HOUSE of REPRESENTATIVES

STATE OF MICHIGAN

Appropriations Requests for Legislatively Directed Spending Items

1. The sponsoring representative's first name:
   Timothy

2. The sponsoring representative's last name:
   Beson

3. The cosponsoring representatives' names. All cosponsors must be listed. If none, please type 'n/a.' A signed letter from the sponsor approving the co-sponsorship and a signed letter from the member wishing to co-sponsor are required. Attach letters at question #9 below.
   N/A

4. Name of the entity that the spending item is intended for:
   Charter Township of Bangor

5. Physical address of the entity that the spending item is intended for:
   Charter Township of Bangor 180 State Park Drive Bay City, Michigan 48706

6. If there is not a specific recipient, the intended location of the project or activity:
   The project area for the proposed water system looping and certain small water main replacements as noted in the DWSRF Project Plan attached with this appropriations request. The lead service line replacements will be completed throughout the Township where the DSMI project currently underway will identify these lead service lines.

7. Name of the representative and the district number where the legislatively directed spending item is located:
   The project area for the proposed water system looping and certain small water main replacements as noted in the DWSRF Project Plan attached with this appropriations request. The lead service line replacements will be completed throughout the Township where the DSMI project currently underway will identify these lead service lines.

8. Purpose of the legislatively directed spending item. Please include how it provides a public benefit and why it is an appropriate use of taxpayer funding. Please also demonstrate that the item does not violate Article IV, S 30 of the Michigan Constitution.

Public Benefits:
1. Improved Water Quality
• Reduced Water Stagnation: Looping minimizes dead ends, which are prone to stagnant water, sediment buildup, and bacterial growth.
• Better Chlorine Residuals: Continuous movement of water helps maintain disinfectant levels throughout the network.
2. Enhanced Reliability and Redundancy
• Backup Flow Paths: If one section of pipe needs to be shut off (for maintenance or due to a break), water can still reach all areas through alternate routes.
• Improved Service Continuity: Reduces the number and duration of service interruptions for consumers.
3. Better Fire Protection
• Higher Flow Rates: Looped systems provide better flow and pressure for fire hydrants compared to dead-end systems.
• Redundancy: Ensures reliable water availability for emergency services even during outages.
4. Pressure Stabilization
• Even Pressure Distribution: Looping helps equalize water pressure throughout the system, which is especially beneficial in large or hilly areas.
• Prevention of Pressure Surges: Reduces the likelihood of pipe bursts due to sudden pressure changes.
5. Easier Maintenance and Repairs
• Isolated Sections: Sections can be isolated for repairs without cutting supply to large numbers of customers.
• Reduced Downtime: Minimizes the impact of maintenance on residents and businesses.

9. Attach documents here if needed:
   Attachments added to the end of this file.

10. The amount of state funding requested for the legislatively directed spending item.
    1500000

11. Has the legislatively directed spending item previously received any of the following types of funding? Check all that apply.
    ["None"]

12. Please select one of the following groups that describes the entity requesting the legislatively directed spending item:
    Local unit government

13. For a non-profit organization, has the organization been operating within Michigan for the preceding 36 months?
    Not applicable

14. For a non-profit organization, has the entity had a physical office within Michigan for the preceding 12 months?
    Not applicable

15. For a non-profit organization, does the organization have a board of directors?
    Not applicable

16. For a non-profit organization, list all the active members on the organization's board of directors and any other officers. If this question is not applicable, please type 'n/a.'
    N/A

17. "I certify that neither the sponsoring representative nor the sponsoring representative's staff or immediate family has a direct or indirect pecuniary interest in the legislatively directed spending item."
    Yes, this is correct

18. Anticipated start and end dates for the legislatively directed spending item:
    Start Date: September 2025 End Date: December 2026

19. "I hereby certify that all information provided in this request is true and accurate."
    Yes

Name of the entity that the spending item is intended for:

Charter Township of Bangor

Physical address of the entity that the spending item is intended for:

Charter Township of Bangor
180 State Park Drive
Bay City, Michigan 48706
Glenn Rowley, Supervisor
989-684-8931

If there is not a specific recipient, the intended location of the project or activity:

The project area for the proposed water system looping and certain small water main replacements as noted in the DWSRF Project Plan attached with this appropriations request.
The lead service line replacements will be completed throughout the Township where the DSMI project currently underway will identify these lead service lines.

Purpose of the legislatively directed spending item. Please include how it provides public benefit and why it is an appropriate use of taxpayer funding. Please also demonstrate that the item does not violate Article IV, S 30 of the Michigan Constitution.

Public Benefits:

1. Improved Water Quality
   - Reduced Water Stagnation: Looping minimizes dead ends, which are prone to stagnant water, sediment buildup, and bacterial growth.
   - Better Chlorine Residuals: Continuous movement of water helps maintain disinfectant levels throughout the network.
2. Enhanced Reliability and Redundancy
   - Backup Flow Paths: If one section of pipe needs to be shut off (for maintenance or due to a break), water can still reach all areas through alternate routes.
   - Improved Service Continuity: Reduces the number and duration of service interruptions for consumers.
3. Better Fire Protection
   - Higher Flow Rates: Looped systems provide better flow and pressure for fire hydrants compared to dead-end systems.
   - Redundancy: Ensures reliable water availability for emergency services even during outages.
4. Pressure Stabilization
   - Even Pressure Distribution: Looping helps equalize water pressure throughout the system, which is especially beneficial in large or hilly areas.

- Prevention of Pressure Surges: Reduces the likelihood of pipe bursts due to sudden pressure changes.

5. Easier Maintenance and Repairs
    - Isolated Sections: Sections can be isolated for repairs without cutting supply to large numbers of customers.
    - Reduced Downtime: Minimizes the impact of maintenance on residents and businesses.

Public Benefit for Replacement of Lead Service Lines:

1. Improved Public Health
    - Eliminates Lead Exposure: Lead in drinking water can leach from old pipes and is especially harmful to children, causing developmental delays, learning difficulties, and behavioral issues.
    - Protects Vulnerable Populations: Infants, young children, and pregnant women are most at risk. Replacing LSLs directly reduces this risk.
    - Lowers Healthcare Costs: Reducing lead exposure leads to fewer lead-related illnesses, which can save millions in long-term healthcare and education costs.
2. Increased Property Value
    - Modernized Infrastructure: Homes and neighborhoods with updated, lead-free plumbing are more attractive to buyers.
    - Peace of Mind for Residents: Knowing that drinking water is lead-free boosts public trust and satisfaction with municipal services.
3. Economic Equity
    - Supports Underserved Communities: Lead service lines are more common in older, lower-income neighborhoods. Replacing them helps reduce environmental injustice and promotes equity.
    - Public Funding Assistance: Many programs use public funds to help cover the cost for homeowners who can't afford replacement, creating broad public good.
4. Infrastructure Modernization
    - Opportunity for System Upgrades: Replacement often coincides with other water main or roadwork, allowing municipalities to modernize infrastructure efficiently.
    - Improved Water Delivery: New pipes improve flow, reduce leaks, and provide better long-term performance.
5. Regulatory Compliance
    - Meets EPA and State Standards: Helps cities and utilities comply with evolving federal and local rules (e.g., Lead and Copper Rule Revisions).
    - Avoids Fines and Penalties: Proactive replacement reduces the risk of non-compliance and associated costs.
6. Restores Public Trust
    - Transparency and Action: Addressing lead concerns shows that utilities and governments are prioritizing public health.
    - Builds Confidence: Residents are more likely to trust their water supply and public institutions

Water Main Looping and Lead Service Line Replacements does not violate Article IV, S 30 of the Michigan Constitution.

- System-wide benefits: Improves overall system reliability, water quality, pressure balance, and fire protection.
- Community health and safety: Improves infrastructure that serves all users on the system.

The amount of state funding requested for the legislatively directed spending item.

$1,500,000

Has the legislatively directed spending item previously received any of the following types of funding? Check all that apply: Federal, State, Local, Private,

None

Please select one of the following groups that describes the entity requesting the legislatively directed spending item: For-profit organization, Non-profit organization, University/College

Local unit government

For a non-profit organization, has the organization been operating within Michigan for the preceding 36 months?

Not Applicable

For a non-profit organization, has the entity had a physical office within Michigan for the preceding 12 months?

Not Applicable

For a non-profit organization, does the organization have a board of directors?

Not Applicable

For a non-profit organization, list all the active members on the organization's board of directors and any other officers. If this question is not applicable, please type 'n/a.'

Not Applicable

“I certify that neither the sponsoring representative nor the sponsoring representative's staff or immediate family has a direct or indirect pecuniary interest in the legislatively directed spending item.”

Anticipated start and end dates for the legislatively directed spending item:

Start Date: September 2025
End Date: December 2026

Charter Township of Bangor

Bay County, Michigan

DWSRF PROJECT PLAN

May 2021
Revised May 30, 2024

F&V Project No. 845220

Prepared by:

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

CHARTER TOWNSHIP OF BANGOR
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CHARTER TOWNSHIP OF BANGOR
DRINKING WATER STATE REVOLVING FUND (DWSRF) PROJECT PLAN

I. INTRODUCTION & PROJECT BACKGROUND

The purpose of the Bangor Township Drinking Water State Revolving Fund Project Plan is to fulfill the project planning requirements under the States' Safe Drinking Water Act 399 and to provide the basis for ranking of the Township's proposed waterworks improvements under a Project Priority List for a low interest Drinking Water State Revolving Fund Loan.

The Scope of the Project Plan includes a summary of the existing water quality and reliability issues within the Township's service area, projection of the population served within the next 20 years, screening, and identifying principal alternatives to meet the future water needs of the service area, and to evaluate the environmental impacts in both long and short term on a selected alternative.

The Project Plan also presents projected user costs for financing the selected alternative and a review of the public participation and public comments solicited by the Township on the selected alternative.

The format of the report follows the May 2016 project planning guidelines for Drinking Water Revolving Fund Projects issued by the Michigan Department of Environmental Quality (MDEQ)

A. Summary of Project Need

1. Compliance with Drinking Water Standards

The service area for the DWSRF Project Plan includes the entire township. The service area is defined as that portion of the township which has a water distribution system.

The Bangor Township's water supply system currently consists of the following:

- Watermain 3-inch to 12-inch diameter – 428,000 feet
- Fire Hydrants with Valves – 654
- Main Line Valves – 707

Orders / Enforcement Actions

There are no orders or enforcement actions in place.

2. Drinking Water Quality.

The township water supply comes from the Bay Area Water Treatment Plant (BAWTP). This plant delivers water to over 100,000 customers in 17 communities.

The annual Water Quality Report for the township public water system for the year 2020 is included in Appendix A. As shown in the annual report, the township met or exceeded all State and Federal drinking water standards.

