adequately drained (G090AY005WI), Acer saccharum-Tsuga/ Maianthemum (ATM)
Hydric soil rating: No

Sayner

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY019WI - Dry Sandy Uplands
Other vegetative classification: Low AWC, adequately drained (G090AY002WI), Pinus/Maianthemum-Vaccinium (PMV), Acer rubrum-Quercus/Vaccinium (ArQV)
Hydric soil rating: No

Manitowish

Percent of map unit: 2 percent
Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F090AY013WI - Sandy Upland
Other vegetative classification: Low AWC, adequately drained (G090AY002WI), Tsuga/Maianthemum-Coptis (TMC), Acer saccharum-Tsuga/Maianthemum (ATM), Pinus/Maianthemum-Vaccinium (PMV)
Hydric soil rating: No

104B—Stambaugh silt loam, 1 to 6 percent slopes

Map Unit Setting

National map unit symbol: fyqw
Elevation: 600 to 1,970 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Stambaugh and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stambaugh

Setting

Landform: Stream terraces, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Riser, tread, rise, talf
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Parent material: Silty loess over sandy and gravelly outwash

Typical profile

A - 0 to 4 inches: silt loam
Bs1 - 4 to 10 inches: silt loam
Bs2 - 10 to 18 inches: silt loam
E - 18 to 22 inches: very fine sandy loam
B/E - 22 to 39 inches: silt loam
2C1 - 39 to 50 inches: very gravelly sand
2C2 - 50 to 80 inches: gravelly sand

Properties and qualities

Slope: 1 to 6 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Acer Viola Osmorhiza (AVO_1)
Hydric soil rating: No

Minor Components

Beechwood

Percent of map unit: 10 percent
Landform: End moraines, till plains, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Rise, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Tsuga Maianthemum Coptis (TMC_1), Tsuga Maianthemum Coptis - Dryopteris (TMC-D_1)
Hydric soil rating: No

104D—Stambaugh silt loam, 6 to 18 percent slopes, stony

Map Unit Setting

National map unit symbol: fyqx
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Stambaugh, stony, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stambaugh, Stony

Setting

Landform: Outwash plains, stream terraces

Landform position (two-dimensional): Footslope, summit, shoulder, backslope
Landform position (three-dimensional): Riser, tread, rise, talf
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Parent material: Silty loess over sandy and gravelly outwash

Typical profile

A - 0 to 4 inches: silt loam
Bs1 - 4 to 10 inches: silt loam
Bs2 - 10 to 18 inches: silt loam
E - 18 to 22 inches: very fine sandy loam
B/E - 22 to 39 inches: silt loam
2C1 - 39 to 50 inches: very gravelly sand
2C2 - 50 to 80 inches: gravelly sand

Properties and qualities

Slope: 6 to 18 percent
Surface area covered with cobbles, stones or boulders: 0.1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer-Viola-Osmorhiza (AVO)
Hydric soil rating: No

105D—Wabeno-Rock outcrop complex, 1 to 18 percent slopes, very stony

Map Unit Setting

National map unit symbol: fyqy
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 38 inches
Mean annual air temperature: 36 to 45 degrees F
Frost-free period: 70 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Wabeno, very stony, and similar soils: 84 percent
Rock outcrop: 16 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabeno, Very Stony

Setting

Landform: Moraines, till plains
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, base slope, crest, rise, talf
Down-slope shape: Concave, convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-silty eolian deposits over coarse-loamy till

Typical profile

A - 0 to 2 inches: silt loam
E - 2 to 4 inches: silt loam
Bs1 - 4 to 11 inches: silt loam
Bs2 - 11 to 23 inches: silt loam
B/E - 23 to 32 inches: silt loam
2B/Ex - 32 to 42 inches: very fine sandy loam
2Btx - 42 to 50 inches: sandy loam
2C - 50 to 80 inches: sandy loam

Properties and qualities

Slope: 1 to 18 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 20 to 40 inches to fragipan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Ecological site: F093BY008MI - Fragic Loamy Uplands
Other vegetative classification: Tsuga-Maianthemum/Acer-Tsuga-Dryopteris (TM/ATD)
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Knolls, knobs
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Convex
Across-slope shape: Convex

Typical profile

R - 0 to 80 inches: unweathered bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s

Hydric soil rating: Unranked

109D—Udorthents, nearly level to rolling

Map Unit Setting

National map unit symbol: fyr5
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Landform: Moraines, till plains
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, crest, rise, talf
Down-slope shape: Concave, convex, linear
Across-slope shape: Linear, convex
Parent material: Till

Typical profile

C1 - 0 to 10 inches: gravelly sandy loam
C2 - 10 to 60 inches: variable

Properties and qualities

Slope: 0 to 18 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 1.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: F090AY016WI - Loamy Upland
Hydric soil rating: No

116B—Wabeno-Goodwit silt loams, 1 to 6 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2tnzt
Elevation: 1,300 to 1,890 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Wabeno, very stony, and similar soils: 50 percent
Goodwit, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabeno, Very Stony

Setting

Landform: Drumlins, moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 13 inches: silt loam
E/B - 13 to 26 inches: silt loam
2(B/E)x - 26 to 40 inches: gravelly sandy loam
2Btx - 40 to 50 inches: gravelly sandy loam
2C - 50 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 1 to 6 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 20 to 39 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e

Hydrologic Soil Group: C/D
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Maianthemum (ATM), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Goodwit, Very Stony

Setting

Landform: Moraines, drumlins
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 19 inches: silt loam
E/B - 19 to 24 inches: silt loam
2B/E - 24 to 31 inches: gravelly sandy loam
2Bt - 31 to 45 inches: gravelly sandy loam
2C - 45 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 1 to 6 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Maianthemum (ATM), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Minor Components

Mudlake, very stony

Percent of map unit: 5 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Acer saccharum/Viola-Osmorhiza (AViO), Tsuga/Maianthemum-Coptis (TMC), High AWC, high water table (G090AY007WI)
Hydric soil rating: No

Stambaugh, very stony
Percent of map unit: 5 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Dryopteris (ATD), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

Padus, very stony
Percent of map unit: 3 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Mod AWC, adequately drained (G090AY005WI), Acer saccharum-Tsuga/Maianthemum (ATM)
Hydric soil rating: No

Witbeck, very stony
Percent of map unit: 2 percent
Landform: Drainageways, depressions
Down-slope shape: Linear, concave
Across-slope shape: Concave
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Tsuga Thuja Sphagnum (TTS_1), Mod AWC, high water table (G090AY004WI)
Hydric soil rating: Yes

116D—Wabeno-Goodman silt loams, 6 to 15 percent slopes, very stony

Map Unit Setting
National map unit symbol: 2tnzv
Elevation: 1,280 to 1,940 feet

Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Wabeno, very stony, and similar soils: 50 percent
Goodman, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabeno, Very Stony

Setting

Landform: Moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 13 inches: silt loam
E/B - 13 to 26 inches: silt loam
2(B/E)x - 26 to 40 inches: gravelly sandy loam
2Btx - 40 to 50 inches: gravelly sandy loam
2C - 50 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 6 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 20 to 39 inches to fragipan
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Maianthemum (ATM), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Description of Goodman, Very Stony

Setting

Landform: Moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 12 inches: silt loam
E/B - 12 to 19 inches: silt loam
B/E - 19 to 25 inches: silt loam
2Bt1 - 25 to 41 inches: sandy loam
2Bt2 - 41 to 51 inches: gravelly sandy loam
2C - 51 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 6 to 15 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Maianthemum (ATM), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Minor Components

Stambaugh, very stony

Percent of map unit: 5 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland

Other vegetative classification: Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Dryopteris (ATD), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

Padus, very stony

Percent of map unit: 5 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Mod AWC, adequately drained (G090AY005WI), Acer saccharum-Tsuga/Maianthemum (ATM)
Hydric soil rating: No

Pence, very stony

Percent of map unit: 3 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY013WI - Sandy Upland
Other vegetative classification: Low AWC, adequately drained (G090AY002WI), Acer saccharum-Tsuga/Maianthemum (ATM)
Hydric soil rating: No

Mudlake, very stony

Percent of map unit: 2 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Acer saccharum/Viola-Osmorhiza (AViO), Tsuga/Maianthemum-Coptis (TMC), High AWC, high water table (G090AY007WI)
Hydric soil rating: No

124B—Wabeno-Net silt loams, 0 to 6 percent slopes, very stony

Map Unit Setting

National map unit symbol: fyrr
Elevation: 1,100 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F

Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Wabeno, very stony, and similar soils: 60 percent
Net, very stony, and similar soils: 35 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabeno, Very Stony

Setting

Landform: Moraines, till plains
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, base slope, crest, rise, talf
Down-slope shape: Concave, convex, linear
Across-slope shape: Linear, convex
Parent material: Coarse-silty eolian deposits over coarse-loamy till

Typical profile

A - 0 to 2 inches: silt loam
E - 2 to 4 inches: silt loam
Bs1 - 4 to 11 inches: silt loam
Bs2 - 11 to 23 inches: silt loam
B/E - 23 to 32 inches: silt loam
2B/Ex - 32 to 42 inches: very fine sandy loam
2Btx - 42 to 50 inches: sandy loam
2C - 50 to 80 inches: sandy loam

Properties and qualities

Slope: 1 to 6 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 20 to 40 inches to fragipan
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer-Tsuga-Dryopteris (ATD)
Hydric soil rating: No

Description of Net, Very Stony

Setting

Landform: End moraines, till plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope, dip, talf
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Modified loamy eolian deposits over loamy or sandy gravelly till

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
A - 2 to 5 inches: silt loam
E - 5 to 8 inches: gravelly silt loam
Bhs - 8 to 9 inches: very gravelly loam
Bs1 - 9 to 17 inches: gravelly silt loam
2Bs2 - 17 to 25 inches: gravelly fine sandy loam
2Bx - 25 to 41 inches: gravelly sandy loam
2C - 41 to 80 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 15 to 30 inches to fragipan
Drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Tsuga-Maianthemum-Coptis (TMC)
Hydric soil rating: No

Minor Components

Witbeck, very stony

Percent of map unit: 5 percent
Landform: Depressions
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: F090AY006WI - Wet Loamy Lowland
Other vegetative classification: Fraxinus-Impatiens (FI)
Hydric soil rating: Yes

166F—Soperton-Goodman silt loams, 15 to 35 percent slopes, very stony

Map Unit Setting

National map unit symbol: 2tnzw
Elevation: 1,260 to 1,900 feet
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Soperton, very stony, and similar soils: 50 percent
Goodman, very stony, and similar soils: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Soperton, Very Stony

Setting

Landform: Moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 15 inches: silt loam
E/B - 15 to 21 inches: silt loam
2B/E - 21 to 29 inches: gravelly sandy loam
2Btx - 29 to 37 inches: gravelly sandy loam
2BC - 37 to 46 inches: gravelly sandy loam
2C - 46 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: 24 to 49 inches to fragipan
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained with limitations (G090AY006WI)
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Maianthemum (ATM), Mod AWC, adequately drained with limitations (G090AY006WI)
Hydric soil rating: No

Description of Goodman, Very Stony

Setting

Landform: Moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess over loamy till and/or sandy till and/or mudflow deposits

Typical profile

A - 0 to 3 inches: silt loam
E - 3 to 5 inches: silt loam
Bs - 5 to 12 inches: silt loam
E/B - 12 to 19 inches: silt loam
B/E - 19 to 25 inches: silt loam
2Bt1 - 25 to 41 inches: sandy loam
2Bt2 - 41 to 51 inches: gravelly sandy loam
2C - 51 to 79 inches: gravelly sandy loam

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 1.5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: F090AY016WI - Loamy Upland
Forage suitability group: Mod AWC, adequately drained (G090AY005WI)
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Maianthemum (ATM), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Minor Components

Wabeno, very stony

Percent of map unit: 5 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Maianthemum (ATM), Mod AWC, adequately drained (G090AY005WI)
Hydric soil rating: No

Padus, very stony

Percent of map unit: 3 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum-Tsuga/Dryopteris (ATD), Mod AWC, adequately drained (G090AY005WI), Acer saccharum-Tsuga/Maianthemum (ATM)
Hydric soil rating: No

Stambaugh, very stony

Percent of map unit: 3 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY016WI - Loamy Upland
Other vegetative classification: Acer saccharum/Viola-Osmorhiza (AViO), Acer saccharum-Tsuga/Dryopteris (ATD), High AWC, adequately drained (G090AY008WI)
Hydric soil rating: No

Mudlake, very stony

Percent of map unit: 2 percent
Landform: Moraines, drumlins
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Ecological site: F090AY011WI - Moist Loamy Lowland
Other vegetative classification: Acer saccharum/Viola-Osmorhiza (AViO), Tsuga/Maianthemum-Coptis (TMC), High AWC, high water table (G090AY007WI)
Hydric soil rating: No

Pence, very stony

Percent of map unit: 2 percent
Landform: Moraines, drumlins

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: F090AY013WI - Sandy Upland
Other vegetative classification: Low AWC, adequately drained (G090AY002WI), Acer saccharum-Tsuga/Maianthemum (ATM)
Hydric soil rating: No

W—Water

Map Unit Setting

National map unit symbol: fyxd
Mean annual precipitation: 27 to 36 inches
Mean annual air temperature: 37 to 46 degrees F
Frost-free period: 80 to 150 days
Farmland classification: Not prime farmland

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Lake plains, moraines, outwash plains

Typical profile

W - 0 to 80 inches: water

Properties and qualities

Slope: 0 percent
Depth to water table: About 0 inches

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Appendix B

EGLE Sanitary Survey Letter & Wellhead Protection Approval Letter

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
MARQUETTE DISTRICT OFFICE

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

October 10, 2022

VIA ELECTRONIC MAIL AND U.S. MAIL

Rachel Andreski, City Manager
City of Iron River
106 West Genesee Street
Iron River, Michigan 49935

WSSN: **03410**
County: Iron
System: City of Iron River

Dear Rachel Andreski:

SUBJECT: City of Iron River Water System Sanitary Survey

This letter confirms the Department of Environment, Great Lakes, and Energy's (EGLE) staff meeting with Rachel and Jeff Andreski on September 8, 2022, to conduct a Survey of the City of Iron River's (Iron River) water system and to present the final findings, discuss areas for improvement, and identify timelines for corrective actions where appropriate. The purpose of a Survey is to evaluate the water supply system with respect to the requirements of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399). It is also an opportunity to update EGLE records, provide technical assistance, and identify potential risks that may adversely affect drinking water quality. Enclosed is a copy of the Sanitary Survey Summary for your reference.