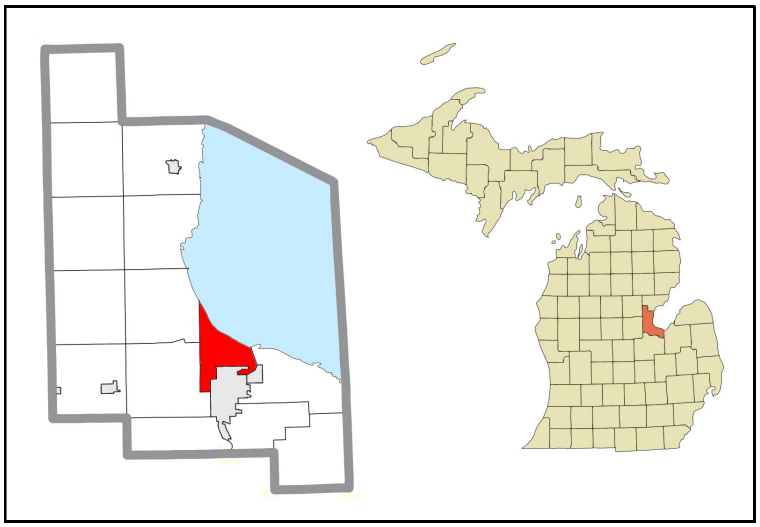
Based on the December 2017 Water Asset Management Plan for Bangor Township, approximately 4% of the Township's watermains are cast-iron and approximately 3% of the

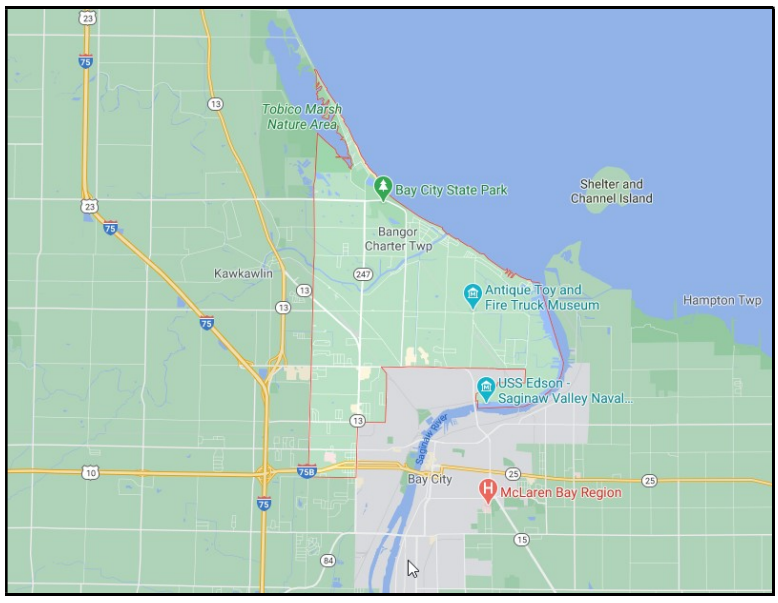
water mains are 4-inch in diameter, or smaller. Undersized, cast iron watermains are subject to increased breakage, low pressures, and poorer water quality. This poor water quality can be compounded if the cast iron watermains do not have a mortar lining in them which is the case in the Township. Replacement of this watermain would be beneficial to the residents in the way of better water delivered by a more reliable water system and would assist the Township in reducing the amount of non-revenue water which can lead to lower operating costs and lower water rates for all customer classes.

B. Study Area Characteristics

1. Delineation of Study Area

The study and service area includes all of Bangor township, Bay County as highlighted in red below:





According to the United States Census Bureau, the township has a total area of 21.9 square miles, of which 13.9 square miles is land and 8.0 square miles (36.6%) is water.

Bangor Township was organized on March 22, 1859, becoming the third township of Bay County. Bangor was organized in the same year as the townships of Arenac and Portsmouth. Bangor included present townships of Fraser, Kawkawlin and Monitor. In 1868, the northern portion of Bangor was detached to form Kawkawlin Township. In 1869, the southern portion of Bangor was detached to form Monitor Township, this consisted of the south 30 sections of township 14 north of range 4 east, and sections 30 and 31 of township 14 north of range 5 east. Petitioners for the new township were John G. Kiesel, John Gies, Charles Nickel, Scott W. Sayles, Frederick Kiesler and Mathew Miller, of Hampton Township. The largest land holder in Bangor at the time was Joseph Trombley.

The first town meeting was held April 7, 1859. The township name was chosen by Thomas Whitney who was from Bangor, Maine. He owned a mill on the east side of the river.

In 1877, Bangor lost a large portion of its territory to the newly chartered community of West Bay City which in 1905 became a part of Bay City. In the 1880s, Bangor had three coal mines in operation.

The historical population of the township was mostly near the Saginaw River, along and near Marquette street which included several small merchant businesses.

Year	Population
1880	271
1894	843
1900	1,195
1960	11,686
1970	15,896
1980	17,494
1990	16,028
2000	15,547
2010	14,641

The USGS topography mapping of Bangor Township study area is shown in Appendix B. The major surface water features through the study area are the Saginaw River as the township boundary to the east and Lake Huron to the north.

The township contains five unincorporated communities:

Aplin Beach, also known as Wenona Beach, is located at Patterson and Zimmer Roads near the Saginaw Bay shoreline. (Elevation: 584 ft)

Donahue Beach, also known as Bayside and Donoghue Beach, is located at Donahue Beach Road along the Bay shoreline near the mouth of the Kawkawlin River. (Elevation: 584 ft)

Killarney Beach is located between the Bay shoreline and Tobico Marshes on Killarney Beach Road. (Elevation: 577 ft)

Lagoon Beach, also known as Lagoona Beach, is located along the Bay shoreline North of the mouth of the Kawkawlin River. (Elevation: 584 ft)

Little Killarney Beach is located between the Bay shoreline and Tobico Marshes on Killarney Beach Road. (Elevation: 584 ft)

Tobico Beach is located along the Bay shoreline on Euclid Avenue between Tobico Lagoon and Tobico Marshes. (Elevation: 584 ft)

2. Land Use in Study Area

The land uses in Bangor Township are classified into 9 categories for the purposes of mapping. General definitions of the uses follow. Bangor occupies an area of 8,753 acres (13.7 square miles). The chart below shows the proportionate land uses currently allocated in the Township. As shown on chart below the township is primarily a residential community with 31.3% as single family residential. The next highest use is agricultural with 27.6%. Existing Land Use and Zoning maps are shown in Appendix C.

Existing Land Use

	1989		2001	
Land Use Categories	Acres	Percent of Total	Acres	Percent of Total
Agriculture/Vacant	4,328.0	49.4	2,334	27.6
Residential				
-Single-Family Residential	2,126.0	24.3	2,638	31.3
-Mobile Homes	55.1	0.62	86	1.0
-Multiple Family	105.0	1.2	92	1.0
Commercial	359.3	4.1	490	5.8
Office	17.6	0.20	48	0.57
Industrial	527.9	6.1	850	10.1
Public/Semi-public	1,234.4	14.1	1,339	15.9
Total	8,753	100.0	8,436*	100.0

* Total includes right-of-way (559 acres).
Source: Charter Township of Bangor Comprehensive Plan, 1990; McKenna Associates, Inc., 2001

Bangor Township is in southern part of Bay County, along Lake Huron and is located directly north of the City of Bay City. The Bay County region is largely rural with most of the land being used for agricultural purposes. There are 444 square miles in Bay County and approximately 30 miles of Lake Huron shoreline. This shoreline is wholly contained within the Saginaw Bay watershed, which is the largest drainage basin in Michigan, and contains the largest contiguous freshwater coastal wetland system in the United States.

A large area of the township is within the 100-year flood plain and is shown in Appendix D.

Bay County sits in an imperceptible lowland with a rich soil ideal for growing a large variety of plant products. According to the USDA's Natural Resource Conservation Service (NRCS), nearly all of Bangor Township's land is either "prime farmland if drained" or "farmland of local importance."

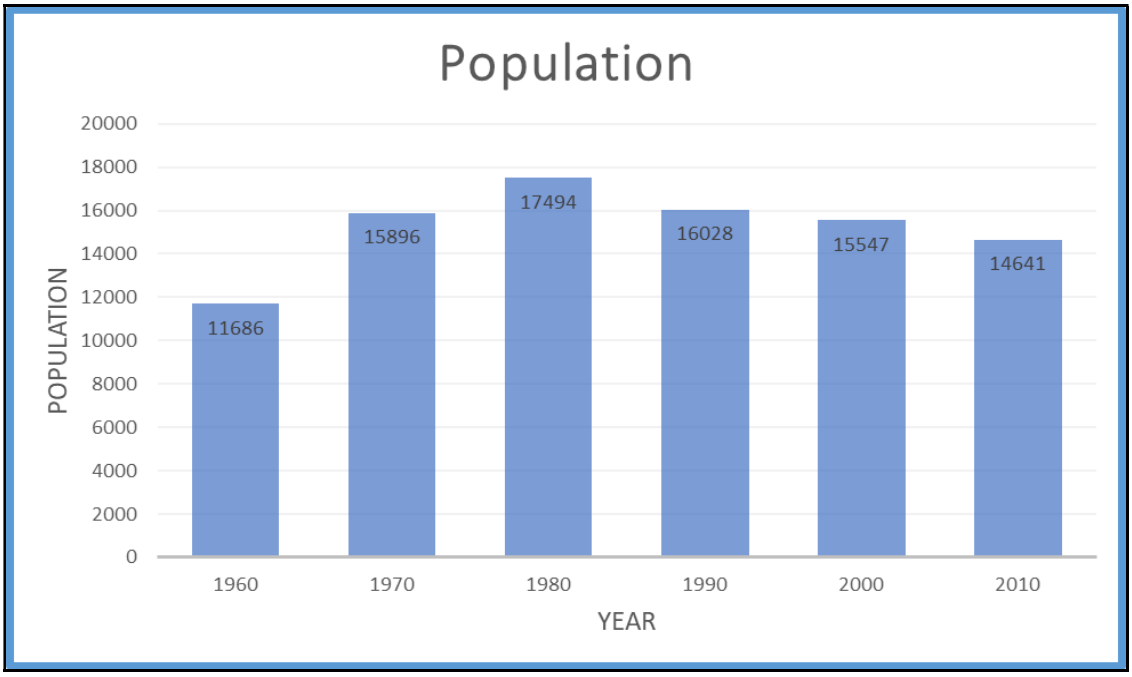
Natural features are important to the Township for several reasons: their scenic quality, their recreation potential, and the habitat they provide for fish and wildlife. Perhaps most importantly, however, are the functions provided by these natural features that are imperative to the health of the community. Wetlands, for example along the shoreline, serve to filter out pollutants from run-off and therefore promote better water quality, as well as provide valuable habitat for wildlife and waterfowl.

Wetlands serve an important purpose in an ecosystem by providing wildlife habitat, erosion control, floodwater storage, ground water recharger and water purification. They are also used for recreation purposes such as hiking, bird watching, photography and hunting. Wetlands that are five acres in size or larger and wetlands that are contiguous to a water body are protected in Michigan by the Goemaere-Anderson Wetland Protection Act.

C. Population Data

1. Study and Service Area Populations

Bangor Township's population grew dramatically from 1960 to 1980 and since that time it has remained relatively stable with a slight decline. The graph below shows the overall change in population in the Township since 1960.



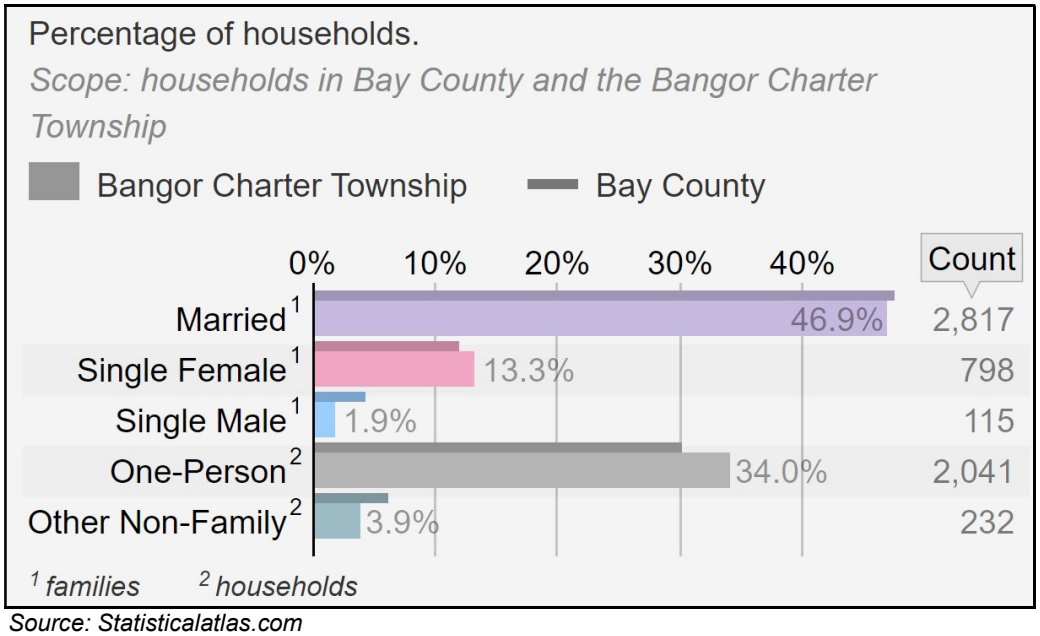
Based on Census Bureau information

Working with Bay City Area Transportation Study (BCATS), we were able to obtain population projections data that has been provided by Michigan Department of Transportation (MDOT) and is used in their travel demand model for forecasting capacity issues on the federal aid transportation road network in Bay County. A base year population for 2017 (used in the current BCATS 2045 Long Range Plan) was reviewed and approved by the BCATS Policy Committee. MDOT then forecasted future year population estimates.

Bangor Township Population Estimates are as follows:

- 2017 – 14,247
- 2025 – 13,967
- 2035 – 13,717
- 2045 – 13,290

Households and families in Bangor Township compared to Bay County:



Source: Statisticalatlas.com

Families made up 62 percent of the households in the township. This figure includes both married-couple families (47 percent) and other families (15 percent). Nonfamily households made up 38 percent of all households in the township. Most of the nonfamily households were people living alone, but some were composed of people living in households in which no one was related to the householder. There is minimal seasonal variance in population.

Other significant demographic data for Bangor Township as compared to the county, state, and country is shown below:

	Bangor Twp.	Bay County	Michigan	United States
Median Age	45.3	42.7	39.5	37.7
Population 65+	22.6%	18.3%	15.4%	14.5%
Population under 18	19.0%	21.0%	22.5%	23.1%
Owner Occupied Homes	73.0%	77.9%	73.0%	65.10%
Average Household Size	2.35	2.39	2.51	2.64
Bachelor's Degree or Higher	16.9%	18.1%	27.4%	30.3%
Median Household Income	$45,158	$45,851	$50,803	$55,322
Per Capita Income	$25,853	$24,753	$27,549	$29,829
Disabled	14.8%	16.6%	14.2%	12.5%
Poverty level	16.8%	15.8%	16.3%	15.1%

D. Existing Facilities

1. Condition of Source Facilities

The township water supply comes from the Bay Area Water Treatment Plant (BAWTP). This plant delivers water to over 100,000 customers in 17 communities. The BAWTP purchases raw water from Saginaw-Midland Municipal Water Supply Corporation.

This Whitestone Point facility near AuGres draws raw water from Lake Huron. This raw water travels approximately 50 miles to the BAWTP for processing.

2. Water Treatment Methods

The water is supplied from the BAWTP.

3. *Existing Storage Facilities*

Bangor township does not have storage and relies on other community water storage towers.

4. Condition of Service Lines

According to the 2020 BAWTP water quality report, the township has total 5,260 service lines. 7 of those are Lead service lines, and 1,400 are unknown.

Customer meters are changed out on an as needed basis.

5. Existing Distribution System

Based on information from the township Water Asset Management Plan, that was done in 2018, the water distribution system is composed of cast iron (4%), asbestos cement (56%), ductile iron (11%), PVC (28%) and unknown (1%). The distribution system consists of approximately 428,699 feet of watermain varying in size from 3-inch to 12-inch in diameter.

6. Methods of Residual Handling and Disposal

There are no existing residuals handling and disposal requirements for the township's water supply system.

7. Design Capacity of Existing Waterworks System

The rated design capacities of the system are outlined above in report Sections D.1.

Table 1 is an analysis of the annual water usage and summarizes the total annual usage, the maximum day and annual average day demands, along with the service population and average per capital water use (gpcd).

For fiscal years 2017 and 2020, the average annual water usage was 313.52 million gallons (MG). The average day demand for the reporting period was 0.859 mgd. Historical data for Bay County shows that the maximum demand is 1.3X the average demand making the maximum demand 1.117 mgd. The average per capita use for 2017 and 2020 was 60.5 gpcd.

Based on the service area population projections and the projected needs of commercial/industrial facilities over the next 20 years, the projected maximum day demand for the year 2041 is as follows:

2041 Average Day Demand	(13,461 x 60.5 gpcd) = 0.814 MGD = 566 GPM
2041 Maximum Day Demand	(0.814 x 1.3) = 1.059 MGD = 735 GPM

8. Operation and Maintenance

As previously discussed, the township routinely performs maintenance on the pumps.

The 2020 Water Quality Report for the township water system indicated no samples were above action level for lead and copper.

As recommended in the EGLE Water System Evaluation the township DPW routinely exercises valves throughout the distribution system and conducts regular flushing programs once per year.

As noted in previously, the township has identified an issue with significant water loss in the system, areas that suffer from breaks in services, and inefficiencies with the well pumps. These issues increase the operation and maintenance costs for the system.

II. ANALYSIS OF ALTERNATIVES

A. Identification of Potential Alternatives

The EGLE Project Plan preparation guidance document requires that the alternatives evaluation process examine the objectives of the project, including the needs, technical constraints and applicable drinking water standard requirements to be met. The widest variety of potential alternatives for both the entire system and the various functional subsystems must be identified, evaluated, and screened. All the alternatives evaluated must serve the same service area population with demonstrated drinking water needs. The rationale for rejecting any of these alternatives must be provided in the Plan. In-depth analysis will only be performed for the principal alternatives. The in-depth analysis must be based on a cost-effective analysis, potential environmental impacts, implementablity, and technical issues.

The following alternatives were considered for the township DWSRF Project and service area:

1. Alternative A – No Action.

Under the no action alternative, the township would continue use of the existing water system in its current condition.

A. Alternative A1-No Main Replacement

The no action alternative assumes continued use of the leaking undersized cast iron water mains in the Southwest quadrant of the township.

These mains have excessive interior corrosion causing excessive water loss and poor water quality. The water mains were installed over 65-75 years ago. The system would continue to age, causing increased water loss, increased frequency of watermain and service breaks. In addition, it would leave suspected leaking lead and galvanized water services that are connected to the cast iron mains.

Based on the analysis presented above, this alternative does not accomplish the objectives of the project and will not be further evaluated as a principal alternative.

2. Alternative B – System Replacements.

A. Alternative B1-Main Replacement

Under this alternative, the undersized cast iron watermains in the Southwest quadrant of the township will be replaced. New 12” watermain would be installed under the Kawkawlin River to create looping to improve water quality and reliability.

These mains have excessive interior corrosion causing excessive water loss and poor water quality. The water mains were installed over 65-75 years ago. In addition, new water service lines will be installed to eliminate suspected leaking lead and galvanized water services that are connected to the cast iron mains. Estimated cost of this work is $4,705,000.

See Appendix L for location of watermain replacement work as listed below:

4-inch Cast Iron replace with 8” pipe	8,001 Feet
6-inch Cast Iron replace with 8” pipe	1,503 Feet

8-inch Cast Iron replace with 12" pipe	5,815 Feet
New 12" HDPE pipe under Kawkawlin River	595 Feet

3. Alternative C – Optimize Performance of the Existing Facilities

This alternative would consist of optimizing the performance of existing facilities through operational changes, addition of equipment, or additional training of operating personnel.

The Township regularly inspects and maintains the water distribution system to identify and fix leaks. This helps reduce water loss and improve water efficiency.

The Township provides water demand management strategies to help reduce water consumption including promoting water-saving practices.

The drinking water for Bangor Township is supplied by the Bay Area Water Treatment Plant using raw water sourced from the Saginaw-Midland Municipal Water Supply Corporation. The Saginaw-Midland Municipal Water Supply Corporation performs regular Source Water Assessments to monitor for and avoid pollution and contamination around the existing raw water intake at Whitestone Point in Lake Huron.

The Township is proceeding with infrastructure upgrades and replacement of aging water lines which is noted in Alternative B. These upgrades reduce energy consumption and minimizes water loss.

The Township has already implemented optimization strategies to maximize the performance of existing facilities. The issues present in the Bangor Township water distribution system which this Project Plan seeks to remedy cannot be addressed by optimizing usage of existing facilities. There is no viable alternative for remediating aging and deteriorating distribution water mains which suffer from excessive corrosion and water loss than replacing the existing facilities. This alternative does not accomplish the project objectives. Based on the analysis presented above, the Optimize Performance of the Existing Facilities Alternative will not be further evaluated as a principle alternative

4. Alternative D – Regionalization

The Regionalization Alternative would consist of sourcing drinking water from a regional water authority who would provide treated drinking water to the community or partnering with another community who would already has a drinking waster system and the ability to provide treated drinking water to Bangor Township.

Bangor Township currently receives treated drinking water from the Bay Area Water Treatment Plant(BAWTP). The Bay Area Water Treatment Plant also supplies treated drinking water to multiple communities surrounding Bangor Township.

Switching to a different water source would not address the issues within the Township's water distribution system. There have been no documented issues with water received from BAWTP, the issues the drinking water system experiences are related to facilities within the Township's water distribution system.

Based on the above analysis, the Regionalization Alternative will not accomplish the project objectives and will not be evaluated further as a principle alternative.

B. Analysis of Principal Alternatives

1. Present Worth Analysis.

A monetary evaluation includes a present worth analysis. This analysis does not identify the source of funds but compares cost uniformly for each alternative over the 20-year planning period. The present worth is the sum which, if invested now at a given interest rate, would provide exactly the same funds required to pay all present and future costs. The total present worth, used to compare the principal alternatives, is the sum of the initial capital cost, plus the present worth of operation, maintenance, and replacement (OM&R) costs, minus the present worth of the salvage value at the end of the 20-year planning period. The discount rate used in computing the present worth cost was taken from 2021 Discount Rates OMB Circular No. A-94. The rate is currently set at 1 ½ % (1.5%).

The salvage value is calculated at the end of 20 years where portions of the project structures or equipment may have salvage value which is determined by using a straight-line depreciation. The present value of the salvage value is then computed using the discount rate of 1.5%. The EGLE in their guidance document establishes the estimated life for the project structures and equipment to assess salvage values at 20 years in the future.

The cost of labor, equipment and materials is not escalated over the 20-year life since it assumes any increase in these costs will apply equally to all alternatives. Energy prices, however, are escalated at a uniform rate of 3% per year over the 20-year planning period with O&M costs.

Since the total estimated construction costs are similar between the principal alternatives, the interest charge during construction (capitalized interest) would not influence the comparison of alternatives and was not included in the cost-effective analysis.

To ensure uniformity of the cost comparisons, the EGLE guidance indicates that the following cost comparison details should be specifically addressed and were applied in the present worth analysis:

- Capital costs were included for all identified improvements.
- Sunk costs were excluded from the present worth cost. Sunk costs for the project include existing land, existing waterworks facilities, and outstanding bond indebtedness.
- Operations, maintenance, and replacement, (OM&R) costs were included in the present worth cost.
- Correct discount rate. The economic comparison is based on a 20-year period and a discount interest rate of 1.5% has been used from the 2021 Discount Rates for OMB Circular No. A-94.
- Salvage values were included in the present worth cost.
- Escalation of energy values was applicable to the principal alternatives, but the cost differences between alternatives were limited.
- Land purchase/acquisition costs were not applicable to the principal alternatives.