Since the last Survey, EGLE acknowledges that Iron River has completed the following water facility improvements and operations:

1. Submitted an Emergency Response Plan
2. Submitted a Bacteriological Site Sampling Plan
3. Submitted an Updated Cross Connection Control Plan

The following table summarizes EGLE final findings from the Survey of the water system:

Survey Element	Findings
Source	**Deficiencies Identified**
Treatment	Not Applicable
Distribution System	**Deficiencies Identified**
Finished Water Storage	**Deficiencies Identified**
Pumps	No Deficiencies/Recommendations

Monitoring & Reporting	No Deficiencies/Recommendations
Management & Operations	No Deficiencies/Recommendations
Operator Compliance	No Deficiencies/Recommendations
Security	No Deficiencies/Recommendations
Financial	Recommendations
Other	No Deficiencies/Recommendations

Deficiencies:

Deficiencies indicate non-compliance with one or more Act 399 requirements, which include defects in a water system's infrastructure, design, operation, maintenance, or management that cause, or may cause, interruptions to the "multiple barrier" protection system and adversely affect the system's ability to produce safe and reliable drinking water in adequate quantities.

During the Survey, three deficiencies were identified and are listed below:

1. Source – Unprotected Openings

   Ten States Standards for Waterworks 3.2.7.3(a)(6) states, "Discharge piping shall be equipped with an air release-vacuum relief valve located upstream from the check valve, with exhaust/relief piping terminating in a down-turned position at least 18 inches above the floor and covered with a 24-mesh corrosion resistant screen."

   Ten States for Water works 3.2.7.3(a)(3) states, "Discharge piping shall be protected against contamination."

   During the survey, it was determined that well #2 requires new screens on the Pump to Waste and Air release-vacuum release and well #4 requires new screen or cap on the pump to waste. Please propose a repair schedule by November 14, 2023.

2. Distribution – Flooded PRV Vaults

   R325.11107 Isolation of water mains from sources of contamination. Rule 1107 states, "All public water supplies shall maintain adequate vertical and horizontal isolation of water mains from sources of contamination."

   During the survey, it was determined that several pressure reducing valve (PRV) vaults are prone to flooding. Degraded infrastructure represents an unacceptable risk to introduce sanitary hazards and create extended service interruptions. Iron River must create a plan to repair or replace degraded infrastructure.

Please propose a repair schedule by November 14, 2023.

3. Finished Water Storage – Elevated Storage Tanks

   R325.11112 Storage tank generally. Rule 1112(c) states, “All storage tanks, including hydropneumatic or gravity storage tanks which are used for the storage of finished water, shall have no unprotected openings.”

   Ten States Standards for Waterworks 7.0.8.2(b) states, “Each access manhole shall be fitted with a solid watertight cover which overlaps a framed opening and extends down around the frame at least two inches.”

   Iron River’s elevated storage tanks require the following:

   - Hunter road tank overflow requires a new screen to prevent contamination, rainwater, or insects to enter the tanks
   - Hunter road tank wetted interior access hatch requires a watertight gasket and a lock.
   - The Stambaugh elevated storage tank overflow requires a 24-mesh screen as it has no solid cover.
   - The Stambaugh elevated storage tank wetted interior access hatch requires a watertight gasket and a lock.

Please provide EGLE a schedule for replacement by November 14, 2023.

Recommendations:

Recommendations are suggestions the public water supply should consider, to enhance its operations and services, and to avoid future deficiencies.

During the survey, the following recommendations were identified:

1. Distribution – Cross Connections

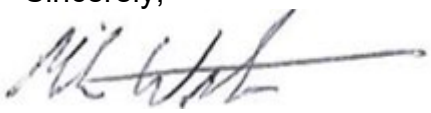
   EGLE recommends Iron River develop a public education program to assist in Iron River’s Cross Connection program. Public Education is a very useful tool to aid in eliminating or preventing potential cross connections from developing throughout the distribution system. Public education could help reduce the number of corrections that must be made because of inspection activities. Enclosed are documents to assist in this process, a residential program guidance document, a residential public education brochure, and a residential questionnaire. Iron River should consider including the brochure and questionnaire with utility bills as the public education portion of the residential program.

2. Financial – Infrastructure Funding

   EGLE recommends Iron River consider applying for Infrastructure funding for water system needs identified in the Survey. Iron River can submit an ITA (Intent to Apply) until November 1, 2022, for infrastructure funding recently announced by the State of Michigan. Enclosed is the infrastructure funding Memo and information sheet sent to public water systems.

We look forward to our continued joint effort to provide safe drinking water to your customers. If you have questions, please contact us by phone at the number listed below, email at WestraM@Michigan.gov, or regular mail at 1504 West Washington Street, Marquette, Michigan 49855.

Sincerely,



Michael Westra, P.E.
District Engineer
Marquette District Office
Drinking Water and Environmental Health Division
906-869-8823

Enclosures:
Sanitary Survey Summary Form
SDWIS Basic Data Reports
Grant Funding Memo – UP
EGLE Water Infrastructure Investments Brochures
Residential Cross Connection documents & Template

Cc: Jeff Andreski, Operator in Charge
File: Iron River Water Supply Correspondence

Sanitary Survey of Community Water Supply - Review Summary

Water Supply: Iron River
County: Iron
Evaluator: Mike Westra

WSSN: 03410
District: 81
Date: 9/8/2022

Category	Comment	N/A	NotEv	NoD/R	Rec	**Def**	**SigDef**
Source							
Construction & Maintenance	*Wells #2 #4 need PTW screens #2 Air/Vac release screen*					**X**	
Standby Power				X			
Isolation				X			
Source Water Protection				X			
Capacity				X			
Treatment							
Disinfection		X					
Fluoride		X					
Phosphate Addition		X					
Softening		X					
Iron/Manganese Removal		X					
Arsenic Removal		X					
Pretreatment		X					
Filtration (gravity or membranes)		X					
C*T		X					
Other		X					
Distribution System							
Interconnections w/ Other WS				X			
Hydrants & Valves				X			
Service Lines & Metering				X			
General Plan				X			
Cross Connections	*Recommend Public Education Program*				X		
Construction & Maintenance	*PRV vaults prone to flooding*					**X**	
Capacity				X			
Finished Water Storage							
Construction & Maintenance	*Tank overflows require new screens, access hatches require gaskets and locks*					**X**	
Controls				X			
Capacity				X			
Pumps (All Pumping Facilities)							
Construction & Maintenance		X					
Controls		X					
Capacity		X					
Monitoring & Reporting							
Bacteriological Monitoring				X			
Chemical Monitoring				X			
MOR or Annual Pumpage Report				X			
Consumer Confidence Report				X			
Analytical Capabilities				X			
System Management & Operations							
Owner Responsibility				X			
Capacity Development				X			
Reliability Study				X			
Operations Oversight				X			
Permits				X			
Operator Compliance							
Operator Certification				X			
Technical Knowledge & Training				X			
Security							
Emergency Response Plan				X			
Site Security (Fences, Alarms...)				X			
Financial							
Rates				X			
Budget & Capital Imp. Plan	*Apply for Funding DWRF/ARP/IIJA for system upgrades*				X		
Other - Asset Management Plan				X			

N/A - Not Applicable
NotEv - Not Evaluated
NoD/R - No Deficiencies/Recommendations Made
Rec - Recommendations Made
Def - Deficiencies Identified
SigDef - Significant Deficiencies Identified

MI0003410 IRON RIVER

Alt. State No. (WSSN): 03410
Local Name (District): DISTRICT 81
Principle County: IRON
Billable Population: 3019
Service Connections: 1313

Activity Status: A
Activity Date: 1/1/1800
Op Category: S3
Owner Type: L
Primary Source: GW

% SW: 0 **% GW :** 100 **% GWUI:** 0
% SWP: 0 **% GWP:** 0 **% GWUIP:** 0

Last Sanitary Survey: 8/28/2019

Population History

Type	Pop Count	Begin Date	End Date
R	3019	1/1/1800	

Water System Flow Rates

Flow Rate Type		Quantity	Units
BSLN	Baseline Capacity	3050	GPM

Regulating Agency

DISTRICT 81
MDEQ
DISTRICT 8

Points of Contact

PL				106 West Genesee Street IRON RIVER, MI 49935
FC	Ms. RACHEL ANDRESKI CITY OF IRON RIVER MANAGER			106 West Genesee Street IRON RIVER, MI 49935
	BUS	906-265-4719	x	citymanager@ironriver.org
	FAX	906-265-5776	x	
AC	Ms. RACHEL ANDRESKI CITY OF IRON RIVER MANAGER			106 West Genesee Street IRON RIVER, MI 49935
	BUS	906-265-4719	x	citymanager@ironriver.org
	FAX	906-265-5776	x	
SA	Mr. JEFF ANDRESKI CITY OF IRON RIVER OPERATOR IN CHARGE			106 West Genesee IRON RIVER, MI 49935
	BUS	906-265-9414	x	dpw@ironriver.org
	FAX	906-265-6303	x	
	MOB	906-376-1188	x	
DO	Mr. JEFF ANDRESKI CITY OF IRON RIVER OPERATOR IN CHARGE			106 West Genesee IRON RIVER, MI 49935
	BUS	906-265-9414	x	dpw@ironriver.org
	FAX	906-265-6303	x	
	MOB	906-376-1188	x	
EC	Mr. NICK KARNACK IRON RIVER DPW DIRECTOR			106 West Genesee Street IRON RIVER, MI 49935
	BUS	906-265-4719	x	dpw@ironriver.org

AC-Administrative; OW-Owner; DO-Operator in Charge; DS-Distribution Operator; OP-Operator; FC-Financial; PM-Property Manager; EC-Emergency; LE-Lead Engineer; SA-Sampler; LC-Legal; OT-Other; CC-Carbon Copy

Deficiencies Determined in Last 5 Years and/or Unresolved

Deficiency	Severity	Date Determined	Date Resolved	Comments	Description
SOCM Construction & Maintenance	MIN	8/27/2019		DUE: 08/27/2022 Well 5 water level measuring device	Water level measuring device for Well 5

Violations and Enforcement Actions - Last 10 Years

Type	Violation Name	Code	Analyte Name	Period End	Period Begin	RTC Date
22	MCL (TCR), MONTHLY	3100	COLIFORM (TCR)	11/1/2015	11/30/2015	11/12/2015
22	MCL (TCR), MONTHLY	3100	COLIFORM (TCR)	10/1/2013	10/31/2013	11/14/2013
22	MCL (TCR), MONTHLY	3100	COLIFORM (TCR)	4/1/2015	4/30/2015	5/13/2015
24	MONITORING (TCR), ROUTINE MINOR	3100	COLIFORM (TCR)	12/1/2014	12/31/2014	12/29/2014
22	MCL (TCR), MONTHLY	3100	COLIFORM (TCR)	12/1/2014	12/31/2014	12/29/2014
24	MONITORING (TCR), ROUTINE MINOR	3100	COLIFORM (TCR)	10/1/2013	10/31/2013	11/14/2013
24	MONITORING (TCR), ROUTINE MINOR	3100	COLIFORM (TCR)	11/1/2013	11/30/2013	12/30/2013
24	MONITORING (TCR), ROUTINE MINOR	3100	COLIFORM (TCR)	8/1/2013	8/31/2013	10/21/2013

MI0003410 IRON RIVER

Well Facilities

Site Code: WL002 **Facility Name:** WELL 1 **Wellogic ID:** 36000000024

Status: A **Constructed Date:** **Modified Date:** **Lat / Long:** 46.094 -88.632502

Availability: P **Pump Type:** **Treated?** N **In Abv Grade:** 0 **SWAP Status & Date:**

Comments:

Comments / Corrections / Updates

Flow Rate Type		Quantity	Units
APCD	Approved Design Capacity	700	GPM
APCD	Approved Design Capacity	700	GPM
PUMP	Current Pump Capacity	610	GPM

Site Code: WL003 **Facility Name:** WELL 2 **Wellogic ID:** 36000000025

Status: A **Constructed Date:** **Modified Date:** **Lat / Long:** 46.094811 -88.63174

Availability: P **Pump Type:** **Treated?** N **In Abv Grade:** 0 **SWAP Status & Date:**

Comments:

Comments / Corrections / Updates

Flow Rate Type		Quantity	Units
APCD	Approved Design Capacity	700	GPM
APCD	Approved Design Capacity	700	GPM
PUMP	Current Pump Capacity	700	GPM

Site Code: WL004 **Facility Name:** WELL 4 **Wellogic ID:** 36000000026

Status: A **Constructed Date:** 1/1/1975 **Modified Date:** **Lat / Long:** 46.097489 -88.640441

Availability: P **Pump Type:** **Treated?** N **In Abv Grade:** **SWAP Status & Date:**

Comments:

Comments / Corrections / Updates

Indicator Type		Value and/or Date
EMER	Emergency Power	NO

Flow Rate Type		Quantity	Units
APCD	Approved Design Capacity	750	GPM
APCD	Approved Design Capacity	750	GPM
PUMP	Current Pump Capacity	750	GPM

MI0003410 IRON RIVER

Site Code: WL005 **Facility Name:** WELL 5 **Wellogic ID:** 36000000023

Status: A **Constructed Date:** 1/1/1995 **Modified Date:** **Lat / Long:** 46.102506 -88.63349

Availability: P **Pump Type:** SU **Treated?** N **In Abv Grade:** **SWAP Status & Date:**

Comments:

Indicator Type		Value and/or Date
EMER	Emergency Power	NO

Measure Type		Quantity	Units
DPCP	Depth at Completion	182.5	FT
WLDM	Well Diameter	10	IN

Flow Rate Type		Quantity	Units
APCD	Approved Design Capacity	700	GPM
APCD	Approved Design Capacity	700	GPM
PUMP	Current Pump Capacity	700	GPM

Comments / Corrections / Updates

MI0003410 IRON RIVER

Storage Facilities

Site Code ST001 **Facility Name:** HUNTER ROAD ELEVATED TANK **Local Name:**
Type: UK **Material:** **Coating:** **Status:** A **Constructed Date:**
Comments:

Indicator	Type	Value and/or Date	
CAPR	Cathodic Protection	YES	
DTIN	Date Last Inspected	YES	8/3/2009
DTPT	Date Last Painted (wet interior)		8/2/2012
MUDV	Mud Valve	NO	

Comments / Corrections / Updates

Flow Rate Type		Quantity / Units	
EFTV	Effective Volume	0.2	MGL

Site Code ST002 **Facility Name:** STAMBAUGH TANK **Local Name:** STAMBAUGH TANK - EAST
Type: UK **Material:** **Coating:** **Status:** A **Constructed Date:**
Comments:

Indicator	Type	Value and/or Date	
EMER	Emergency Power	NO	
CAPR	Cathodic Protection	YES	
DTIN	Date Last Inspected	YES	8/3/2009
DTPT	Date Last Painted (wet interior)	YES	8/2/1999
MUDV	Mud Valve	YES	

Comments / Corrections / Updates

Flow Rate Type		Quantity / Units	
EFTV	Effective Volume	0.2	MGL

Type: EL=elevated GR=ground HD=hydropneumatic BL=bladder ST=standpipe UN=underground
Material: ST=steel CC=concrete AC=asbestos cement AS=asphalt CP=copper ER=earth FG=fiberglass PL=plastic WD=wood
Coating: AP=approved paint ER=epoxy resin FG=fiberglass GR=greased GS=glass-lined steel PL=plastic UN=unlined

Distribution System

Site Code DIST **Facility Name:** DISTRIBUTION SYSTEM **Status:** A
Comments:

Comments / Corrections / Updates

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING

GRETCHEN WHITMER
GOVERNOR

DANIEL EICHINGER
ACTING DIRECTOR

April 18, 2023

VIA EMAIL

Ms. Rachel Andreski, City Manager
City of Iron River
106 West Genesee Street
Iron River, Michigan 49935

Dear Rachel Andreski:

SUBJECT: Source Water Protection Plan Update – City of Iron River, WSSN 03410

Congratulations! The city of Iron River Source Water Protection Plan update is approved. The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Drinking Water and Environmental Health Division (DWEHD) commends you on your efforts and encourages you to keep the program viable by updating it every six years or as changes occur within the source water protection program.