- Mitigation costs are included in the project costs, which was included in the present worth cost.
- Total existing and projected user costs for the project are presented.
- Appropriate planning period of 20 years was used in accordance with EGLE guidance.
- Equivalent alternatives were compared, where no principal alternative was substantially more effective in terms of population served, design life of facilities and level of service provided.

Alternative B1 - Main Replacement

A present worth analysis of Alternative B1 is unnecessary because it is the only viable option for maintaining and improving the water supply system. The existing watermains are undersized and leaking and it would leave suspected leaking lead and galvanized water services. The total project cost for Alternate B1 is $4,705,000.

The cost includes the new water main, services to the right-of-way line, partial road replacement, and the engineering, legal, administration, and bonding services required to complete the project through the DWSRF Program.

2. Environmental Evaluation.

An analysis of the potential environmental and public health impacts of the principal alternatives is also an important part of the Project Plan analysis.

The following aspects of the environmental setting along with appropriate narrative discussion and maps are presented as follows:

a. Cultural Resources

None of the alternatives discussed are expected to have any impact upon historical or archeological sites.

b. The Natural Environment

None of the alternatives are expected to have a significant impact on wetlands, flood plains, surface water, prime farmlands, air quality and plant / animal communities. No alternative will impact wild or scenic rivers designated by the Michigan Department of Environment, Great Lakes, and Energy (EGLE).

Alternative B1 would include the replacement and open-cut construction of watermain within the township right-of-way. Some road replacement is anticipated with this alternative as required to replace the watermain and water services. During construction, the potential would exist for site runoff and soil erosion. No trees are proposed to be removed due to this alternative.

Environmental impacts are discussed in more detail in Section IV.

3. Implementability and Public Participation.

Throughout the evaluation of the alternatives, the public must be provided the opportunity to comment. With public input, it may become apparent that certain alternatives or sites may not be acceptable to the public which may be affected by the project.

The draft Project Plan was on display at the Township Hall 30 days prior to the Public Hearing on June 29, 2021. Public notice was made on May 27, 2021 in the Valley Farmer newspaper. Public input provided either by written comments or presented at the Public Hearing was considered during the review of the principal alternatives.

None of the alternatives require land purchase or other concerns with implementability.

4. Technical and Other Considerations.

- **System Reliability**

  The principal alternatives evaluated would meet the engineering principals and comply with the reliability requirements of the Michigan Safe Drinking Act, Act 399.

- **Residuals**

  The township does not generate any residuals treating its existing water supply and neither principal alternative will require residual disposal.

- **Industrial/Commercial/Institutional Usage**

  Water usage in the township is primarily residential. These users together utilize nearly 34% of the townships water supply.

- **Growth Capacity**

  The proposed alternatives meet the needed capacity for the year 2041.

- **Contamination at the Project Site**

  - A search for contaminated sites was conducted on the Michigan Department of Environmental Quality's website. The contaminated sites are those that are regulated under Part 201, Environmental Remediation, and under Part 213, Leaking Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). Results of the search are included in Appendix E. The search shows 10 locations, which will not impact construction activities.

III. SELECTED ALTERNATIVE

A. Description

Based on a review of the environmental evaluation and cost comparisons, the selected alternative is Alternative B1 – Main Replacement

Table 2 summarizes the capital costs for the selected alternative. The total project cost for the selected alternative is $4,705,000. Included in the estimate are costs for engineering, legal, administration, and bonding services required to complete the project through the DWSRF Program.

Table 4 summarizes the OM&R costs for the existing waterworks facilities and the projected costs for the selected alternative for the first year of full operation under a DWSRF Project. The townships current OM&R budget for 2021 totals $2,382,437. The overall OM&R costs for the selected alternative was assumed to increase by 3% to account for the 1-year timeframe before the proposed alternative would be under the first full year of operation.

The tentative schedule for design and construction of the selected alternative is presented in Table 6. It has construction starting in August 2022 and ending in May 2023.

No land will need to be acquired for any of the proposed improvements.

B. Watermain System Replacements

1. Capacity

The proposed water system improvements shown in Appendix L for the selected alternative were all sized to meet maximum day and peak hour demands and will supply the necessary water demands for the service area for the 20-year planning period. The Township is planning to continue replacing existing small diameter watermains with 8-inch and 12-inch mains in conjunction with road improvement projects in the future as funds are available.

The replacement watermain size of 8-inch and 12-inch was selected based on water system modeling completed in the townships Water Reliability Study, and the sizing was based on the minimum watermain size needed to meet the peak water system demands.

2. Land Development/Land Use.

There is no anticipated change in land use as a result of this project.

C. Monetary Cost Estimate

Table 3 shows an estimate of the overall capital costs for the selected alternative. The total estimated project cost for the selected alternative is $4,705,000. The project costs include a 15% construction contingency on the estimated construction costs. The estimated construction cost will be further defined once a preliminary engineering design is complete.

Table 5 also provides a summary of the estimated capital project cost, annual operation, maintenance and replacement cost and the estimated annual user costs for the year 2023 which would be the first full year of operation with the water system improvements. The estimated annual operation, maintenance and replacement costs are as detailed in Table 4 for the chosen Alternative.

A further breakdown of the total project cost in Table 2 is provided with the estimated DWSRF loan bonding amount.

Bangor township has an established water rate ordinance. The existing rate structure and water rate ordinance would be modified to fund the incurred debt under any future DWSRF loan financing.

Bangor township has established legal, institutional, technical, financial and managerial resources to implement the DWSRF project and loan bond financing.

D. Ability to Implement the Selected Alternative

The ability for Bangor Township to implement the selected alternative depends on the success of the township's application to the EGLE for a low interest loan to fund the project. As discussed previously, the township will be able to make principal and interest payments on the loan through the increased billing rates to customers. The township intends to utilize consultants to assist with project coordination, construction management and bidding.

IV. EVALUATION OF ENVIRONMENTAL IMPACTS

A. General

The potential beneficial and detrimental environmental impacts of the selected alternative are evaluated in this section of the project plan. The analysis of impacts is divided into direct, indirect, and cumulative impacts. Direct environmental impacts are those that are directly attributable to the construction and operation of the project. Indirect impacts are caused by the project but removed in time and/or distance and are often considered secondary in nature. Cumulative impacts increase in magnitude over time, or which result from individually minor but collectively significant actions.

1. Beneficial or Adverse Impacts.

Discussions of the full range of potential impacts i.e., direct, indirect, and cumulative must identify the nature of the impacts in terms of both beneficial and adverse impacts. The following section will describe the positive and negative impacts resulting from the proposed selected alternative with special emphasis on cultural or environmentally sensitive resources.

2. Short-Term and Long-Term Impacts.

The analysis of the environmental impacts also includes any irreversible commitments or use of irretrievable resources such as the commitment of construction materials, energy, and land to the proposed project. The analysis includes tradeoffs between short-term uses and the maintenance enhancement of long-term productivity and vice versa.

B. Analysis of Impacts

1. Direct Impacts

Direct impacts are the environmental impacts directly attributive to the construction and operation of the project. The township must consider impacts resulting from construction in areas which have not been previously disturbed.

The effects of the proposed project are considered for each of the following environmental factors:

- **Historic, Archaeological, Geological, Cultural, or Recreational Areas**

  The National Historic Preservation Act, as amended, mandates the protection of historic sites, buildings, structures, districts, and objects of national, state, regional, or local significance listed in the National Register of Historic Places and requires that the effect of a federally assisted project upon properties included in or eligible for inclusion in the National Register must be considered during project planning. There are no known historical Tribal areas within the proposed project area.

  There are no sites within the township that are listed on the National Register of Historic Places.

- **Climate**

  Bay County's latitude, longitude, and proximity to Lake Huron help to create the local climate. The climate is defined as "humid continental". This climatic term simply means moist air masses prevail aloft and greater fluctuations in daily and seasonal temperature are experienced due to the Township's interior continental position. It is

characterized by four distinct seasons and a relatively short summer. Summers are influenced by warm moist air masses from the Gulf of Mexico. In winter, cold, dry air masses cross the warmer Great Lakes and pick up moisture. This moisture can fall in the form of rain or “lake effect” snow. Bay County commonly experiences the lake effect phenomenon when winds form the northeast flows over Lake Huron

These climatic conditions give local agrarians about five months, or approximately 150 frost-free days a year. The Great Lakes provide a moderating effect on local temperatures, preventing early budding in the Spring and extending the growing season in autumn.

The average annual temperature is 56.7 degrees Fahrenheit. In winter, the average daily temperature dips down to 24.9 degrees F. In summer, the average daily temperature climbs to 69.8 degrees F. Average annual rainfall is 27.9 inches of which 16.37 inches, or 59 percent, usually falls between April and September, which is the growing season for most plants.

These climate conditions, specifically the winter conditions and design frost levels, would have equal design and construction impacts on all the principal alternatives and equally affect the length of construction seasons for all alternatives.

- **Air Quality**

  The Clean Air Act requires an analysis of whether air pollutant emissions will result from the construction or operation of a federally assisted project.

  Air quality within the service area complies with Federal Clean Air Act Standards for attainment for all air quality standards.

  The impacts in air quality from dust and emissions in the area due to typical construction operations would be temporary and similar for all principal alternatives.

- **Major Surface Waters**

  The major water system found in the service area is the Saginaw River that runs along the east boundary of the township and Lake Huron along the north. The selected alternative will have no impact on both.

- **Wetlands**

  A review of the mapping available from the US Fish and Wildlife indicated that the project does not impact any state or federally identified wetlands. This map is shown in Appendix F.

- **Coastal Zones**

  There are no coastal zones within the influence of this project.

- **Flood Plains**

  A review of the project by the EGLE Land and Management Division has been requested. The flood insurance rate maps for the township indicate that the project is located outside of the 100-year floodplain. The mains are located outside of the

floodplain and the proposed work does not include earth moving or ground disrupting activities. This floodplain is regulated under the Floodplain Regulatory Authority of Part 31, Water Resources, of the Natural Resources and Environmental Protection Act.

The Flood Insurance Rate Map (FIRM) are shown in Appendix G. The 100-year flood plain elevation along Lake Huron has been determined to be 585.0 feet NGVD29. The 100-year flood plain elevation along Saginaw River has been determined to be 585.0 feet NGVD29.

During design, an application for a joint permit with the EGLE and USACE (United States Army Corp of Engineers) will be submitted pursuant to state and federal rules and regulations for construction activities in the land/water interface. The selected alternative will have no impact on flood plains.

- **Natural, Wild or Scenic Rivers**

  The Wild and Scenic Rivers Act as amended by the Michigan Scenic Rivers Act of 1991, prohibits federal assistance to a project which will have a direct and adverse effect on the values for which a river segment listed in the National Wild and Scenic Rivers System or designated for study on the National Rivers Inventory was established.

  The Saginaw River is not listed on the National Wild and Scenic Rivers System website, administered by the National Park System, or on the Michigan Natural Rivers System found on the Michigan Department of Environmental Quality website.

- **Topography**

  Appendix B shows the existing topography from the USGS quadrangle map. The elevations in the township range from 585 to 600. The 100-year floodplain along the lake is at an elevation of 585 feet.

- **Geology**

  The regional geology for the area is based on a review of the Quaternary Geology of Michigan Map (W.R. Farrand, 1982), and the Bedrock Geology of Michigan Map (MDNR Geological Survey Division, 1987), are shown in Appendix H.

  The general geology of the township area is characterized by dune sand, lacustrine clay and silt, end moraines of fine-textured fill and lacustrine sand and gravel.

  Michigan, like much of this part of North America, was almost entirely at the bottom of a great inland sea. What is now Bay County was part of the sea bottom that was far from shore. Limestone, sandstone, and shale were produced during this period following the accumulation of organic material and chemical change. Gravel, clay, and sand were later deposited by glacial drift. This glacial activity also formed the Great Lakes and the Saginaw River Valley.