If you have any questions, comments, or need assistance implementing your program, you may contact me by telephone at 517-203-9631; email at BerndtJ1@Michigan.gov; or by mail at EGLE-DWEHD, Environmental Health Section, Source Water Unit.

Sincerely,

Jason Berndt, Environmental Quality Specialist
Source Water Unit
Environmental Health Section
Drinking Water and Environmental Health Division

jb/ms

cc: Craig Richardson, President Wickwire Solutions
Sara Pearson, EGLE
Tom Flaminio, EGLE

Appendix C

- **Figures 11 and 12: Water System P&ID**

WATER SYSTEM MAIN CONTROL PANEL MCP-0-1

WELL No. 1	WELL No. 4	HUNTER ROAD TANK	STAMBAUGH TANK
SEE DWG. 01-I-2 WELL No. 1 CONTROL PANEL LCP-1-1	SEE DWG. 01-I-1 WELL No. 4 CONTROL PANEL LCP-4-1	SEE DWG. 01-I-1 CONTROL VALVE VAULT CONTROL PANEL LCP-30-1	SEE DWG. 01-I-2 CONTROL VALVE VAULT CONTROL PANEL LCP-30-1

WELL No. 2	WELL No. 5	FLOW CONTROL VALVE VAULT
SEE DWG. 01-I-2 WELL No. 2 CONTROL PANEL LCP-2-1	SEE DWG. 01-I-1 WELL No. 5 CONTROL PANEL LCP-5-1	SEE DWG. 01-I-2 CONTROL VALVE VAULT CONTROL PANEL LCP-30-1

MCP-0-1 NOTES:
1. WATER SYSTEM MAIN CONTROL PANEL IS LOCATED AT THE DPW GARAGE.
2. ALL LOCAL PROCESS TAGS AT ALL LOCATIONS SHOWN ABOVE SHALL ALSO BE SHOWN IN THE MCP-0-1.

120 VOLT

RADIO COMMUNICATION TO EXISTING WATER SYSTEM COMPONENTS

RADIO COMMUNICATION TO WATER SYSTEM MAIN CONTROL PANEL (MCP-0-1)

WELL No. 5 LOCAL CONTROL PANEL LCP-5-1

- HS 5-1-1-7 — PUMP 1 ON/OFF/AUTO
- YL 5-1-1-7 — PUMP 1 RUN
- YL 5-1-1-2 — PUMP 1 FAIL
- JA 5-3-1-7 — POWER/ COMMUNICATION LOSS
- FIR 5-4-1 — PUMP 1 RATE
- HS 5-2-1-3 — VALVE OPEN FAIL
- TAL 5-5-1 — WELL HOUSE LOW TEMPERATURE
- HS 5-1-1-3 — PUMP 1 LEAD/LAG/ALT
- ETM 5-1-1 — PUMP 1
- LI 10-1-1 — HUNTER RD TANK LEVEL
- FQI 5-4-1 — PUMP 1 TOTAL
- HS 5-2-1-2 — VALVE CLOSE FAIL
- HS 5-1-1-5 — PUMP 1 RESET
- YX 5-1-1 — PUMP 1 CYCLES
- YL 5-2-1-1 — VALVE OPEN
- YL 5-2-1-2 — VALVE CLOSED

LCP-5-1 NOTE:
EXISTING WELL No. 5 CONTROL PANEL TO INCLUDE NEW HMI.

120 VOLT

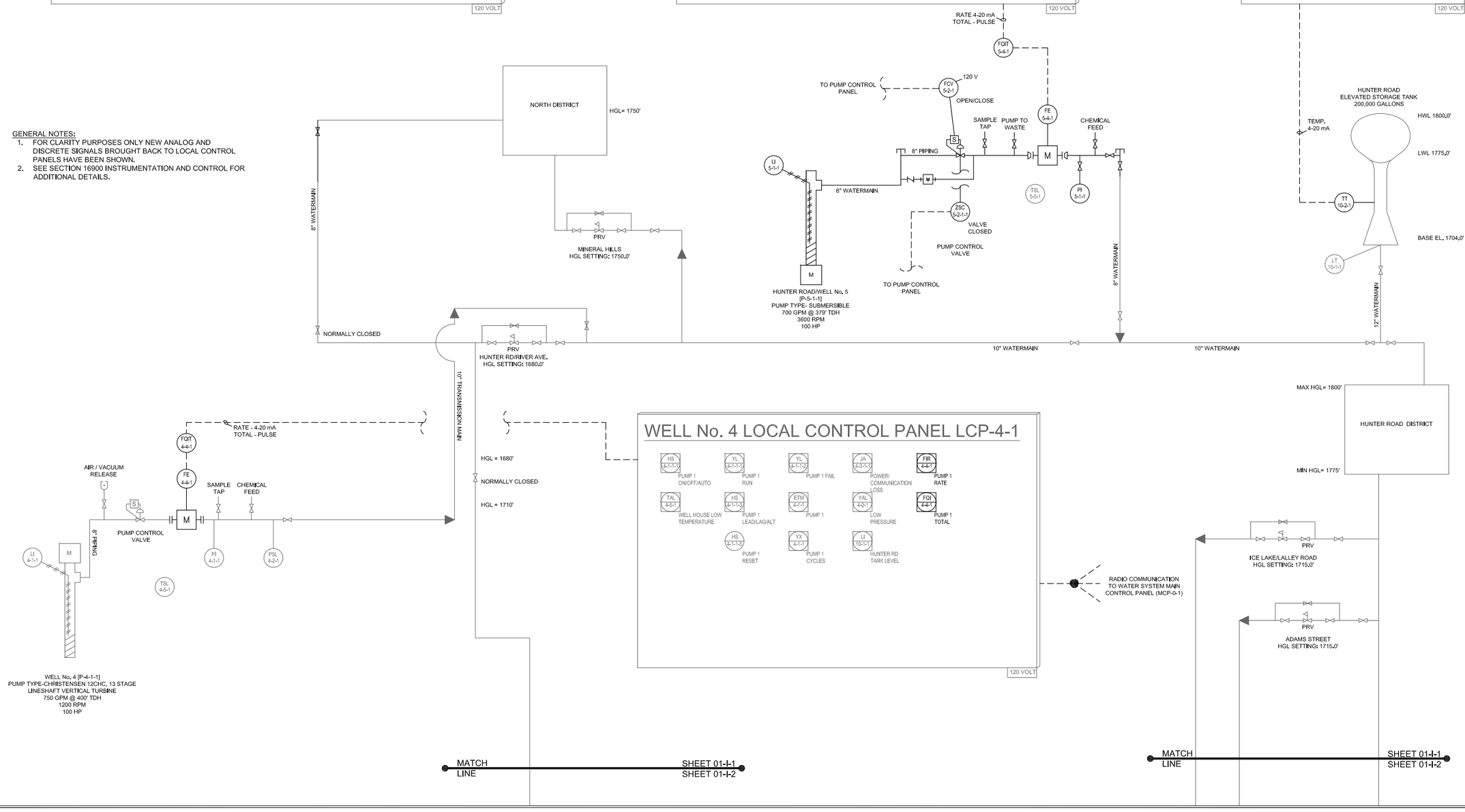
RADIO COMMUNICATION TO MAIN CONTROL PANEL (MCP-0-1)

HUNTER ROAD TANK LOCAL CONTROL PANEL LCP-10-1

- LI 10-1-1-7 — TANK LEVEL
- TI 10-2-1 — TANK WATER TEMP
- HS 10-5-1-2 — SET POINT HIGH
- TIR 10-1-1 — TEMP INDICATOR
- YAH 10-1-1-7 — HIGH LEVEL
- HS 10-4-1-2 — LEAD FILL START
- HS 10-5-1-3 — SET POINT LOW
- YAL 10-1-1-7 — LOW LEVEL
- HS 10-4-1-3 — LAG FILL START
- YAF 10-1-1 — LEVEL FAIL
- JA 10-3-1-7 — POWER/ COMMUNICATION LOSS
- HS 10-4-1-5 — FILL STOP
- LIR 10-1-1 — LEVEL INDICATOR

120 VOLT

GENERAL NOTES:
1. FOR CLARITY PURPOSES ONLY NEW ANALOG AND DISCRETE SIGNALS BROUGHT BACK TO LOCAL CONTROL PANELS HAVE BEEN SHOWN.
2. SEE SECTION 16900 INSTRUMENTATION AND CONTROL FOR ADDITIONAL DETAILS.



WELL No. 4 LOCAL CONTROL PANEL LCP-4-1

- HS 4-1-1-7 — PUMP 1 ON/OFF/AUTO
- YL 4-1-1-7 — PUMP 1 RUN
- YL 4-1-1-2 — PUMP 1 FAIL
- JA 4-3-1-7 — POWER/ COMMUNICATION LOSS
- FIR 4-4-1 — PUMP 1 RATE
- TAL 4-5-1 — WELL HOUSE LOW TEMPERATURE
- HS 4-1-1-3 — PUMP 1 LEAD/LAG/ALT
- ETM 4-1-1 — PUMP 1
- YAL 4-2-1 — LOW PRESSURE
- FQI 4-4-1 — PUMP 1 TOTAL
- HS 4-1-1-5 — PUMP 1 RESET
- YX 4-1-1 — PUMP 1 CYCLES
- LI 10-1-1 — HUNTER RD TANK LEVEL

120 VOLT

RADIO COMMUNICATION TO WATER SYSTEM MAIN CONTROL PANEL (MCP-0-1)

EGLE DWSRF Project Plan
City of Iron River
106 W. Genesee Street
Iron River, MI 49935

WATER SYSTEM P&ID

Attention: 0 — 1"
If this scale bar does not measure 1" then drawing is not original scale.

RELEASE #	DATE
DESCRIPTION	

Designed By:
Checked By:
Drawn By:
Approved By:

FIGURE 11

MATCH LINE — SHEET 01-I-1 / SHEET 01-I-2

MATCH LINE — SHEET 01-I-1 / SHEET 01-I-2

STRAWBERRY HILL STORAGE TANK
250,000 GALLONS
(CURRENTLY NOT IN USE
AND WILL BE DEMOLISHED)
HWL 1714.6'
LWL 1683.0'
BASE EL. 1626.0'
LE 40-3-1
CLOSED

8" WATERMAIN

RATE 4-20 mA TOTAL - PULSE
TO LCP-1-1
FQIT 1-4-1
AIR / VACUUM RELEASE
FE 1-4-1
PUMP TO WASTE
4" SURGE ANTICIPATOR VALVE
4" PIPING
4" PIPING
CHEMICAL FEED
LI 1-1-1
PI 1-2-1
TSL 1-5-1

WELL No. 1 [P-1-1-1]
PUMP TYPE- LINESHAFT
VERTICAL TURBINE
700 GPM @ 300' TDH
100 HP

RATE 4-20 mA TOTAL - PULSE
TO LCP-2-1
FQIT 2-4-1
AIR / VACUUM RELEASE
FE 2-4-1
PUMP TO WASTE
4" SURGE ANTICIPATOR VALVE
4" PIPING
4" PIPING
CHEMICAL FEED
LI 2-1-1
PI 2-2-1
TSL 2-5-1

WELL No. 2 [P-2-1-1]
PUMP TYPE- LINESHAFT
VERTICAL TURBINE
700 GPM @ 300' TDH
75 HP

OPEN VALVE AFTER VALVE VAULT CONSTRUCTION
8" WATERMAIN
MAX HGL= 1800'
LOW HGL= 1775'
FCV 30-1-1
120 V
OPEN/CLOSE
FE 30-5-1
FT 30-5-1
MIN HGL= 1730'
FLOW RATE 4-20 mA
PRV
LSH 30-6-1
FLOOD LEVEL HIGH
8" WATERMAIN
THROTTLING VALVE
FSH 30-4-1
FLOW SWITCH
PI 30-7-1
ZSC 30-2-1
VALVE CLOSED
PI 30-7-2
FLOW CONTROL VALVE VAULT

RADIO COMMUNICATION TO MAIN CONTROL PANEL (MCP-0-1)

FLOW CONTROL VALVE VAULT LOCAL CONTROL PANEL LCP-30-1

- HS 30-1-1 — LEAD/LAG/ALT
- HS 30-1-2 — VALVE O/C/A
- FIR 30-6-1 — FLOW RATE
- JA 30-3-1 — POWER/ COMMUNICATION LOSS
- YL 30-2-1 — VALVE OPEN
- FQI 30-5-1 — FLOW TOTAL
- YL 30-4-1 — FLOW SWITCH INDICATOR
- YL 30-2-2 — VALVE CLOSED
- YAH 30-6-2 — FLOOD LEVEL HIGH
- FAH 30-4-1 — FLOW ALARM
- LI 20-1-1 — STAMBAUGH TANK LEVEL

120 VOLT

LIGHT SWITCH
120V OUTLET

WELL No. 1 LOCAL CONTROL PANEL LCP-1-1

- HS 1-1-1-1 — PUMP 1 ON/OFF/AUTO
- YL 1-1-1-3 — PUMP 1 RUN
- YL 1-1-1-2 — PUMP 1 FAIL
- JA 1-3-1-1 — POWER/ COMMUNICATION LOSS
- FIR 1-4-1 — PUMP 1 RATE
- HS 1-1-1-2 — SET POINT PUMP ON
- HS 1-1-1-3 — PUMP 1 LEAD/LAG/ALT
- ETM 1-1-1 — PUMP 1
- LI 20-1-1 — STAMBAUGH TANK LEVEL
- FQI 1-4-1 — PUMP 1 TOTAL
- HS 1-1-1-4 — SET POINT PUMP OFF
- HS 1-1-1-5 — PUMP 1 RESET
- YX 1-1-1 — PUMP 1 CYCLES
- TAL 1-5-1 — WELL HOUSE LOW TEMPERATURE

120 VOLT

RADIO COMMUNICATION TO WATER SYSTEM MAIN CONTROL PANEL (MCP-0-1)

TO FQIT-1-1-1

WELL No. 2 LOCAL CONTROL PANEL LCP-2-1

- HS 2-1-1-1 — PUMP 1 ON/OFF/AUTO
- YL 2-1-1-3 — PUMP 1 RUN
- YL 2-1-1-2 — PUMP 1 FAIL
- JA 2-3-1-1 — POWER/ COMMUNICATION LOSS
- FIR 2-4-1 — PUMP 1 RATE
- HS 2-1-1-2 — SET POINT PUMP ON
- HS 2-1-1-3 — PUMP 1 LEAD/LAG/ALT
- ETM 2-1-1 — PUMP 1
- LI 20-1-1 — STAMBAUGH TANK LEVEL
- FQI 2-4-1 — PUMP 1 TOTAL
- HS 2-1-1-4 — SET POINT PUMP OFF
- HS 2-1-1-5 — PUMP 1 RESET
- YX 2-1-1 — PUMP 1
- TAL 2-5-1 — WELL HOUSE LOW TEMPERATURE

120 VOLT

TO FQIT-2-1-1

RADIO COMMUNICATION TO WATER SYSTEM MAIN CONTROL PANEL (MCP-0-1)

CENTRAL DISTRICT
HGL = 1710'

PRV — UPPER RIVERSIDE HGL SETTING: 1710.0' — 6" WATERMAIN
PRV — RIVERTON AVENUE HGL SETTING: 1715.0' — 8" WATERMAIN
PRV — WASHINGTON AVENUE HGL SETTING: 1715.0' — 8" WATERMAIN
PRV — STAMBAUGH AVENUE HGL SETTING: 1715.0'

8" WATERMAIN

SOUTH DISTRICT
MAX HGL= 1751.0'
MIN HGL= 1730.0'

STAMBAUGH ELEVATED STORAGE TANK
200,000 GALLONS
TOP TANK EL. 1751.0'
BOTTOM TANK EL. 1730.0'
TT 20-2-1
BASE EL. 1624.0'
LT 20-1-1

RADIO COMMUNICATION TO MAIN CONTROL PANEL (MCP-0-1)

STAMBAUGH TANK LOCAL CONTROL PANEL LCP-20-1

- LI 20-1-1 — TANK LEVEL
- TI 20-2-1 — TANK WATER TEMP
- HS 20-1-1-4 — SET POINT HIGH
- TIR 20-1-1 — TEMP INDICATOR
- YAH 20-1-1-2 — HIGH LEVEL
- HS 20-1-1-3 — LEAD FILL START
- HS 20-1-1-5 — SET POINT LOW
- YAL 20-1-1-3 — LOW LEVEL
- HS 20-1-1-6 — LAG FILL START
- YAF 20-1-1 — LEVEL FAIL
- JA 20-3-1-1 — POWER/ COMMUNICATION LOSS
- HS 20-1-1-7 — FILL STOP
- LIR 20-1-1 — LEVEL INDICATOR

120 VOLT

GENERAL NOTES:
1. FOR CLARITY PURPOSES ONLY NEW ANALOG AND DISCRETE SIGNALS BROUGHT BACK TO LOCAL CONTROL PANELS HAVE BEEN SHOWN.
2. SEE SECTION 16900 INSTRUMENTATION AND CONTROL FOR ADDITIONAL DETAILS.

EGLE DWSRF Project Plan
City of Iron River
106 W. Genesee Street
Iron River, MI 49935

WATER SYSTEM P&ID

Attention:
0 — 1"
If this scale bar does not measure 1" then drawing is not original scale.

RELEASE #	DATE
DESCRIPTION	

Designed By:
Checked By:
Drawn By:
Approved By:

FIGURE 12

Appendix D

- **Figures 13: Water System Improvements Map**
- **Table 11: Water Distribution Pipe Replacement**
- **Table 12: Hydrant/Valve Replacement**
- **Table 13: PRV Station Replacement**
- **Table 14: Elevated Water Storage Tank Improvements**

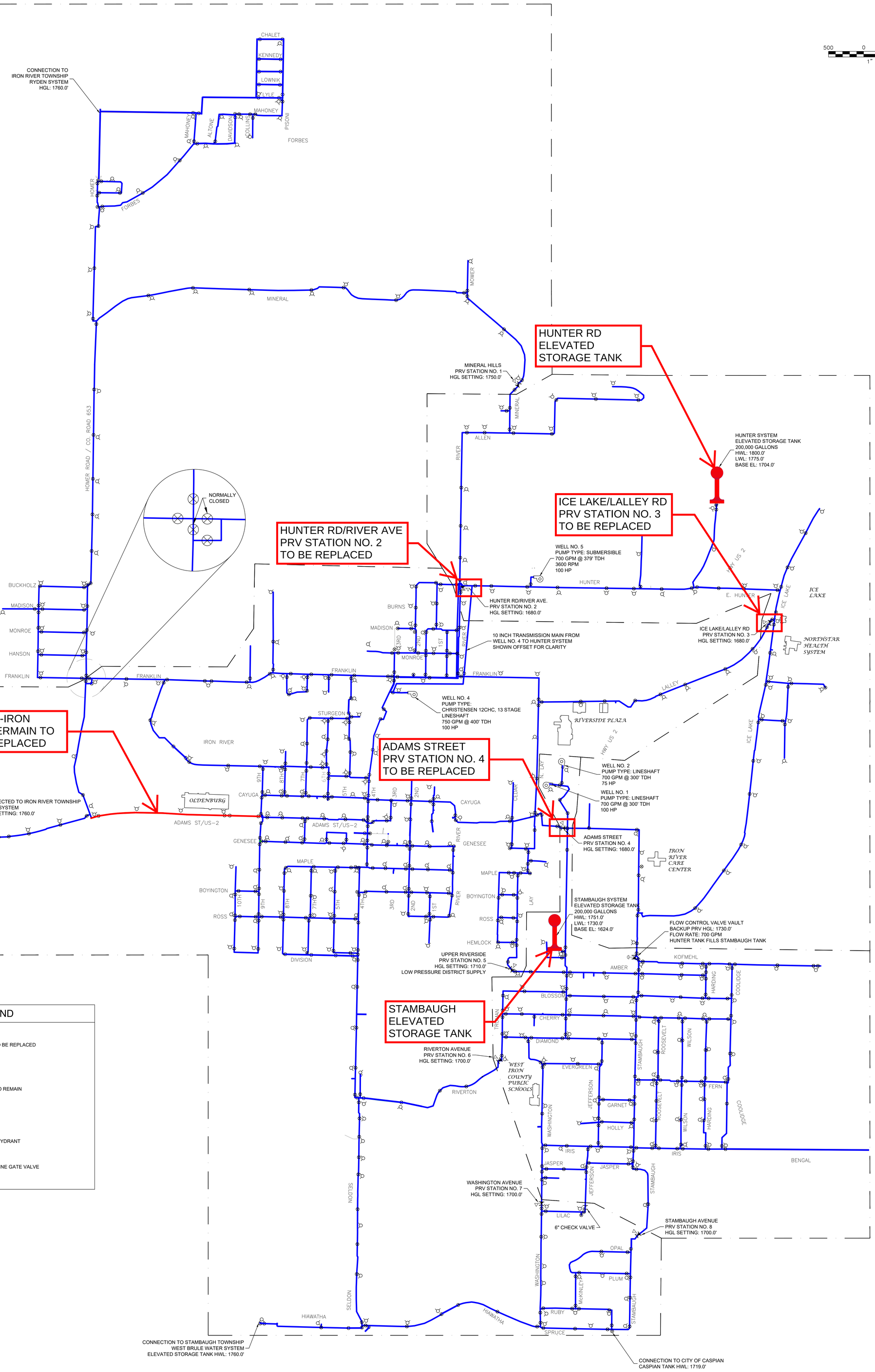


Fig. 13

CITY OF IRON RIVER

WATER SYSTEM IMPROVEMENTS MAP

Iron River MICHIGAN
Nestled in the heart of the U.P.

EGLE DWSRF PROJECT PLAN
CITY OF IRON RIVER
106 W. GENESEE STREET
IRON RIVER, MI 49935
TABLE 11 - WATER DISTRIBUTION PIPE REPLACEMENT

Pipe ID (GIS)	Pipe Size (inches)	Pipe Material	Pipe Length (feet)	Year Installed	Risk Factor
56	12	CIP	177	1960	10
57	12	CIP	118	1960	10
58	12	CIP	128	1960	10
59	12	CIP	96	1960	10
60	12	CIP	116	1960	10
61	12	CIP	87	1960	10
64	12	CIP	110	1960	10
65	12	CIP	87	1960	10
66	12	CIP	336	1960	10
67	12	CIP	125	1960	10
208	12	CIP	746	1980	10
209	12	CIP	290	1980	10

EGLE DWSRF PROJECT PLAN
CITY OF IRON RIVER
106 W. GENESEE STREET
IRON RIVER, MI 49935
TABLE 12 - HYDRANT/VALVE REPLACEMENT

Hydrant / Valve ID (GIS)	Type	Year Installed	Risk Factor	Pipe(s) Connected To (GIS)
16	Hydrant	1980	9	64
18	Hydrant	1980	9	57
19	Hydrant	1980	9	66
20	Hydrant	1980	9	208
364	Valve	1960	15	64/65

EGLE DWSRF PROJECT PLAN
CITY OF IRON RIVER
106 W. GENESEE STREET
IRON RIVER, MI 49935
TABLE 13 - PRV STATION REPLACEMENT

PRV	HGL Setting	Year Installed	Criticality Rating	Repair Type
Hunter Rd/River Ave PRV Station No. 2	1715	2002	5	Replacement
Ice Lake/Lalley Road PRV Station No. 3	1715	2002	5	Replacement
Adams Street PRV Station No. 4	1715	2002	5	Replacement

EGLE DWSRF PROJECT PLAN
CITY OF IRON RIVER
106 W. GENESEE STREET
IRON RIVER, MI 49935
TABLE 14 - ELEVATED WATER STORAGE TANK IMPROVEMENTS

Tank	Type	Volume (gallons)	Base Elevation	Overflow Elevation	Year Installed	Risk Factor
Hunter Tank	CBI Niacon	200,000	1704	1800		
Wet Interior Paint	TNEMEC Epoxy				2010	10
Exterior Paint	TNEMEC Hydroflon				2010	4
Overflow Screen						
Interior Access Hatch Watertight Gasket and Lock						
Tank Mixer						
Stambaugh Tank	Maguire Iron	200,000	1624	1730		
Wet Interior Paint	Epoxy				2000	15
Exterior Paint	Epoxy/Urethane				2000	12
24-Mesh Overflow Screen						
Interior Access Hatch Watertight Gasket and Lock						
Tank Mixer						

Appendix E

- **Figure 14: Iron River City and Caspian City Interconnection**
- **Figure 15: Iron River City and Bates Township Interconnection**
- **Figure 16: Iron River City and Stambaugh Township Interconnection**
- **Figure 17: Iron River City and Iron River Township Nash System Interconnection**
- **Figure 18: Iron River City and Iron River Township Ryden System Interconnection**