  The shore of the Saginaw Bay is about 580 feet above the level of the ocean. The coastline is relatively regular with many swampy areas and few indentations. One of the few slight indentations, or bays, is located at Tobico Marsh in Bangor Township.

- **Soils**

  Appendix I shows the general soil map from the Soil Survey of Bay County, Michigan prepared by the U.S. Department of Agriculture, Soil Conservation Service. The soils around the township are mainly sandy.

- **Groundwater**

  There are some private residential wells in the township.

- **Agricultural Resources**

  The project is in an urban area and will have no impact of farmland.

- **Threatened or Endangered Plant and Animal Species**

  Information provided by Michigan Natural Features Inventory, US EPA Endangered Species Protection Project and US Fish and Wildlife Service revealed the following species as endangered or threatened in Bangor Township:

  Endangered:

  Indiana Bat: *Myotis sodalist* (mammal)
  Piping Plover: *Charadrius melodus* (bird)

  Threatened:

  Northern Long-eared Bat: *Myotis septentrionalis* (mammal)
  Red Knot: *Calidrus canutus rufa* (bird)
  Eastern Massasauga: *Sistrurus catenatus* (reptile)
  Eastern Prairie Fringed Orchid: *Platanthera leucophaea* (flowering plant)

  More detailed information from the US Fish and Wildlife Service database is provided in Appendix I. Due to the nature of this project, and working within existing paved roads and lawn areas, the normal habitat for any of these species will not be affected.

- **National Natural Landmarks**

  The Historic Sites Act mandates the protection of national natural landmarks.

  A review of the National Natural Landmarks in Michigan revealed Tobico Marsh located within Tobico Marsh State Game Area, is a relatively undisturbed area with three distinct habitats: a wide expanse of open water, marshland, and a mixed hardwood forest. The site is used by large numbers of migrating waterfowl. It is an area of 1,019 acres and was designated in 1976 and is owned by the State of Michigan.

  Replacement of watermains in our selected alternative are not located near this area and will have no impact on Tobico Marsh.

- **Construction Activities**

  Typical machinery noise and airborne dust may result temporarily during construction of the selected alternative. However, because construction will be temporary, impacts are negligible.

2. Indirect Impacts

Indirect impacts are those caused by the proposed project but removed in time and/or distance. Indirect impacts are often secondary nature and are generally caused by residential and/or commercial development made possible by the project. The impact areas of this project are in fully developed areas, therefore, growth in the Township will not be affected.

There are no expected adverse impacts resulting from the selected Alternative.

3. Cumulative Impacts

There are no anticipated negative cumulative impacts which would increase in magnitude over time or result from individually minor but collectively significant actions of the project. There is no anticipated new infrastructure proposed along with the water system improvements such as sewer or improved road system projects in conjunction with the water system improvements.

The project is anticipated to solve ongoing maintenance concerns in the township. Replacing the aging watermains will remove many existing suspected lead water services, will remove lead joints in the system, and will reduce the number of watermain breaks in the system. This project will improve the safety and reliability of the water supply system.

V. MITIGATION

Structural and non-structural measures which avoid, eliminate, or mitigate adverse impacts on the environment need to be identified in the project plan. The cost of mitigation was considered in the cost-effective analysis and included in the unit costs and lump sum prices developed during the capital cost evaluation for the principal alternatives.

The structural measures involve the specific design and construction of the improvements while the non-structural measures involve regulatory, institutional, governmental or private plans, policies or regulations of the Township. Mitigation of short-term, long-term, and indirect impacts must be considered in the project plan.

A. Mitigation of Short-Term Impacts

- **Traffic and Safety Hazard Control**

  Road work is proposed as part of the selected alternative, so traffic control during construction will be necessary. Work can be limited to two streets at a time to limit the impact of construction to residents and traffic.

  Equipment operations safety is the responsibility of the Contractor, and they will be required to have trained persons performing all phases of the work. The Contractor will be required, by the project specifications, to hold regular safety meetings for their employees. Back up alarms on all equipment will be required. Contractor's employees must also be trained in hazard control and must have access to any permanent materials safety data sheets (MSDS) for any material they may use or may come in contact with.

- **Dust Control**

  Construction activities will result in increased dust in the vicinity of the construction site during the length of the proposed construction. Mitigation measures to minimize the negative effect of dust on residents and construction workers will be defined in the project specifications. It is anticipated dust control will be provided by the application of water and/or dust palliative during dry and dusty periods. The Contractor will be required to control dust in accordance with methods described in the project specifications.

- **Noise Control**

  Noise levels will increase during construction due to the excavation equipment used to complete the proposed water system improvements. Construction activities will only be allowed during the Township's approved hours to limit the adverse effect of noise to the residents/businesses near the construction area. Construction workers may be required to wear earplugs to minimize the effects of long-term noise during the construction operations.

- **Soil Erosion/Sedimentation Control**

  The Contractor will be required to obtain a soil erosion and sedimentation control permit from the local agency prior to the start of the work. It is anticipated that mitigation measures that may be utilized will include silt fence, straw bales, rip rap, geotextile fabric, etc. as appropriate. Mitigation and abatement measures will be detailed in both the plans and specifications for this site work and will be reviewed and approved by the MDEQ Land & Water Management Division prior to construction if necessary.

- **Restoration of Roads/Disturbed Areas**

  Roads and lawn areas will be restored following the construction of the watermain to match or improve the existing conditions. Road restoration will be limited if it is possible to construct the new watermain outside of the pavement limits.

B. Mitigation of Long-Term Impacts

There are no expected long-term impacts that will require mitigation for this project.

C. Mitigation of Indirect Impacts

There are no expected indirect impacts that will require mitigation for this project.

VI. PUBLIC PARTICIPATION

A public hearing on the alternatives was conducted on June 29, 2021 at Bangor Township Hall.

The hearing was advertised in the Valley Farmer, a weekly paper for the township area.

The public hearing notices and the proof of publication are included in Appendix K.

A public hearing was recorded, and a copy of the audio recording is included in a separate enclosure.

The public hearing included the discussion of the following:

- A description of the drinking water needs, and problems and the principal alternatives considered.
- A description of the selected alternative, including its capital costs and a cost breakdown by project components (e.g., supply, treatment, distribution, storage).
- A discussion of project financing and costs to users, including the proposed method of project financing and estimated monthly debt retirement; the proposed monthly charge to the typical residential customer; and any special fees that will be assessed.
- A description of the anticipated social and environmental impacts associated with the selected alternative and the measures that will be taken to mitigate adverse impacts.

The township did not receive any public written comments prior to the June 29, 2021 deadline for written comments to be submitted prior to final plan adoption. Changes/revisions were incorporated into the Final Plan to address these reviews.

There were no significant issues raised by the public that resulted in any changes to the alternatives evaluated and to the final selected alternative adopted by the township.

Discussion at the public hearing related to the need for the project and user costs.

A copy of the township's resolution adopting the project plan and to implement the selected alternative is enclosed in Appendix L.

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TABLE 1
BANGOR TOWNSHIP
DWSRF PROJECT PLAN
WATER USAGE TRENDS

Year	Average Day Demand (gpd)	Maximum Day Demand (gpd)	Average Day Demand (gpm)	Maximum Day Demand (gpm)	Peaking Factors	Estimated Population	Average per Capita Use (gpcd)
2017	894,575	1,162,948	621.23	807.60	1.3	14,247	62.8
2020	823,366	1,070,376	571.78	743.32	1.3	14,142	58.2
Averages	**858,971**	**1,116,662**	**597**	**775**	**1.3**	**14,195**	**60.5**

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TABLE 2
BANGOR TOWNSHIP
DWSRF PROJECT PLAN
OPINION OF PROBABLE COST

Item	Description	Unit	Qty.	Unit Price	Amount
1	~~W & E Birch Drive Completed~~	~~2,551~~	~~LFT~~	~~$ 180.96~~	$ -
2	Lynmar Lane	1,046	LFT	$ 210.00	$ 219,660.00
3	~~Smith Road Completed~~	~~405~~	~~LFT~~	~~$ 180.96~~	$ -
4	~~Spruce Ridge Drive Completed~~	~~481~~	~~LFT~~	~~$ 180.96~~	$ -
5	Ada Drive	967	LFT	$ 210.00	$ 203,070.00
7	Ferris Drive	603	LFT	$ 210.00	$ 126,630.00
8	Hushen Drive	1,307	LFT	$ 210.00	$ 274,470.00
9	4670 Wilder Road	260	LFT	$ 210.00	$ 54,600.00
10	Tews Lane	1,396	LFT	$ 210.00	$ 293,160.00
11	N Wenona Avenue	472	LFT	$ 210.00	$ 99,120.00
12	Richardson Drive	1,250	LFT	$ 210.00	$ 262,500.00
13	~~Morningside Drive Completed~~	~~1,276~~	~~LFT~~	~~$ 180.96~~	$ -
14	Engelhardt Drive	984	LFT	$ 210.00	$ 206,640.00
15	N Columbia Street	872	LFT	$ 210.00	$ 183,120.00
16	Shriwinjo Drive	375	LFT	$ 210.00	$ 78,750.00
17	Gies & W. Jenny Street	52	LFT	$ 210.00	$ 10,920.00
18	Gies & W. White Street	45	LFT	$ 210.00	$ 9,450.00
19	State Park Route	5,815	LFT	$ 248.39	$ 1,444,410.00
20	Kawkawlin River Crossing Looping	595	LFT	$ 500.00	$ 297,500.00
				Estimated Budget	**$ 3,764,000.00**

Construction	**$ 3,764,000.00**
Engineering Fees (15%)	**$ 564,600.00**
Consturction Contingencies (10%)	**$ 376,400.00**
Total Project Cost:	**$ 4,705,000.00**

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TABLE 3
BANGOR TOWNSHIP
DWSRF PROJECT PLAN

SELECTED ALTERNATIVE B1 - Main Replacement
CAPITAL COSTS

Item		Amount
1. Watermain Replacement		$3,764,000
	Subtotal	**$3,764,000**
	Engineering (15%):	$564,600
	Construction Contingencies (10%):	$376,400
	Total Project Cost:	**$4,705,000**

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TABLE 4
BANGOR TOWNSHIP
DWSRF PROJECT PLAN
2021 OPERATION, MAINTENANCE & REPLACEMENT BUDGET

Item		FY 2021		Selected Alternatives for 2023 Budget (Assumed 3% Annual Increase over 2021 Budget)
Water System Operation:				
Utilities	$	8,050	$	8,540
Repairs/Maintenance	$	73,500	$	77,976
Water & Transmission Cost	$	1,513,114	$	1,605,263
Sewer Fund Reimbursement	$	119,000	$	126,247
Utility Administration:				
Wages, Benefits	$	481,423	$	510,742
Office Supplies/Printing	$	2,400	$	2,546
Miss Dig/Lease Payments/Bank Service Charges	$	6,900	$	7,320
Professional Services/Analytical	$	93,500	$	99,194
Insurance/Bonding	$	11,200	$	11,882
Reporting	$	1,500	$	1,591
Expense Allocation	$	43,850	$	46,520
Depreciation	$	28,000	$	29,705
TOTAL OM& R COSTS:	**$**	**2,382,437**	**$**	**2,527,527**

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TABLE 5
BANGOR TOWNSHIP
DWRF PROJECT PLAN
PROJECT AND USER COSTS
SELECTED ALTERNATIVE

Total Project Costs		$4,705,000
Annual OM&R Costs		$2,385,437
Estimated DWRF Bonding		$4,705,000
Estimated Annual Bond Payment[1]		$213,706
Estimated Annual Increase for OM&R for 2023		$145,090
Total Estimated Additional Annual Revenue Required		$358,796
Additional Revenue Required Per meter Per Year to Fund DWRF Bonds[1] and additional OM&R for 2023	($41.97 for Bond, $28.50 for OM&R)	$70.47

Current Rates:	(as of 2020)	
	$12.35/meter quarterly Readiness-To-Serve (RTS)=	$49.40/yr
	$5.33/meter per CCF Commodity Charge @ 20 CCF = $106.60/quarter =	$426.40/yr
	Total Current Annual Rate per meter	$475.80/yr

Average Yearly rate per meter with DWSRF Bonding: $475.80 + $41.97 = $517.77/yr

[1]Based on 30-yr, 2.125 % loan, 5,092 meters, no capitalized interest

F&V has estimated these rates based on available information using basic financial calculations, however we are not a Municipal Financial Advisor. We recommend the Township consult with an MFA to confirm and refine these rates if the Township elects to proceed with the Grant/Loan.