FIGURE 14
IRON RIVER CITY AND CASPIAN CITY INTERCONNECTION

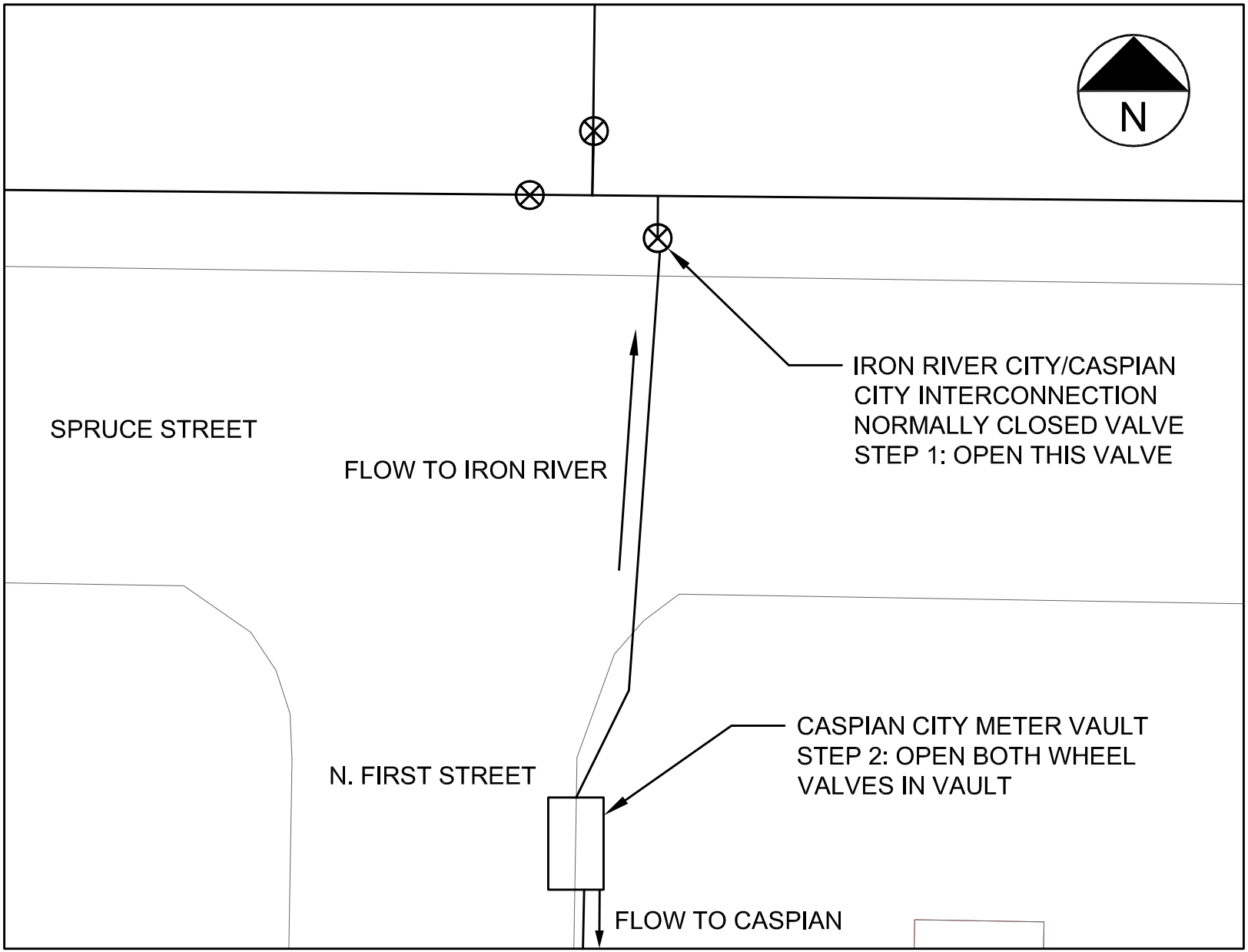


FIGURE 15
IRON RIVER CITY AND BATES TOWNSHIP INTERCONNECTION

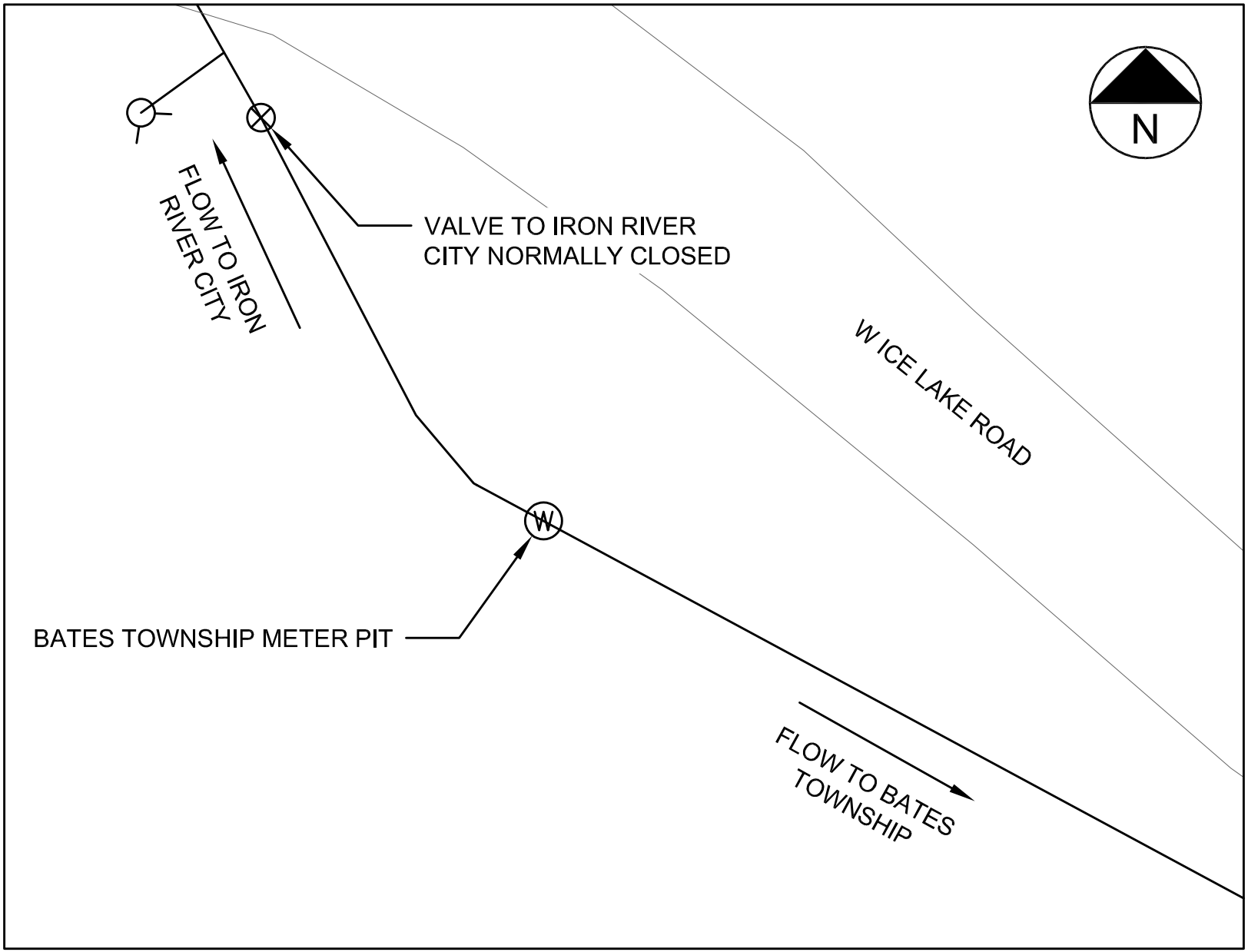


FIGURE 16
IRON RIVER CITY AND STAMBAUGH TOWNSHIP INTERCONNECTION

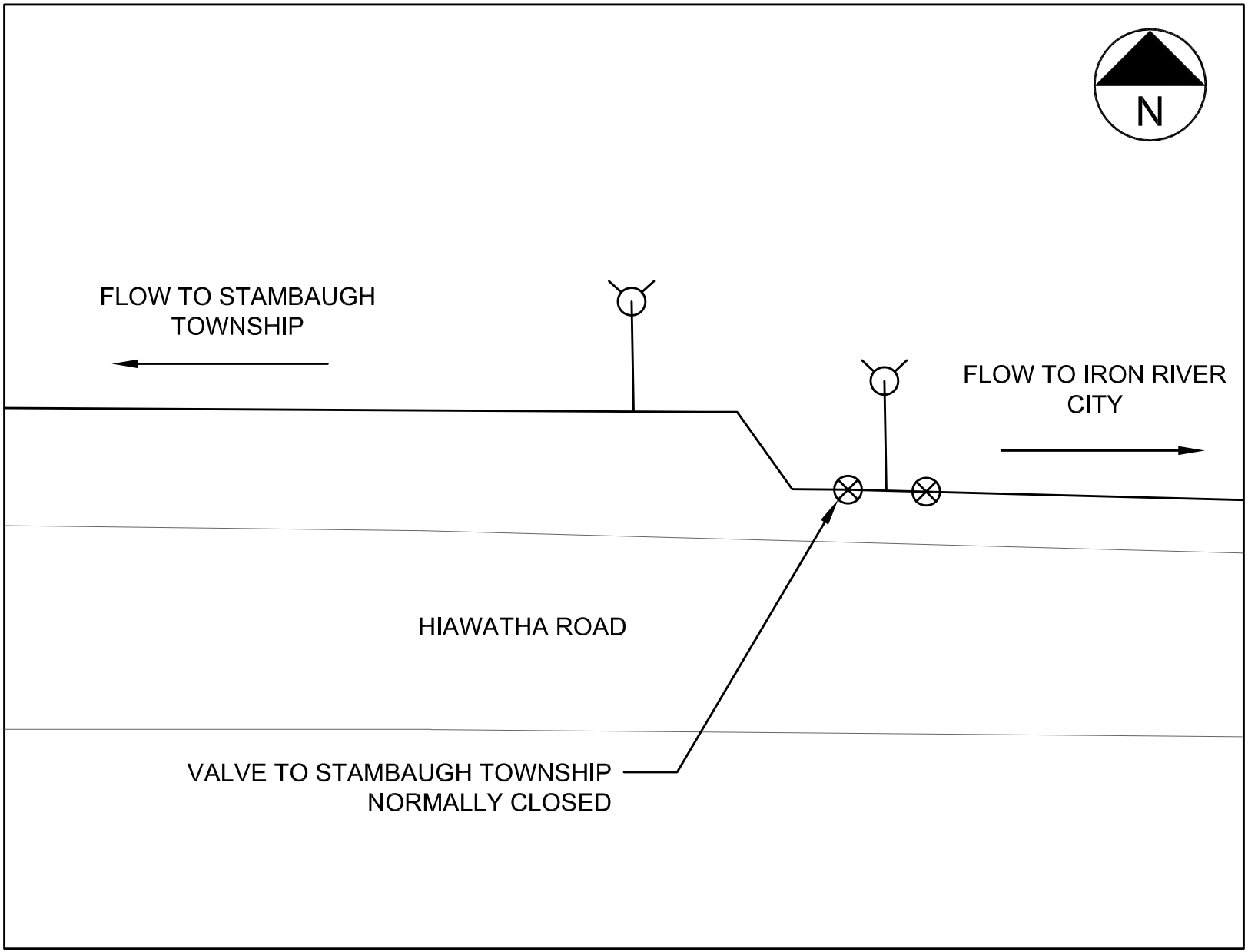


FIGURE 17
IRON RIVER CITY AND IRON RIVER TOWNSHIP NASH SYSTEM INTERCONNECTION

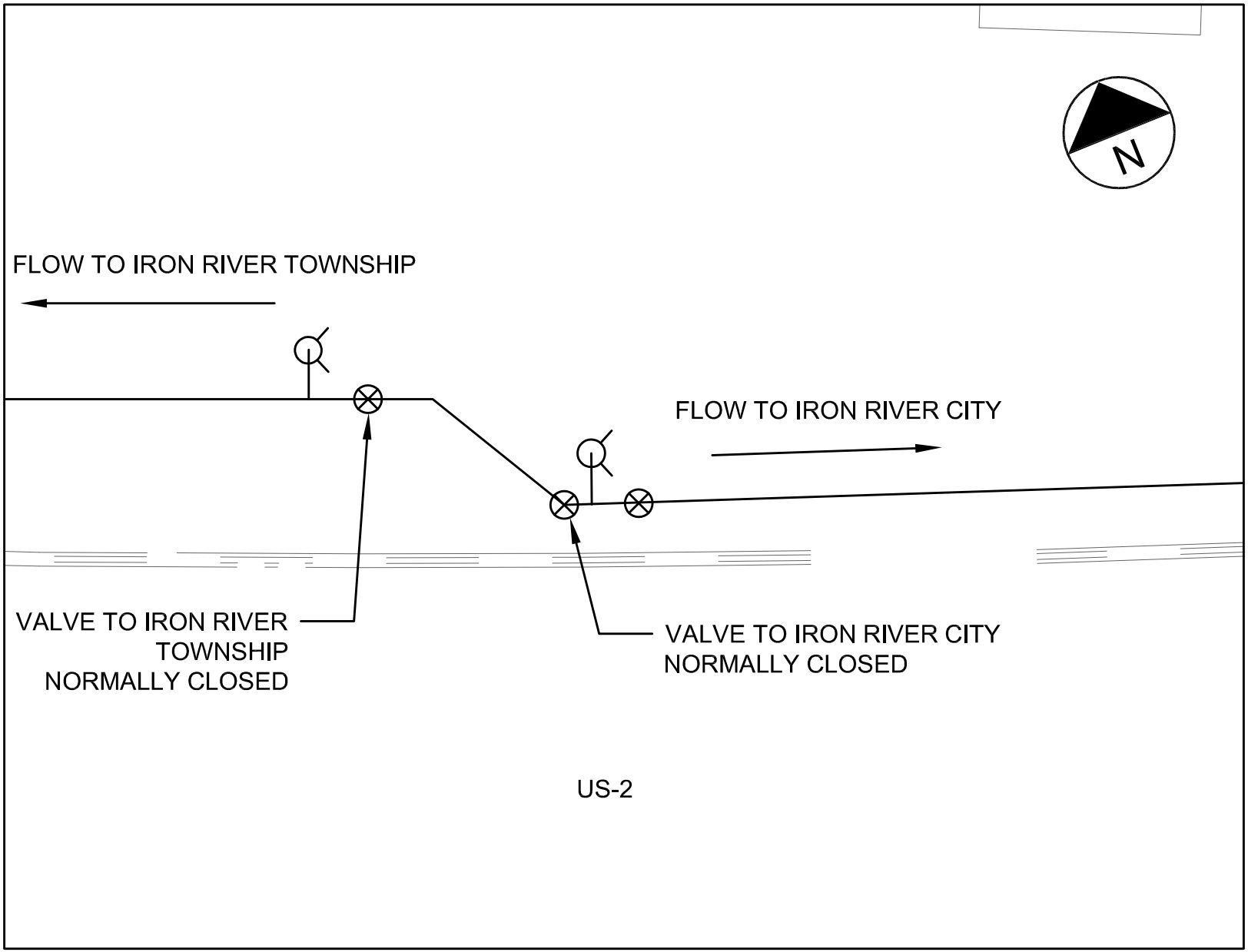
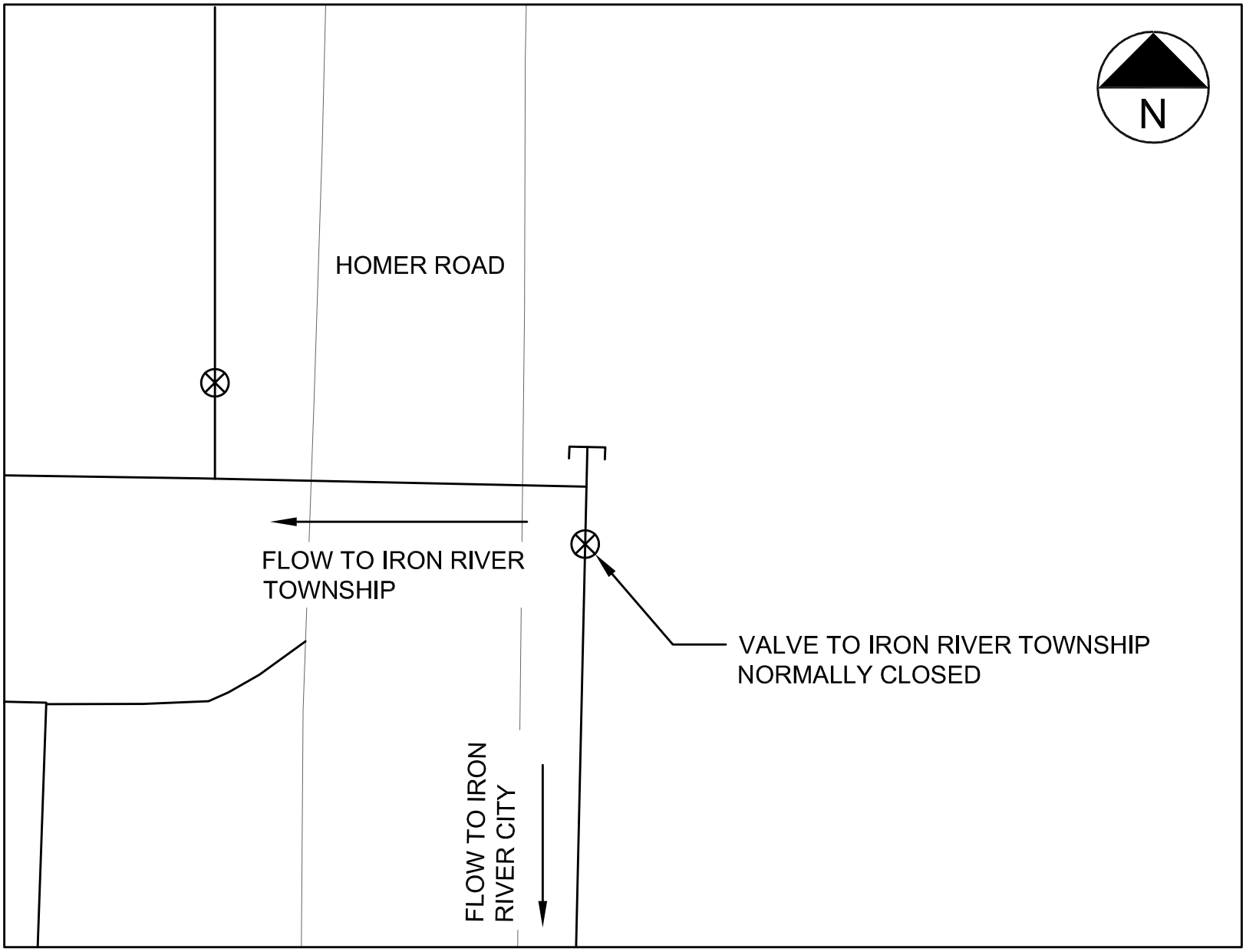