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TABLE 6
BANGOR TOWNSHIP
DWSRF PROJECT PLAN
PROJECT SCHEDULE

Task	Completion Date
Submit Final Project Plan to MDEQ	07/01/2021
Part I and Part II of DWRF Application Due	02/15/2022
FNSI Clearance	03/09/2022
Design Plans/Specifications	
User Charge System Approved	
Bid Advertisement Published No Later Than	03/09/2022
Part III of DWRF Application Due	04/15/2022
Bid Data Submittal (w/ tentative contract award)	
EGLE Order of Approval Issued	05/16/2022
Pre-Closing w/ MFA	05/27/2022
MFA Closing	06/06/2022
Award Contract/Begin Construction	08/05/2022
Complete Construction	05/30/2023

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BANGOR TOWNSHIP
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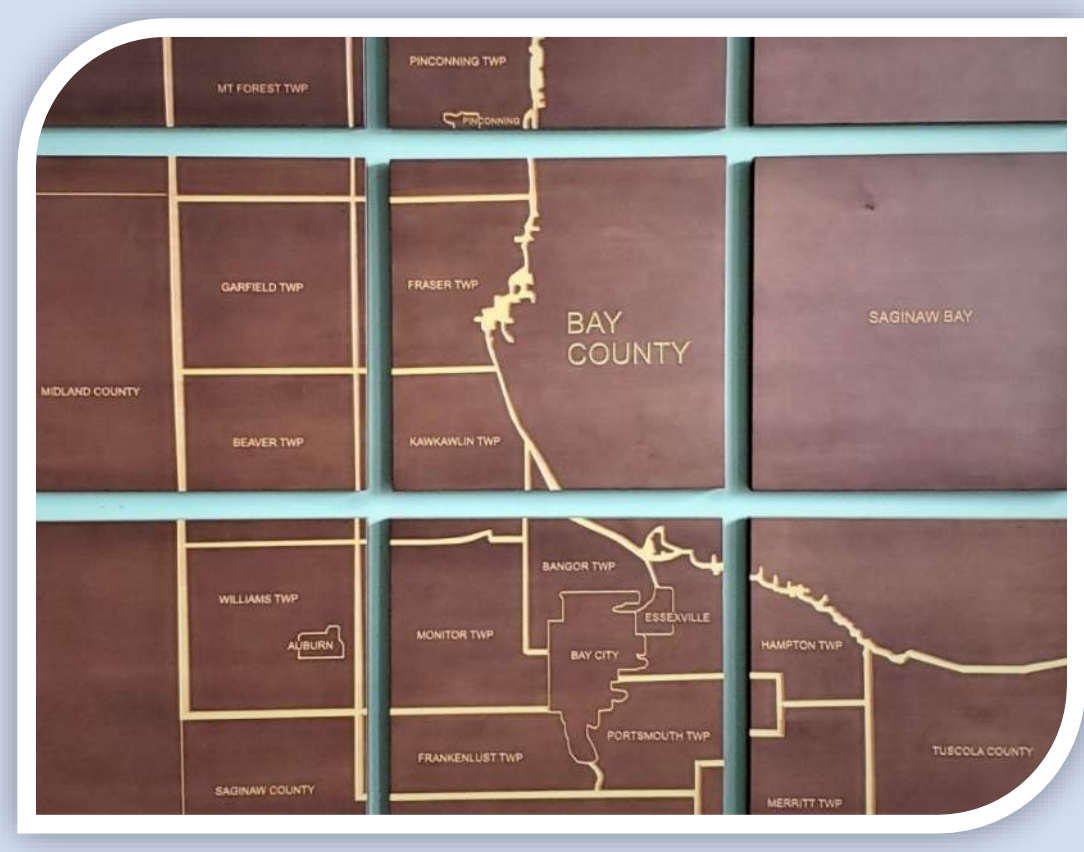
Appendix A

Water Quality Report

Bay Area Water System
2020 Water Quality Report

Serving the People of:

- Akron Township
- Bangor Township
- Bangor-Monitor Association
- Beaver Road Association
- Beaver Township
- City of Bay City
- City of Essexville
- City of Pinconning
- Frankenlust Township
- Fraser Township
- Hampton Township
- Kawkawlin Metro
- Kawkawlin Township
- Merritt Township
- Monitor Township
- Pinconning Township
- Portsmouth Township
- Williams Township
- Wisner Township



What's in This Report

Safe Drinking Water - Our Most Important Goal

Delivering safe drinking water to nearly 100,000 customers who rely upon us every day is the number one goal of the distribution system workers, plant operators, maintenance personnel, and supervisors throughout the Bay Area Water System and at the Bay Area Water Treatment Plant.

This Annual Water Quality Report will be of interest to you if you consume drinking water from the public water supply in our service area. It contains water quality data from the Bay Area Water Treatment Plant, along with results from the distribution system for calendar year 2020, unless stated otherwise. This information is a snapshot of the quality of the water that we provided to you in 2020. Included are details about where your water comes from, what it contains, and how it compares to United States Environmental Protection Agency (U.S. EPA) and state standards.

Is Your Water Safe?

The State of Michigan and the U.S. Environmental Protection Agency require us to test our water on a regular basis to ensure its safety. **We are proud to state that we met all the monitoring and reporting requirements for 2020.**

In order to ensure that tap water is safe to drink, the U.S. EPA prescribes regulations that limit the levels of certain contaminants in water provided by public water systems. Federal Food and Drug Administration regulations establish limits for contaminants in bottled water, which provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the U.S. EPA's Safe Drinking Water Hotline (800-426-4791).

Source Water

The source of drinking water (both tap water and bottled water) includes rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- **Microbial** contaminants, such as viruses and bacteria which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- **Inorganic** contaminants, such as salts and metals, which can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- **Pesticides** and **herbicides**, which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- **Organic** chemical contaminants, including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, and septic systems.
- **Radioactive** contaminants, which can be naturally-occurring or be the result of oil and gas production and mining activities.

Source Water Assessment

The quality of tap water depends greatly on its source. Fortunately for us, we start with high quality raw water purchased and supplied by the Saginaw-Midland Municipal Water Supply Corporation (jointly owned by the cities of Saginaw and Midland). SMMWSC's intake is located near Whitestone Point, a location selected in the 1940s after an engineering study showed that water at this location was typical of deep Lake Huron currents. Raw water travels approximately 50 miles from their facility near AuGres to the Bay Area Water Treatment Plant for processing.

EGLE (Michigan Department of Environment, Great Lakes, and Energy) previously completed Source Water Assessments of all 59 public water supplies in Michigan that draw drinking water from surface water sources such as rivers, lakes, and impoundments. The State used a seven-tiered susceptibility rating scale from "very low" to "very high" based primarily on geologic sensitivity, water chemistry, and contaminant sources. The EGLE Source Water Assessment report determined that the susceptibility of the Saginaw-Midland source raw water was rated "**Moderately Low**." This rating is the best a surface water source can achieve.

Anyone interested in seeing the source water assessment for water being used at the BAWTP can call the plant at (989) 439-7245. Additional information about the EGLE Source Water Assessment program can be viewed on the internet at **http://www.michigan.gov/egle/** . Follow the link to Water, then to Drinking Water, and finally to Source Water Assessment.

Water Quality Data Tables

The data presented in the upcoming tables are from testing done in 2020, unless otherwise noted. In the first table you will find terms, abbreviations, and definitions that might not be familiar to you.

DEFINITIONS OF ABBREVIATED SYMBOLS		
Symbol	**Abbreviation for**	**Definition/Explanation**
AL	Action Level	The concentration of a contaminant, which, if exceeded, triggers treatment or other requirements that a water system must follow.
LRAA	Locational Running Annual Average	The average of sample results taken at a particular monitoring location during the previous four calendar quarters, calculated quarterly.
MCL	Maximum Contaminant Level	The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.
MCLG	Maximum Contaminant Level Goal	The level of contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
MRDL	Maximum Residual Disinfectant Level	The highest level of disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum Residual Disinfectant Level Goal	The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
NA/ND	Not Applicable/Not Detected	
NTU	Nephelometric Turbidity Units	A measurement of the lack of clarity in water, or cloudiness of the water.
PPB	Parts Per Billion	The PPB is equivalent to micrograms per liter, or ug/L.
PPM	Parts Per Million	The PPM is equivalent to milligrams per liter, or mg/L.
RAA	Running Annual Average	The average of sample results during the previous four calendar quarters, calculated quarterly.
TT	Treatment Technique	A required process intended to reduce the level of a contaminant in drinking water.

REGULATED PARAMETERS AT THE BAY AREA WATER TREATMENT PLANT TAP

Contaminants	MCL	MCLG	Result	Violation?	Typical Source
Fluoride (ppm) (a)	4	4	0.70	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories.
Barium (ppm) (b)	2	2	0.01	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits.
Sodium (ppm) (c)	NA	NA	5.5	No	Erosion of natural deposits.

a) Level reported from annual regulatory sampling. The plant also performs daily sampling. Results for 2020 averaged 0.77 PPM, with a range of 0.18 PPM - 0.86 PPM.

b) Testing for this substance is conducted every nine years. Last test date 2017.

c) Sodium is not a regulated contaminant.

REGULATED PARAMETERS AT BAY AREA WATER TREATMENT PLANT FILTER EFFLUENT

	MCL	MCLG	Average	Range	Violation	Typical Source
Turbidity	TT(d)	0	0.022 NTU	0.020-0.218 NTU	None	Soil runoff.

d) The treatment technique requires that all samples test below 1 NTU 100% all of the time and below 0.3 NTU 95% of the time in the month. 100% of samples in 2020 were below 0.3NTU, indicating full compliance with turbidity standards in 2020.

REGULATED PARAMETERS IN THE DISTRIBUTION SYSTEM

Disinfectant & Disinfection By-Products

Substance	MRDL	MRDLG	Highest RAA	Range	Violation	Typical Source
Free Chlorine (as Cl2) (PPM)	4	4	0.66	0.01-1.25	No	Water additive used to control microbes.