FIGURE 18
IRON RIVER CITY AND IRON RIVER TOWNSHIP RYDEN SYSTEM INTERCONNECTION



Appendix F

- **Table 15: Present Worth Calculations for High Priority Capital Improvements**
- **Table 16: Bond Schedule and Rate Increases for High Priority Capital Improvements**
- **Table 17: Preliminary Opinion of Probable Project Costs**
- **Useful Life Documentation**

EGLE DWSRF PROJECT PLAN
CITY OF IRON RIVER
106 W. GENESEE STREET
IRON RIVER, MI 49935

PRESENT WORTH CALCULATIONS FOR HIGH PRIORITY CAPITAL IMPROVEMENTS
Table 15

ESTIMATED USEFUL LIFE =	36.15 YRS
LAND=	PERMANENT
WATER SUPPLY CONVEYANCE =	50 YRS
OTHER STRUCTURES =	30-50 YRS
PROCESS EQUIPMENT =	15-20 YRS
AUXILIARY EQUIPMENT =	15-20 YRS

PRESENT WORTH ONE-TIME EXPENDITURES (CAPITAL COSTS AND SALVAGE VALUE)

Number of Periods(n)	
FUTURE VALUE (F) / ESTIMATED COST	
DISCOUNT RATE(i)	
Formula= PW=F*(1/(1+i)^n)	

CAPITAL	
Future Value (F)=	$ 1,802,000.00
Interest (i)=	0.40%
Years (n)=	20
Present Worth (PW)=	$ 1,663,721.12

SALVAGE	
F=	$ 743,266.84
i=	0.40%
n=	20
PW=	$ 686,231.26

ESTIMATED USEFUL LIFE (YEARS)=	36.15
STRAIGHT LINE DEPRECIATION AMT=	$ 46,022.71

TPW=F-PWS

STRAIGHT LINE DEPRECIATION=	
1	$ 1,617,698.41
2	$ 1,571,675.69
3	$ 1,525,652.98
4	$ 1,479,630.27
5	$ 1,433,607.55
6	$ 1,387,584.84
7	$ 1,341,562.12
8	$ 1,295,539.41
9	$ 1,249,516.69
10	$ 1,203,493.98
11	$ 1,157,471.27
12	$ 1,111,448.55
13	$ 1,065,425.84
14	$ 1,019,403.12
15	$ 973,380.41
16	$ 927,357.69
17	$ 881,334.98
18	$ 835,312.26
19	$ 789,289.55
20	$ 743,266.84

TOTAL PRESENT WORTH=	$ 1,115,768.74

Bond Schedule: High Priority Capital Improvements *Date:* *05/12/23*
Table 16

Borrower Name: **City of Iron River** EDUs = 1,856
Interest Rate: 1.875%
Yrs Deferred Principle 0
Principal: **$1,802,000** Years = 20
Ammort. Factor 0.0604
Ammortized Payment: $108,880

Year	1st Interest	2nd Interest	Principal Paid	Total Year Payment	Loan Balance
					1,802,000
1	16,894	16,894	75,000	108,788	1,727,000
2	16,191	16,191	76,000	108,381	1,651,000
3	15,478	15,478	78,000	108,956	1,573,000
4	14,747	14,747	79,000	108,494	1,494,000
5	14,006	14,006	81,000	109,013	1,413,000
6	13,247	13,247	82,000	108,494	1,331,000
7	12,478	12,478	84,000	108,956	1,247,000
8	11,691	11,691	85,000	108,381	1,162,000
9	10,894	10,894	87,000	108,788	1,075,000
10	10,078	10,078	89,000	109,156	986,000
11	9,244	9,244	90,000	108,488	896,000
12	8,400	8,400	92,000	108,800	804,000
13	7,538	7,538	94,000	109,075	710,000
14	6,656	6,656	96,000	109,313	614,000
15	5,756	5,756	97,000	108,513	517,000
16	4,847	4,847	99,000	108,694	418,000
17	3,919	3,919	101,000	108,838	317,000
18	2,972	2,972	103,000	108,944	214,000
19	2,006	2,006	105,000	109,013	109,000
20	1,022	1,022	107,000	109,044	2,000

$108,880 / 1,856 EDUs = $58.66 / 12 months = $4.89 a month increase

CITY OF IRON RIVER
2024 DRINKING WATER STATE REVOLVING FUND
PRELIMINARY OPINION OF PROBABLE PROJECT COSTS - TABLE 17
WICKWIRE, P.C. PROJECT NO. 22030

Item Description	Estimated Quantity	Unit	Estimated Unit Price	Estimated Extension
Mobilization	1	LSUM	$ 100,000	$ 100,000
Contractor Staking	1	LSUM	$ 25,000	$ 25,000
Maintaining Traffic	1	LSUM	$ 25,000	$ 25,000
Utility Exploration	8	EACH	$ 250	$ 2,000
Soil Erosion and Sedimentation Control	1	LSUM	$ 10,000	$ 10,000
Site Stormwater Operator Inspection	1	LSUM	$ 7,500	$ 7,500
RCP Storm Sewer	115	LFT	$ 100	$ 11,500
Connect to Existing Storm Sewer	14	EACH	$ 500	$ 7,000
Remove Bituminous Bike Path	2,400	SYD	$ 5	$ 12,000
Remove Bituminous Driveway	550	SYD	$ 10	$ 5,500
2" Bituminous Approach	70	TON	$ 250	$ 17,500
Remove Concrete Curb and/or Gutter	15	LFT	$ 25	$ 375
Subbase, MDOT Class II, 12" (CIP)	2,750	SYD	$ 12	$ 33,000
Aggregate Base Under Bit., MDOT 22A, 8" (CIP)	2,750	SYD	$ 15	$ 41,250
3" Bituminous Approach	65	TON	$ 250	$ 16,250
2" Bituminous Bike Path	270	TON	$ 250	$ 67,500
Concrete Curb & Gutter	15	LFT	$ 100	$ 1,500
Adjust Structure Cover	2	EACH	$ 600	$ 1,200
6" Watermain	45	LFT	$ 100	$ 4,500
12" Watermain	2,450	LFT	$ 120	$ 294,000
12" RSGV w/Box	4	EACH	$ 3,500	$ 14,000
12" - 45 Degree Bend	2	EACH	$ 750	$ 1,500
Cut and Cap Existing Watermain	2	EACH	$ 1,000	$ 2,000
Connect to Existing Watermain	2	EACH	$ 2,000	$ 4,000
Hydrant Assembly	4	EACH	$ 7,500	$ 30,000
Remove Existing Valve Box	2	EACH	$ 300	$ 600
Utility Crossing	2	EACH	$ 5,000	$ 10,000
3/4" Type K Copper Water Service	50	LFT	$ 75	$ 3,750
3/4" Corporation Stop	2	EACH	$ 250	$ 500

CITY OF IRON RIVER
2024 DRINKING WATER STATE REVOLVING FUND
PRELIMINARY OPINION OF PROBABLE PROJECT COSTS - TABLE 17
WICKWIRE, P.C. PROJECT NO. 22030

Item Description	Estimated Quantity	Unit	Estimated Unit Price	Estimated Extension
3/4" Curb Stop and Box	2	EACH	$ 400	$ 800
Connect to Existing Water Service	2	EACH	$ 400	$ 800
PRV Replacements	3	EACH	$ 75,000	$ 225,000
Elevated Storage Water Tank Mixers	2	EACH	$ 30,000	$ 60,000
Elevated Storage Water Tank Repairs	1	LSUM	$ 10,000	$ 10,000
Elevated Storage Water Tank Paint Repairs - Wykon Tower	1	LSUM	$ 165,000	$ 165,000
Elevated Storage Water Tank Paint Repairs - Hunter Tank	1	LSUM	$ 175,000	$ 175,000

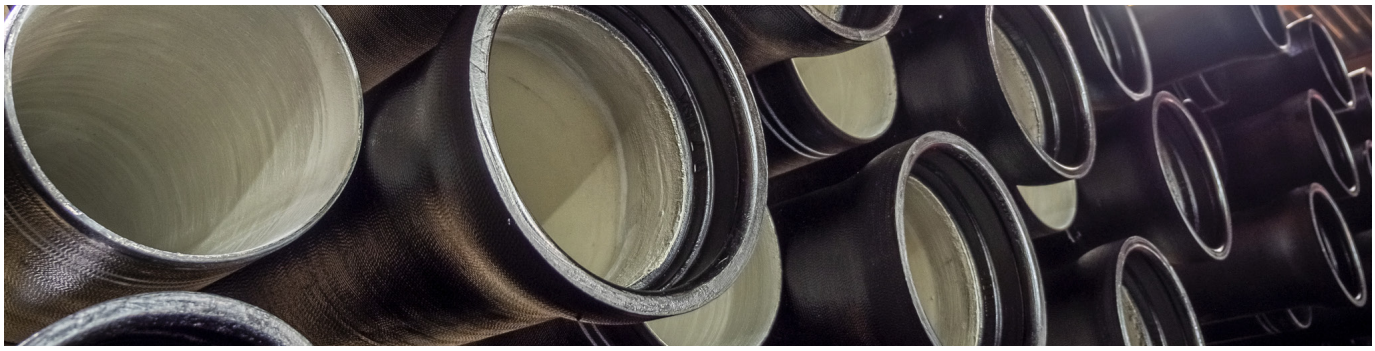
Total Estimated Construction Cost ==> $ 1,386,000

Admin/Legal/Engineering/Contingencies ==> $ 416,000

TOTAL OPINION OF PROBABLE COSTS ==> $ 1,802,000

Benefits of Ductile Iron Pipe

Ductile iron pipe is resilient, safe, and reliable – with a service life of over 100 years. It is an environmentally superior pipe due to its longer service life, resilience, energy savings while in service, recycled content, and its own recyclability. Ductile iron pipe is a key component of a clean energy future and modern, resilient water infrastructure. Ductile iron pipe has proven itself to stand the test of time, is made in America, and supports domestic jobs in communities across the country.



Environmentally Superior Pipe

Ductile iron pipes are natural, safe, and sustainable. Ductile iron pipes contain at least 90% recycled materials with the pipes themselves being 100% recyclable.[2, 6]

Better Value

Ductile iron pipe is a better value than plastic pipe because it lasts longer and saves money over time. According to a University of Michigan report, Ductile iron pipe is the more cost-effective material over a pipeline's service life with lower operational and maintenance costs and lower energy costs.[1]

Lower Emissions and Less Energy

Ductile iron pipe has better environmental performance due to its lower greenhouse gas emissions in both the production and operation phases. From cradle-to-grave, Ductile iron pipe is superior environmentally, as it requires less energy to pump water and has a lower environmental impact.[5]

Resilient

Ductile iron pipe is resilient through extreme weather events, natural disasters, soil contamination, and unpredictable situations. With its strength and durability, Ductile iron is the pipe of choice to protect against wildfires, earthquakes, floods, hurricanes, extreme temperatures, and the regular, ongoing stresses facing water utility systems. [2, 3, 4]

Health and Safety

Production of Ductile iron pipe does not release dangerous chemicals like vinyl chloride, dioxin or ethylene dichloride. Ductile iron pipe does not absorb toxins like plastic pipe and provides better protection against drinking water contamination. Ductile iron pipe is safer to install and maintain than plastic pipe, which is more prone to catastrophic installation and operational failures causing injuries to workers and damage to property.[2, 7]

Longer Life Cycle

Ductile iron pipe requires very little maintenance and has an expected service life of at least 100 years. Ductile iron pipe provides significant cost savings and benefits compared to plastic pipe, which has an average service life of 55 years.[8] A longer life cycle saves money and is better for the environment. It also means fewer interruptions, fewer replacements, and more peace of mind for local communities.[1,5]

dipra
Ductile Iron Pipe Research Association

[1] https://www.dipra.org/ductile-iron-pipe-resources/downloadable-brochures/lcca-brochure

[2] https://www.dipra.org/ductile-iron-pipe/benefits

[3] https://www.dipra.org/phocadownload/Applications-SeismicConsiderations.pdf

[4] https://www.dipra.org/phocadownload/new/CorrosionControl-DesignDecisionModel.pdf

[5] https://www.dipra.org/ductile-iron-pipe/dipra-facts-and-figures/benefits-of-ductile-iron-pipe

[6] https://www.dipra.org/ductile-iron-pipe/dipra-facts-and-figures/environmental-benefits

[7] https://www.dipra.org/ductile-iron-pipe/dipra-facts-and-figures/dangers-of-using-pvc

[8] BURIED NO LONGER: Confronting America's Water Infrastructure Challenge

Table 1: Typical Equipment Life Expectancy

Source of supply

Equipment	Life Expectancy in Years
Intake Structures	35 – 45
Wells and Springs	25 – 35
Galleries and Tunnels	30 – 40
Transmission mains	35 – 40

Pumping Plants

Equipment	Life Expectancy in Years
Structures	30 – 60
Pumping Equipment	10 – 15

Treatment Plants

Equipment	Life Expectancy in Years
Structures	30 – 60
Equipment	10 – 15
Chlorination Equipment	10 – 15

Transmission/Distribution

Equipment	Life Expectancy in Years
Structures	30 – 60
Reservoirs and Tanks	30 – 60
Mains & Distribution Pipes	35 – 40
Services	30 – 50
Valves	35 – 40
Backflow Prevention Valves	35 – 40
Blow-off valves	35 – 40
Meters	10 – 15
Hydrants	40 – 60

General Plant

Equipment	Life Expectancy in Years
Structures	30 – 40
Electrical Systems	7 – 10
Equipment	10 – 15
Transportation Equipment	10
Computers	5
Stores equipment	10
Lab/Monitoring Equipment	5 – 7
Tools and Shop Equipment	10 – 15
Landscaping/Grading	40 – 60
Power operated equipment	10 – 15
Communications equipment	10

From EPA publication EPA 816-R-03-016 Sept. 2003 (reformatted for web accessibility)

Present Worth of Recurring Escalating Expenditures (Energy Costs, if applicable)

$$PW = G \times \left[(1+i)^{n+1} - \frac{(1+ni+i)}{i^2(1+i)^n}\right]$$

F = future value = estimated project cost	A = annual expenditure
n = number of years	G = uniform increasing amount
i = discount rate	PW = Present worth

1) Determine the present worth of construction and OM&R components.
2) Determine the salvage value and present worth of the salvage value.
3) Determine the present value of capitalized interest and revenue generated, if applicable.
4) Calculate total present worth by adding capital costs, plus OM&R components, and capitalized interest minus the present worth of the salvage value and revenue generated.