Total Trihalomethanes (TTHM) & Haloacetic Acid (HAA5)

Typical Source: Byproduct of drinking water disinfection

TTHM MCL = 80 ppb HAA5 MCL = 60 ppb	Akron Twp.(e)	Bangor Twp.	Bangor Monitor	City of Bay City	Bay County Supply #1(f)	Beaver Rd. Assoc.	Beaver Twp.	City of Essexville	Fraser Twp.	Hampton Twp.	Kawkawlin Metro	Kawkawlin Twp.	Merritt Twp.	Monitor Twp.	City of Pinconning	Pinconning Twp.	Portsmouth Twp.	Williams Twp.	Wisner Twp.
Highest TTHM LRAA	**71**	**34**	**25**	**30**	**45**	**57**	**55**	**24**	**44**	**44**	**43**	**44**	**50**	**37**	**39**	**61**	**56**	**49**	**50**
Low	71	17	14	15	25	34	34	16	24	16	28	25	29	18	19	40	37	30	24
High	71	49	35	40	70	75	79	32	68	56	54	56	72	55	59	89	74	81	79
Violation?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Highest HAA5 LRAA	**33**	**25**	**25**	**29**	**28**	**28**	**28**	**23**	**33**	**26**	**30**	**29**	**27**	**28**	**31**	**31**	**28**	**26**	**26**
Low	33	13	16	11	18	15	24	16	20	17	23	20	24	23	16	24	25	23	22
High	33	39	38	40	38	36	32	29	48	42	39	36	30	38	56	42	32	29	33
Violation?	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No

e) Akron Township was only required to collect one TTHM and HAA sample in 2020.

f) Bay County Supply #1 includes parts of Frankenlust, Monitor, and Portsmouth Townships

In 2020, water from the plant tap and distribution system was sampled for an additional 70+ contaminants not listed in this report. Each contaminant was not detected in our water. To receive a list of these contaminants, please send requests to bawtp@baycodws.org, or call us at (989) 439-7245.

Lead & Copper

Lead and copper are not naturally present in our water, and they are not detected in the tap water leaving the plant. However, as long as there are lead services and lead containing fixtures in our water system, there will be traces of lead detected during testing at locations in the distribution system. In an effort to keep lead levels low, the water plant feeds phosphoric acid, a corrosion inhibitor. This forms a protective coating on service lines and plumbing that keeps water from dissolving some metals into the drinking water.

REGULATED PARAMETERS IN THE DISTRIBUTION SYSTEM							
LEAD AND COPPER RESULTS							
		LEAD, Action Level 15, MCLG 0			COPPER, Action Level 1.3, MCLG 1.3		
Your Community	Date Range/Year Sampled	Your Water (PPB) (g)	Range of Results	Number of Samples Above AL	Your Water (PPM) (g)	Range of Results	Number of Samples Above AL
Akron Twp.	June-Sept 2020	0	0-0	0	0.2	0.1-0.3	0
Bangor Twp.	June-Sept 2020	1	0-9	0	0.2	0.0-0.2	0
Bangor Monitor	June-Sept 2020	0	0-0	0	0.2	0.0-0.2	0
City of Bay City	June-Sept 2020	3	0-13	0	0.2	0.0-0.3	0
Bay County Supply #1	June-Sept 2020	4	0-8	0	0.2	0.0-0.2	0
Beaver Rd. Assoc.	June-Sept 2020	0	0-0	0	0.2	0.1-0.2	0
Beaver Twp.	June-Sept 2020	0	0-2	0	0.2	0.1-0.3	0
City of Essexville	Jan-June 2020	14	0-22	2	0.4	0.0-0.4	0
	July-Dec 2020	8	0-22	2	0.2	0.0-0.3	0
Fraser Twp.	June-Sept 2020	0	0-0	0	0.2	0.0-0.3	0
Hampton Twp.	Jan-June 2020	3	0-8	0	0.2	0.0-0.3	0
	July-Dec 2020	1	0-21	1	0.2	0.0-0.3	0
Kawkawlin Metro.	June-Sept 2020	0	0-0	0	0.2	0.0-0.2	0
Kawkawlin Twp.	June-Sept 2020	0	0-0	0	0.2	0.1-0.3	0
Merritt Twp.	June-Sept 2020	0	0-2	0	0.3	0.1-0.4	0
Monitor Twp.	June-Sept 2020	0	0-0	0	0.2	0.1-0.2	0
City of Pinconning	June-Sept 2020	0	0-2	0	0.1	0.0-0.1	0
Pinconning Twp.	June-Sept 2020	0	0-1	0	0.2	0.0-0.3	0
Portsmouth Twp.	June-Sept 2020	0	0-4	0	0.2	0.1-0.3	0
Williams Twp.	June-Sept 2020	0	0-0	0	0.2	0.0-0.2	0
Wisner Twp.	June-Sept 2020	0	0-0	0	0.2	0.1-0.2	0

g) Ninety (90) percent of the samples collected were at or below the level reported for our water.

Typical source contaminants are erosion of natural deposits or corrosion of household piping or plumbing fixtures containing lead and copper. Homes with lead service lines and lead solder used in household plumbing and fixtures have a greater risk of high lead levels.

Lead & Copper(continued)

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The Bay Area Water System is responsible for providing high quality drinking water but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you have a lead service line it is recommended that you run your water for at least 5 minutes to flush water from both your home plumbing and the lead service line. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline at 1-800-426-4791 or at **http://www.epa.gov/safewater/lead**.

Infants and children who drink water containing lead could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.

Additional Monitoring

Unregulated contaminants are those for which the EPA has not established drinking water standards. Monitoring helps the EPA to determine where certain contaminants occur and whether regulation of those contaminants is needed.

UNREGULATED CONTAMINANT MONITORING IN THE BANGOR TWP. DISTRIBUTION SYSTEM				
Unregulated Contaminant Name	**Average Level Detected**	**Range**	**Year Sampled**	**Comments**
Bromochloroacetic acid (ppb)	1.4	0-2.8	2020	Results of monitoring are available upon request. Please email bawtp@baycodws.org.
Bromodichloroacetic acid (ppb)	1.9	0.8-3.0	2020	
Chlorodibromoacetic acid (ppb)	0.4	0.3-0.6	2020	
Dibromoacetic acid (ppb)	0.2	0-0.4	2020	
Dichloroacetic acid (ppb)	5.6	1.1-10.1	2020	
Trichloroactic acid (ppb)	7.5	3.2-11.8	2020	

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Water Drinking Hotline (800) 426-4791.

The Bay Area Water Treatment Plant Laboratory

The Bay Area Water Treatment Plant takes raw water, filters and treats it, and pumps it into the distribution system. What may surprise people is that the plant is also home to a bacteriological and chemical laboratory. Every year, plant staff analyzes over 1,600 water samples for E.coli and Coliform Bacteria. Samples are collected throughout our distribution system and from the plant tap.

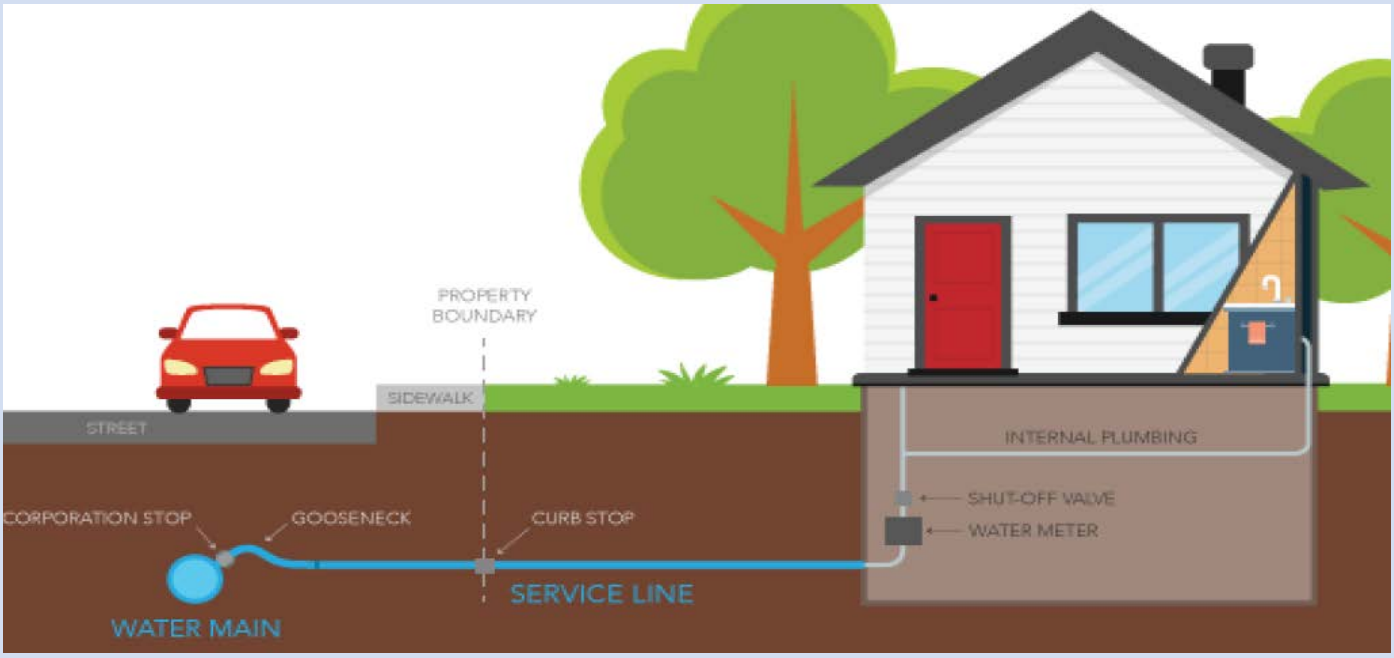
Testing for bacteria throughout our system is important. Finding Coliform Bacteria in water indicates that it may have been contaminated. Because of this, the lab is required to be certified by the State of Michigan to run these tests. Certification requires regular thorough inspections and proficiency testing to ensure accuracy.

Along with bacteriological testing, the lab is capable of analyzing samples for a variety of other substances/water quality indicators. These include chlorine, turbidity (cloudiness of the water), pH, hardness, alkalinity, calcium, sulfate, iron, chloride, conductivity, dissolved oxygen, and orthophosphate. The table below shows the yearly averages for a good number of these.

BAWTP LABORATORY; LAB STAFF ANALYZING SAMPLES

WATER QUALITY TEST RESULTS FROM THE BAY AREA WATER PLANT TAP			
Testing Done	**Average**	**Range**	**Definition of Substance**
pH	7.6	7.4-7.8	A measure of acidity and alkalinity.
Hardness (as CaCO3) (ppm)	103	70-116	A measure of the total concentration of calcium and magnesium ions.
Alkalinity (as CaCO3) (ppm)	77	65-90	A measure of the capacity of water to neutralize an acid.
Calcium (as CaCO3) (ppm)	74	64-88	Inorganic substances often found in water.
Sulfates (ppm)	10	7-16	
Chloride (ppm)	10	8-15	
Conductivity (uS/cm)	235	210-277	A measure of the ability to carry an electrical current
Orthophosphate-PO_4 (ppm)	3.40	3.35-3.54	Corrosion inhibitor added to water to prevent corrosion of plumbing materials

Service Lines



A service line is the pipe that connects a house or business to a water main. The city or township that supplies the water owns the line from the water main to a water shutoff valve called a curb stop, and the homeowner owns the section of service line between the curb stop and the house.

This chart shows the communities in the Bay Area Water System. A service line is listed as a lead service if **any** part of the line is lead.

The communities that have lead services are working hard to remove them. In 2020, Bay City replaced 503 lead services, while Essexville replaced 51 and Hampton replaced 5.

If a community is not absolutely certain what every section of the service is made of, it is listed as an 'unknown service line.' A full inventory of the service lines in our system is currently being performed and is expected to be completed by 2025.