C. Salvage Value

At the end of the 20-year planning period, portions of the proposed structures or equipment may have a salvage value. When calculating present worth, the salvage value of structures or equipment is determined by using straight line depreciation. The useful life to be used in the monetary evaluation should fall within the following ranges:

1) Land — permanent.
2) Water supply conveyance (e.g., distribution and transmission mains, intakes, and wells) — 50 years.
3) Other structures (e.g., waterworks buildings, storage tanks, and pump station structures) — 30 to 50 years.
4) Process equipment (e.g., chemical feed systems, pumps, and motors) — 15 to 20 years.
5) Auxiliary equipment — 15 to 20 years.

If a useful life of less than the planning period is assigned to any project component, the cost-effectiveness analysis must show the present worth of the replacement cost at the end of the useful life, as well as the present worth of the salvage value of the replacement at the end of the planning period.

CITY OF IRON RIVER
2024 DRINKING WATER STATE REVOLVING FUND
WEIGHTED USEFUL LIFE CALCULATIONS
WICKWIRE, P.C. PROJECT NO 22030

Water Distribution System Improvements =	50-year Useful Life and $731,000 cost of improvements =	50 x $731,000 =	$36,550,000
Pressure Reducing Valve (PRV) Replacements =	50-year Useful Life and $225,000 cost of improvements =	50 x $225,000 =	$11,250,000
Elevated Water Storage Tank Improvments =	40-year Useful Life and $410,000 cost of improvements =	40 x $410,000 =	$16,400,000
		Sum =	$64,200,000
		Total Prelimary Opinion of Probable Costs ==>	$1,776,000

Weighted Useful Life = (sum of each asset's dollar value times its estimated useful life) / total estimated dollars spent on assets

Weighted Useful Life = $64,200,000 / $1,776,000 = 36.15 years

Appendix G

Overburdened Status Determination Documents

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

OVERBURDENED AND SIGNIFICANTLY OVERBURDENED COMMUNITY STATUS DETERMINATION WORKSHEET

The following data is required from each State Revolving Fund (SRF) applicant requesting a determination for overburdened and significantly overburdened community status.

The most recent census and tax data are available in a searchable table on EGLE's State Revolving Fund – Overburdened Community Definition and Scoring Criteria Development webpage along with an excel worksheet to help determine blended Median Annual Household Income (MAHI) and blended taxable value per capita for regional systems. The MAHI and taxable value per capita table will be used to make all FY24 determinations. Applicants are encouraged to visit this page prior to completing this form to see if they qualify based on MAHI (blended MAHI if applicable) or taxable value per capita (blended taxable value per capita if applicable) alone. If so, they only need to fill out lines 1 and 2 of this form, electronically sign it on page 2, and submit.

Alternately, **if the applicant's MAHI or blended MAHI is above the state average - $63,498 for FY24 – they cannot be determined as being overburdened or significantly overburdened for FY24 funding and should not complete or turn in this form**.

For applicants whose MAHI or blended MAHI is below $63,498 but do not automatically qualify based on MAHI or taxable value per capita alone, please complete the entire form and return to:

Mark Conradi
conradim@michigan.gov

Name of Applicant

City of Iron River

Please check the box indicating which funding source this determination is for:

DWSRF ☑

CWSRF ☐

1. Is this a regional system? A regional system refers to any system that serves more than one municipality (cities, townships, and/or villages)

Yes ☐
No ☑

If yes, refer to the instructions at the end of this form to complete calculations for a blended MAHI and blended taxable value per capita. Additionally, page 3 of this form will also need to be completed.

2. Median Annual Household Income from table on the overburdened webpage (blended if applicable)

   $39,775

3. Taxable Value Per Capita from table on the overburdened webpage (blended if applicable)

   $18,132

4. Total amount of anticipated debt for the proposed project (amount of loan requested for FY24 loan)

   $1,802,000

5. Annual payments on the existing debt for the system

   $433,827

6. Total operation, maintenance, and replacement expenses (OM&R) for the system on an annual basis

   $520,271

7. Number of residential equivalent users (REUs) in the system

   1,856

***I (Rachel Andreski) hereby certify that the information in this form is complete, true, and correct to the best of my knowledge.**

Rachel Andreski 5/19/2023

Signature Date

For determinations made using anticipated debt, a final determination will be made based upon the awarded loan amount and not the anticipated amount provided on this form.

Regional System Breakdown (If applicable)

Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow
Name of municipality	Percentage of flow

If more spaces are needed, please include them in the email along with this submission. Percentages of flow must add up to 100%.

OVERBURDENED AND SIGNIFICANTLY OVERBURDENED COMMUNITY STATUS INSTRUCTIONS AND GUIDANCE

The following instructions provide guidance to fill out the overburdened and significantly overburdened determination community status worksheet. Systems across the state use many types of methods for billing and some include items that others do not. The purpose of the determination is to put all systems on a level playing field by breaking down system debt, expenses, and number of customers in the same manner. The instructions address each question in the order they are presented on the worksheet.

1. **Regional systems (if applicable) – Blended MAHI and taxable value per capita calculations**

   The definition of overburdened and significantly overburdened communities first requires "(a) Users within the area served by a proposed drinking water project, sewage treatment works project, or stormwater treatment project are directly assessed for the costs of construction." That means that the calculations need to be based on who is paying for the proposed SRF loan.

   For systems that serve more than one municipal entity a blended MAHI and taxable value per capita calculation must be completed. Page 3 of the worksheet includes spaces for a system to list all the municipalities (cities, townships, and/or villages) and the percentage of flow they provide to the system. The flow percentages should be based on the most recent data available.

   The reason flow is used is because most systems add debt costs to customers' bills and those are determined by flow. In rare cases there might be municipal agreements that vary slightly from this method and those will require the applicant to contact EGLE and provide the data separate from this worksheet. EGLE will take each municipality's MAHI and taxable value per capita and multiply it by the percentage of flow and then add them all together to come up with the blended number to be used in the determination (e.g., (municipality A MAHI * flow) + (municipality B MAHI * flow) + (municipality C MAHI * flow = Blended MAHI for the system)). The same formula will be repeated swapping out taxable value per capita for MAHI to determine a blended taxable value per capita.

   The most recent census and tax data are available in a searchable table on EGLE's State Revolving Fund – Overburdened Community Definition and Scoring Criteria Development webpage. This table will be used to make all FY24 determinations. Use the excel FY24 Overburdened Calculation Template also located on the State Revolving Fund – Overburdened Community Definition and Scoring Criteria Development webpage. Tab 1 titled, "Blended MAHI and TVPC calcs" will allow the applicant to input the names of the municipalities, their percentage of flow, the MAHI for each found in the table listed above, and the taxable value per capita for each in the table listed above, to calculate a blended MAHI and blended taxable value per capita of the regional system. **If the blended MAHI is above $63,498 the project cannot qualify for overburdened or significantly overburdened status and the rest of the form should not be filled out or turned in.**

2. **Median Annual Household Income**

   Use the "Fiscal Year 2024 Overburdened Median Annual Household Income (MAHI) and Taxable Values List for SRF Projects; the State of Michigan MAHI is $63,498 for FY24 Projects" searchable table located on the State Revolving Fund – Overburdened Community Definition and Scoring Criteria Development webpage. Search for the system's MAHI and enter it. **If the**

MAHI is above $63,498 the project cannot qualify for overburdened or significantly overburdened status and the rest of the form should not be filled out or turned in.

For regional systems that serve more than on municipality (cities, townships, and/or villages), refer to the instructions for regional systems in step 1 if you have not already completed calculating a blended MAHI for the system. Once the blended MAHI is determined, enter it on line 2 of the worksheet.

3. **Taxable Value Per Capita**

   This data is found in the same location as the MAHI data and was likely already entered by the applicant while completing line 2. If not, repeat the directions for step 2 and enter the taxable value per capita from the table.

   For regional systems that serve more than on municipality (cities, townships, and/or villages), refer to the instructions for regional systems in step 1 if you have not already completed calculating a blended taxable value per capita for the system. Once the blended taxable value per capita is determined, enter it on line 3 of the worksheet.

4. **Total amount of anticipated debt for the proposed project**

   Fill in the total amount of the proposed loan for the project requesting State Revolving Loan financing in FY24.

   EGLE will amortize this amount to determine a yearly cost to the applicant. The excel FY24 Overburdened Calculation Template, also located on the State Revolving Fund – Overburdened Community Definition and Scoring Criteria Development webpage, has this calculation built in so the applicant only needs to enter full FY24 the loan amount when completing that as well.

   Note that this loan amount is an estimate and often changes after project plans are submitted and bids come in. EGLE will run this determination again prior to finalizing the Project Priority List (PPL). Changes in the loan amount can sometimes change an applicant's status from overburdened to not or vice versa if the initial calculation is close to the 1% MAHI threshold.

   Thus, if a system is determined to be overburdened or not based on annual user costs being greater than 1% of system's MAHI vs being determined overburdened by MAHI or state taxable value per capita alone, a loan amount will be provided to the applicant that provides the cutoff loan value to either gain or lose overburdened status.

5. **Annual Payments on the existing debt of the system**

   Fill in the yearly total of any current debt payments for the system. If coming in for a CWSRF project only include debt payments for the wastewater system and if coming in for a DWSRF project only include debt payments for the drinking water system.

   In a regional system the additional debt payments of connected systems may be added if the connected systems are included in the blended MAHI and taxable value per capita calculations and there is no double-counting. For example, if a regional treatment system is coming in for the loan, a connected collection system could add any additional annual debt costs that the

collection system passes onto its customers after paying all debt and expenses to the regional treatment system. This is to account for the fact that the MAHI and state taxable values are being blended so the annual debt payments of the regional system can be blended as well to determine the average user cost of the regional system.

6. Total operation, maintenance, and replacement (OM&R) expenses for the system on an annual basis

As with the annul debt payments, the amount listed here should include only wastewater OM&R for CWSRF loans and only drinking water OM&R for DWSRF loans. If the accounting is combined split the costs as accurately as possible.

The OM&R costs should reflect all annual expenses for the system that are recovered annually through rates. This means that if a community makes an annual contribution of $50,000 a year to a capital improvement fund, they could add that number to the yearly OM&R costs. If they have accumulated $250,000 in that account and plan on using all in the calendar year they are applying for the loan, they cannot claim that amount as it is not a yearly expense; only the $50,000 is. This is also true for depreciation expenses with no cash value or yearly contribution. They cannot be included.

In a regional system the additional OM&R expenses of connected systems may be added if the connected systems are included in the blended MAHI and taxable value per capita calculations, there is no double-counting, and the expenses follow the same OM&R rules listed above. For example, if a regional treatment system is coming in for the loan, a connected collection system could add any additional annual OM&R costs that the collection system passes onto its customers after paying all debt and expenses to the regional treatment system. This is to account for the fact that the MAHI and state taxable values are being blended so the annual OM&R expenses of the regional system can be blended as well to determine the average user cost of the regional system.

7. Number of residential equivalent users (REUs) in the system

REUs refer to number of standard household hookups in a system. In a bedroom community, with little to no commercial or industrial customers, this number clear. However, most systems have a combination of customer types. The purpose of this form is to determine the average bill for a typical residential customer to determine if it is high enough to pose a burden on the ratepayer.

There are two standard ways of determining REUs: meter size and average flow.

- Meter size

  This is the preferred method as it eliminates most variables that using flow may have. To determine the number of REUs in a system take all the systems' meters and convert them down to 5/8^{ths}-inch or ¾-inch (whichever is the system's standard residential size). Use the capacity of the pipe to convert down (e.g., a 2-inch meter would be equivalent to about 8, 5/8^{ths}-inch meters, a 4-inch meter would be equivalent to about 25, 5/8^{ths}-inch meters, etc.). The resulting number of equivalent 5/8^{ths}-inch or ¾-inch meters would be the number of REUs in the system.

- Average flow

  The average flow method requires the system to determine the average yearly flow for a typical residential household (i.e., a 5/8^{ths}-inch or ¾-inch connection). The system takes the most recent yearly flow data of the entire system and divides by the average household usage number to come up with the number of REUs.

EGLE will look at the numbers provided and may have questions based on the population size vs number of REUs. EGLE will reach out and ask to see the calculations in some instances. Applicants are encouraged to include an excel sheet with these calculations along with the submittal of this form to reduce any back-and-forth communications.

Signature

A typed name and accompanying electronic signature are required for the form to be accepted. If this section is left blank the form will be returned to the sender and not reviewed until it has been signed and sent back.

Final Determination

If the system's MAHI or blended MAHI (if applicable) is over the state average - $63,498 for FY24 – it cannot be determined as being overburdened or significantly overburdened for FY24 funding.

EGLE will take the information provided on this form and enter it into the FY24 Overburdened Calculation Template spreadsheet to calculate the average yearly cost per REU. If a community or system is not determined to be overburdened or significantly overburdened based on MAHI or taxable value per capita alone, this calculation will determine if the costs are greater than 1% of the system's MAHI.

The FY24 Overburdened Calculation Template spreadsheet with the calculations and final determination will be sent to the applicant after the review has been completed by EGLE. A blank version is available on the State Revolving Fund – Overburdened Community Definition and Scoring Criteria Development webpage. Ideally the applicant has already completed the calculations using the instructions above prior to submitting. If the applicant completes the worksheet and determines they do not qualify for overburdened status it is requested that they do not submit the completed worksheet unless they have questions. The applicant's preliminary findings using the FY24 Overburdened Calculation Template are not official until they have been reviewed by EGLE as discrepancies and/or questions about some of the numbers may arise. However, EGLE is providing the template to allow applicants to have a good idea of how the determination will result prior to hearing back officially from EGLE.

Please contact Mark Conradi (conradim@michigan.gov) with any questions on the completion of the form.

If you need this information in an alternate format, contact EGLE-Accessibility@Michigan.gov or call 800-662-9278.

EGLE does not discriminate on the basis of race, sex, religion, age, national origin, color, marital status, disability, political beliefs, height, weight, genetic information, or sexual orientation in the administration of any of its programs or activities, and prohibits intimidation and retaliation, as required by applicable laws and regulations. Questions or concerns should be directed to the Nondiscrimination Compliance Coordinator at EGLE-NondiscriminationCC@Michigan.gov or 517-249-0906.

This form and its contents are subject to the Freedom of Information Act and may be released to the public.

Appendix H

Public Participation Documents

Affidavit of Publication

State of Michigan

NOTICE OF PROJECT PLANNING PUBLIC MEETING
NOTICE is hereby given that the City of Iron River will hold a public meeting on the proposed Drinking Water State Revolving Fund Water System Improvements project from interested persons.

Crystal Bear, being duly sworn, says that she is Co-Editor of the Iron County *Reporter*, a newspaper published and circulated in said county and otherwise qualified according to Supreme Court Rule; that annexed hereto is a printed copy of a notice which was published in said newspaper on the following date, or dates, to-wit: **May 3, 2023.**
Subscribed and sworn before me on this **3rd day of May 2023.**

Wendy L. Graham
Notary Public
Iron County, Michigan
My commission expires January 9, 2028

Wendy L Graham
NOTARY PUBLIC
County of Iron
My Commission Expires
January 09, 2028
Acting in the County of
Iron
STATE OF MICHIGAN

RECEIVED
MAY 10 2023
BY:

NOTICE OF PROJECT PLANNING PUBLIC MEETING

NOTICE is hereby given that the City of Iron River will hold a public meeting on the proposed Drinking Water State Revolving Fund Water System Improvements project from interested persons. The meeting will be held on Wednesday May 17, 2023 at 4:30 p.m. at the Iron River City Hall, 106 W Genesee Street, Iron River, MI 49935. The purpose of the proposed project is to make necessary improvements to the City's water system due to the age and deteriorated condition of watermain piping, elevated storage tanks, and pressure reducing valve stations. Project construction will involve the replacement of approximately 2,500 linear feet of watermain piping, 3 pressure reducing valve stations, elevated storage tank infrastructure repairs, elevated storage tank painting, site and roadway restoration, and the addition of a tank mixer to both elevated storage tanks. Short-Term impacts of the proposed project include temporary impacts due to activities during construction such as road closures, dust, and noise. There are no known long-term impacts of the proposed project. The estimated cost to users for the proposed project will be determined once the State announces final grant and loan awards.

Copies of the plan detailing the proposed project are available for inspection at the following location(s):

City of Iron River
Office of the City Clerk
106 West Genesee Street
Iron River, MI 49935
906-265-4719

Written comments received before the meeting record is closed at 3:00 P.M. on Wednesday May 17, 2023 will receive responses in the final project planning document. Written comments should be sent to:

City of Iron River
Office of the City Clerk
106 West Genesee Street
Iron River, MI 49935

R06 5/3

NOTICE OF PROJECT PLANNING PUBLIC MEETING

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R06 5/3

City of Iron River

106 W. Genesee
IRON RIVER, MICHIGAN 49935

Rachel Andreski
City Manager
citymanager@ironriver.org

Phone: 906-265-4719
Fax: 906-265-5776
Web. Page: www.ironriver.org

IRON RIVER CITY COUNCIL
PUBLIC HEARING
Wednesday, May 17, 2023
4:30 PM
AGENDA

1. Open Public Hearing

2. Receive Public Comment on the proposed Drinking Water State Revolving Fund Water System Improvements project from interested persons. The purpose of the proposed project is to make necessary improvements to the City's water system due to the age and deteriorated condition of watermain piping, elevated storage tanks, and pressure reducing valve stations. Project construction will involve the replacement of approximately 2,500 linear feet of watermain piping, 3 pressure reducing valve stations, elevated storage tank infrastructure repairs, elevated storage tank painting, site and roadway restoration, and the addition of a tank mixer to both elevated storage tanks. Short-Term impacts of the proposed project include temporary impacts due to activities during construction such as road closures, dust, and noise. There are no known long-term impacts of the proposed project. The estimated cost to users for the proposed project will be determined once the State announces final grant and loan awards.

3. Close Public Hearing

IRON RIVER CITY COUNCIL
PUBLIC HEARING
Wednesday, May 17, 2023
4:30 PM
AGENDA

1. Open Public Hearing

2. Receive Public Comment on the adoption of Supplement #3 dated December, 2022 to the Code of Ordinances for the City of Iron River.

3. Close Public Hearing

b) DPW Report ..... Page 14

8. Reports

a) IRPD Report ..... Page 15
b) ICECA Report ..... Page 16
c) County of Iron (Verbal)
d) Attorney's Report (Verbal)
e) Manager's Report ..... Page 19

9. Financial Reports

a) City Financial Report – April 2023 ..... Page 23
b) Accounts Payable Report – April 2023 ..... Page 31
c) City Attorney Invoice – April 2023 ..... Page 33

10. Unfinished Business

a) LCC Telecom Services (Telecommunication Tower Lease)
b) Resolution #23-4 Adopting Supplement #3 of City Code ..... Page 38

11. New Business

a) Adopt FY24 Budget
b) Protecting Michigan Pension Grant Program Authorization Resolution #23-2 ..... Page 39
c) MDOT Act 51 Street Decertification – 5th Avenue Bridge Resolution #23-3 ..... Page 40
d) West Side Veterans 4th of July Fundraising Partnership ..... Page 41
e) Parks and Recreation Committee .5 Millage Recommendation
f) Resolution Adopting DWSRF Water System Improvements ..... Page 43

12. Public Comment (Regarding Items Not on the Agenda) –Each public comment is limited to three (3) minutes, which will begin when the speaker approaches the podium.

Public comment shall not be disruptive, nor contain any profanity, racial, ethnic, religious, sexual, or national origin slurs or overtones. Public comment shall not contain defaming or slanderous personal attacks. All public comments shall be directed to the City Council. The City Council will not respond during public comment.

Any violation of Public Comment Procedures shall constitute a breach of the peace. If a member of the public engages in such breach of the peace, they may be ordered to be seated immediately, or removed from the meeting, by the Mayor.

13. Council Member Comments

14. Additional Information

Clerk's Memo ..... Page 44

15. Adjournment

I, Bernadette Coates, City Clerk for the City of Iron River do hereby certify the above agenda was posted in the Iron River City Hall on Thursday, May 11, 2023 at 2 p.m., in accordance with Michigan Open Meetings Act.

Bernadette Coates

Bernadette Coates, City Clerk

MEETING SIGN-IN SHEET

Project:	DWSRF Application Public Meeting	**Meeting Date:**	05/17/2023 @ 4:30 PM
Facilitator:	City of Iron River / WICKWIRE, P.C.	**Location:**	Iron River City Hall

Name	Address	Email	Phone
Seth Miatech	275 W Ice Lake Rd	stmiatec@mtu.edu	(906) 284-8121
Rachel Andreski	900 Andreski Rd, IR	citymanager@ironriver.org	(906)265-4719 x100
Rod Dood	413 JASPER ST	rodneydood@hotmail.com	906-284-9626
Anthony Clements	225 W. Cayuga	aclements79@yahoo.com	989-506-6137
Dennis Powell	611 Mineral av		906-367-2791
Roger [illegible]	302 Washington	[illegible]@fast-air.net	9062652188
[illegible]	126 W Maple	—	—
Bernadette Coates	105 Theodore St I.R.	bmcoates24@gmail.com	906-284-9681
Michaelle Bjorkman	124 Hiawatha R	" "	906-284-9101
Carl Maki	Iron River, MI 49935	" "	
MARK STAUBER	47 Bengal ST CASPIAN	MSTAUBER@FAST-AIR.NET	906-250-0230
Jerry Weeks	1645 Bengal Stambaugh Twp	—	906-367-3501
Ray Coates	504 Maple IR	Iron River [illegible]	906 265 5962
Zach Hautala	132 High Street, CF, 49920	Zach@iron.org	(906) 284-2654
MARC WILSON	P.O BOX 12 49903		
JASON WICKLUND	IRPD		
HARRINGTON	IRPD		
Garrett M. Bigelow	IRCB	garrettbigelow@outlook.com	906-284-0347

City of Iron River
DWSRF Project
Plan Narrative
Public Hearing

Prepared by:

WICKWIRE, P.C.
715 Selden Road
Iron River, MI 49935
Office: 906-265-9865

Prepared For:

City of Iron River
106 West Genesee Street
Iron River, MI 49935

Need for Project

Since the 1980s, the City has undertaken several major water system improvements project to upgrade the system's watermain. With the completion of the recently started MEDC WRI Water System Improvements project this year, only 2,500 linear feet of pipe will need to be upgraded. This section of pipe has a high criticality to the system and services Trident Maritime Systems, one of the City's largest commercial sites. Breaks or failures to the water system in this location along US-2 could cause significant shutdowns and disruptions. The proposed project would replace this section of pipe. Along with the watermain replacement, this project would also address EGLE's latest Sanitary Survey Letter which identified deficiencies to both of the City's Elevated Storage Tanks as well as three (3) of the City's Pressure Reducing Valve Stations that needed to be replaced.

Project Description

The proposed project entails replacement of approximately 2,500 linear feet of watermain, replacement of (3) pressure reducing valve stations, improvements to, and repainting of both elevated water storage tanks, and the addition of tank mixers. The streets expected to experience this work are Hunter Road, River Avenue, Lalley Road, Ice Lake Road, Genesee Street, Homer Road, and US-2. While none of these streets will experience significant modifications, the Homer Road/US-2 intersection and the bike path along the north side of US-2 will need to be reconstructed. The project is estimated to cost $1,802,000.

A detailed cost estimate is attached.

Financial Impact

The intent of the Drinking Water State Revolving Fund Application is to obtain state funding to assist in improving the City's water system. A cost analysis was performed to illustrate the financial impact of the project if the city accepted full financial responsibility for the project. The table below shows a 20-year loan impact on the City's residents without grant funding assistance.

Table 1: Project Loan Impact on Iron River Water Rates

Project Cost	$ 1,802,000
Interest Rate	1.875%
Project Useful Life	37 Years
Average Annual Payment	$ 108,880
EDU's	1,856
Current Monthly Charge	$ 29.25
Monthly Increase at 100% Loan	$ 4.89

Social and Environmental Impacts

The project will provide short-term employment opportunities for construction related activities. Residents in the project area may experience lane closures or slight delays during construction activities. Project areas will be identified with signage to protect the community's public safety.

There are no wetlands to be impacted and no endangered vegetation is found in the construction areas. All areas to be disturbed have been previously constructed. Measures will be taken to minimize dust and erosion in the project areas. All areas disturbed by the project are to be fully restored to their original condition prior to construction.

IRON RIVER CITY COUNCIL
PUBLIC HEARING
Wednesday, May 17, 2023
4:30 PM
AGENDA

Mayor Powell opened the public meeting at 4:30 p.m. in the Council Chamber of Iron River City Hall.

The purpose of this public hearing was to receive public comments on the proposed Drinking Water State Revolving Fund Water System Improvements project from interested persons. The purpose of the proposed project is to make necessary improvements to the City's water system due to the age and deteriorated condition of watermain piping, elevated storage tanks, and pressure reducing valve stations. Project construction will involve the replacement of approximately 2,500 linear feet of watermain piping, 3 pressure reducing valve stations, elevated storage tank infrastructure repairs, elevated storage tank painting, site and roadway restoration, and the addition of a tank mixer to both elevated storage tanks. Short-Term impacts of the proposed project include temporary impacts due to activities during construction such as road closures, dust, and noise. There are no known long-term impacts of the proposed project. The estimated cost to users for the proposed project will be determined once the State announces final grant and loan awards.

Richardson explained since the 1980's the City has undertaken several major water system improvements projects to upgrade the system's watermain. With the completion of the recently started MEDC WRI Water System Improvements project this year, only 2,500 linear feet of pip will need to be upgraded. This section of pipe has a high criticality to the system and services Trident Maritime System, one of the City's largest commercial sites. Breaks or failures to the water system in this location along US-2 could cause significant shutdowns and disruptions. The proposed project would replace this section of pipe. Along the watermain replacement, this project would also address EGLE's latest Sanitary Survey Letter which identified deficiencies to both of the City's elevated storage tanks as well as three of the City's pressure reducing valve stations that needed to be replaced.

The intent of the Drinking Water State Revolving Fund Application is to obtain state funding to assist in improving the City's water system. A cost analysis was performed to illustrate the financial impact of the project if the City accepted full financial responsibility for the project.

The project will provide short-term employment opportunities for construction related activities. Residents in the project area may experience lane closures or slight delays during construction activities. Project areas will be identified with signage to protect the community's public safety.

There are no wetlands to be impacted and no endangered vegetation is found in the construction areas. All areas to be disturbed have been previously constructed. Measures will be taken to minimize dust and erosion in the project areas. All areas disturbed by the project are to be fully restored to their original condition prior to construction.

There being no written or oral comments, Mayor Powell closed the public hearing at 4:36 p.m.

Bernadette Coates
Bernadette Coates, City Clerk

5-18-2023
Date

RESOLUTION ADPOTING A FINAL PROJECT PLANNING DOCUMENT FOR THE CITY OF IRON RIVER'S WATER SYSTEM IMPROVEMENTS PROJECT AND DESIGNATING AN AUTHORIZED PROJECT REPRESENTATIVE

WHEREAS, the City of Iron River recognizes the need to make improvements to its existing distribution system; and

WHEREAS, The City of Iron River authorized WICKWIRE, P.C. to prepare a Project Planning Document, which recommends the replacement of 2,500 linear feet of watermain and 3 Pressure reducing valve stations, elevated storage tank paint and structural repairs, and the addition of storage tank mixers to both elevated storage tanks.

WHEREAS, said Project Planning Document was presented at a Public Hearing held on May 17, 2023 at 4:30 PM and all public comments have been considered and addressed.

NOW THEREFORE BE IT RESOLVED, that the City of Iron River formally adopts said Project Planning Document and agrees to implement the selected alternative High Priority Capital Improvements.

BE IT FURTHER RESOLVED, that the City Manager, a position currently held by Rachel Andreski, is designated as authorized representative for all activities associated with the project referenced above, including the submittal of said Project Planning Document as the first step in applying to the State of Michigan for a Drinking Water State Revolving Fund Loan to assist in the implementation of the selected alternative.

Yeas: Anthony Clements, Rodney Dood, Ronjo Leonoff and Mayor Dennis Powell.

Nays: None.

Absent: Benjamin Garcia.

I certify that the above Resolution was adopted by the City Council on May 17, 2023.

BY: Bernadette Coates — City Clerk

Name — Title

Bernadette Coates — 5-18-2023

Signature — Date