Service Line Numbers			
Community	Total Service Lines	Known Lead Service Lines	Unknown Service Lines
Akron Township	91	0	0
Bangor Township	5,260	7	1,400
Bangor-Monitor Metropolitan Water District	1,392	0	92
City of Bay City	29,082	5,578	2,712
Bay Co. Supply #1 (Frankenlust, Monitor, & Portsmouth Twps.)	3,527	10	462
Beaver Rd. Water Association	284	0	0
Beaver Township	452	0	0
City of Essexville	1,605	332	68
Fraser Township	513	0	0
Hampton Township	2,987	6	2,753
Kawkawlin Metro	428	0	380
Kawkawlin Township	1,273	0	0
Merritt Township	567	0	0
Monitor Township	2,192	0	0
City of Pinconning	661	0	553
Pinconning Township	594	0	0
Portsmouth Township	222	0	0
Williams Township	2,078	0	0
Wisner Township	241	0	0

2020 System Improvements

New 500,000 gallon storage tank at Williams Township Pump Station

10 Million Gallon Raw Tank at BAWTP Cleaned & Inspected

Bay City Staff checking material of service for Distribution Service Inventory

New Finished Water Pump Installed at Plant

Opportunities for Public Participation

We believe that informed and involved citizens can be strong allies of water systems as they take action on pressing problems. The table below lists the meeting dates and locations where your elected officials may discuss water system issues.

Water Supplier	Board Meeting Monthly Schedule	Time	Location of Meeting
Akron Twp.	3rd Thursday	7:00 pm	Township Hall, 4280 Bay City Forestville Rd.
Bangor Twp.	2nd Tuesday	6:00 pm	Township Admin. Office, 180 State Park Dr.
Bangor-Monitor Assoc.	2nd Wednesday	9:00 am	Bangor-Monitor, 2523 E. Midland Rd.
Beaver Twp.	2nd Monday (typically)	6:30 pm	Township Hall, 1850 S. Garfield Rd.
Bay County Road Comm/DWS	1st & 3rd Wednesday (typically)	9:00 am	Road Commission, 2600 E. Beaver Rd.
City of Bay City	1st & 3rd Monday	6:30 pm	City Hall, 301 Washington Ave.
City of Essexville	2nd Tuesday	7:00 pm	City Hall, 1107 Woodside Ave.
City of Pinconning	3rd Monday	5:00 pm	City Hall, 208 S. Manitou St.
Frankenlust Twp.	2nd Tuesday	4:00 pm	Township Hall, 2401 Delta Rd.
Fraser Twp.	2nd Monday	7:00 pm	Township Hall, 1474 N. Mackinaw Rd.
Hampton Twp.	2nd & 4th Monday	7:00 pm	Township Hall, 801 W. Center Rd.
Kawkawlin Metro Assoc.	1st Tuesday	7:00 pm	405 Old Beaver Road
Kawkawlin Twp.	2nd Monday	7:00 pm	Township Administrative Bldg, 1836 E. Parish Rd
Merritt Twp.	2nd Tuesday	7:30 pm	Township Hall, 48 E. Munger Rd.
Monitor Twp.	4th Monday (typically)	7:00 pm	Township Hall, 2483 Midland Rd.
Pinconning Twp.	2nd Tuesday	4:00 pm	Township Hall, 1751 E. Cody Estey Rd
Portsmouth Twp.	3rd Monday	6:00 pm	Township Hall, 1711 W. Cass Ave.
Williams Twp.	2nd Tuesday	7:00 pm	Township Hall, 1080 W. Midland Rd.
Wisner Twp.	3rd Monday	7:00 pm	Township Hall, 7894 Bay City Forestville Rd.

For more information please contact:

Contact Name: Ryan W. Goebel, Plant Superintendent
Bay Area Water Treatment Plant
Address: 2701 N. Euclid Avenue
Bay City, MI 48706
Phone: (989)439-7245

Customer questions and comments are welcome

To receive a hard copy of this report, or to ask questions, please write, call, or send email to:

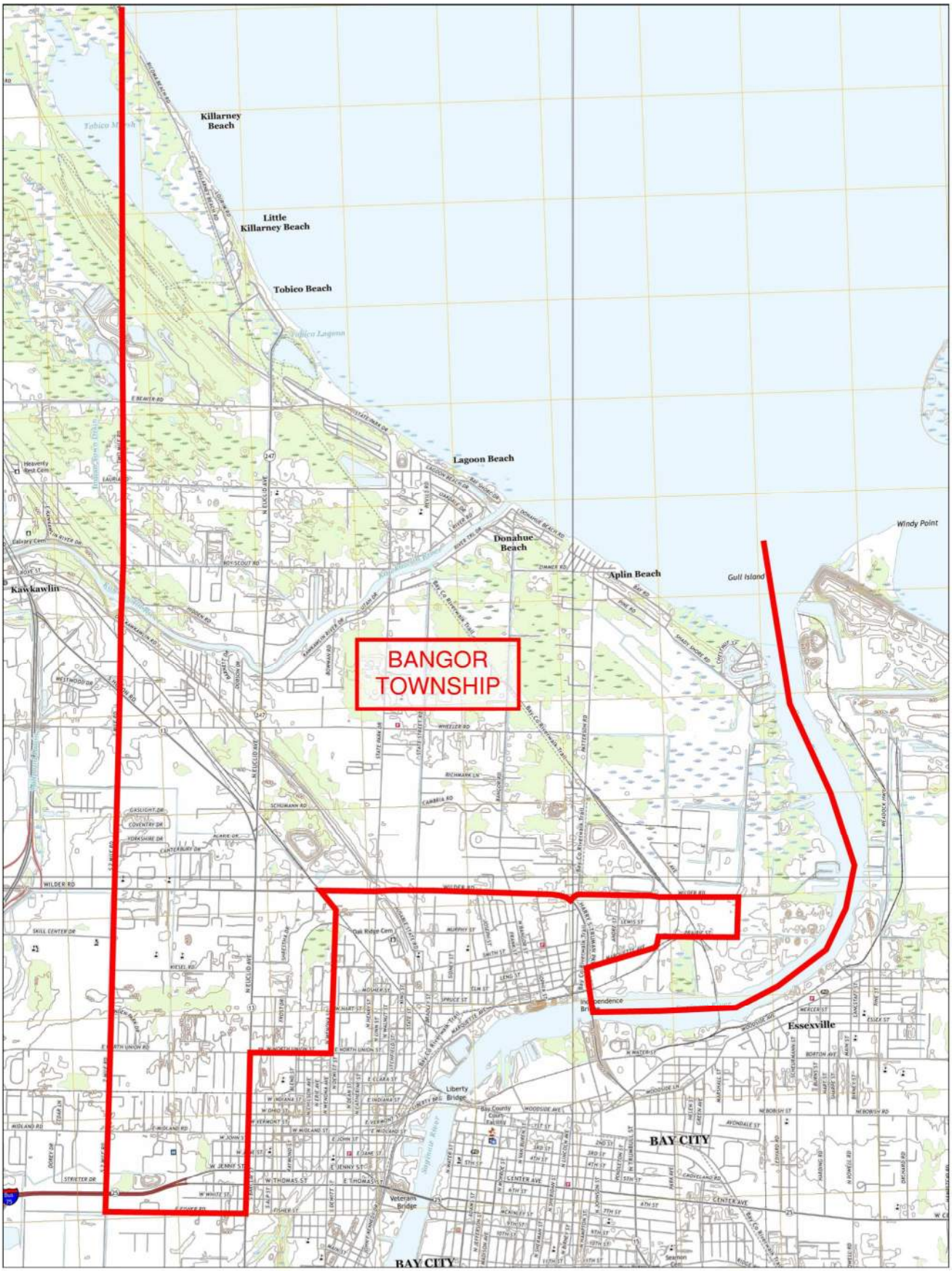
E-mail: bawtp@baycodws.org

This entire water quality report is also available on the
Web site: **www.baycodws.org/ccr2020.pdf**

Appendix B

USGS Map

BANGOR TOWNSHIP
USGS MAP

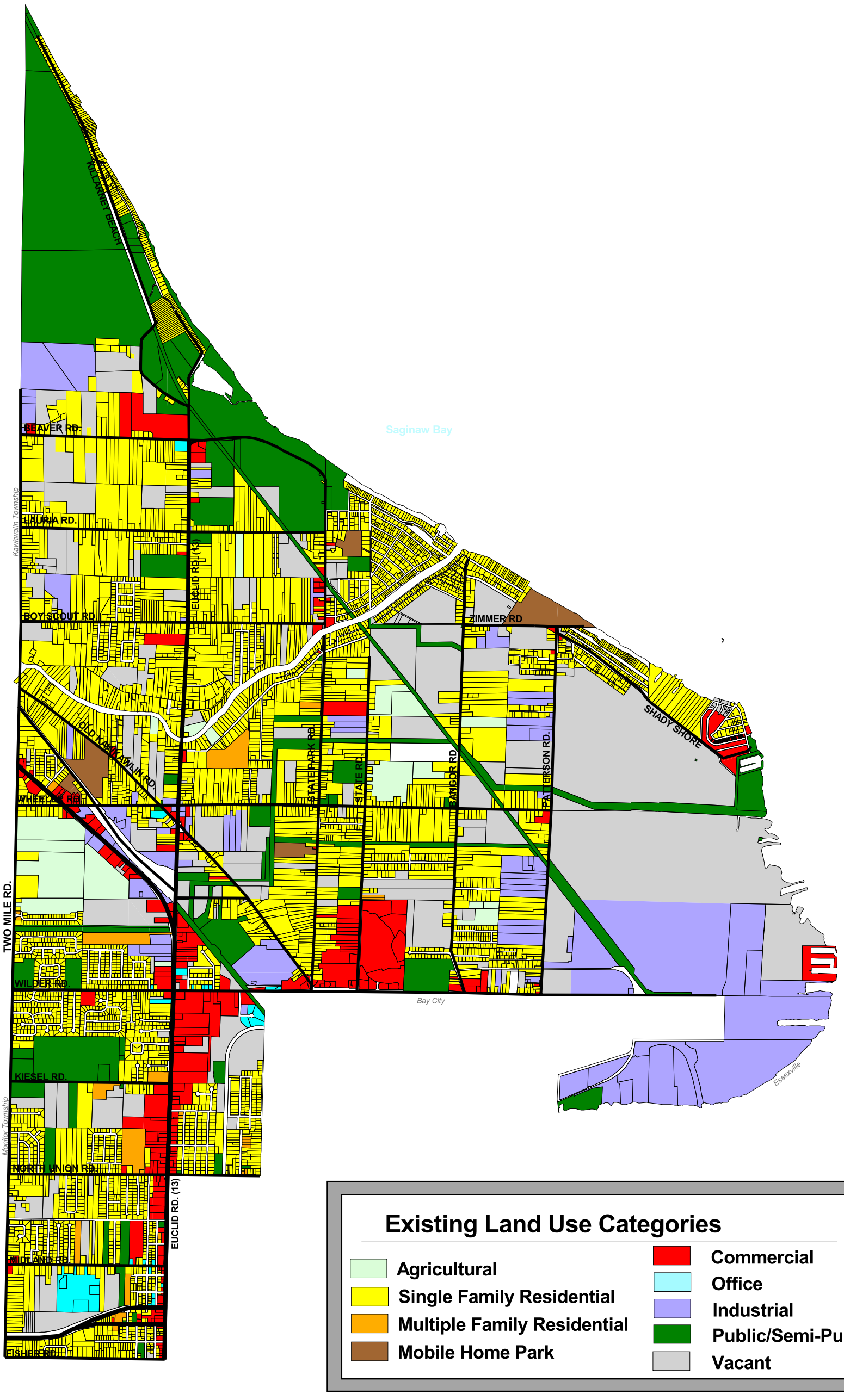


Appendix C

- Existing Land Use Map
- Zoning Map

McKenna ASSOCIATES, INC.
COMMUNITY PLANNING • URBAN DESIGN

Bangor Township, Bay County, Michigan



Existing Land Use Categories

- Agricultural
- Single Family Residential
- Multiple Family Residential
- Mobile Home Park
- Commercial
- Office
- Industrial
- Public/Semi-Public
- Vacant

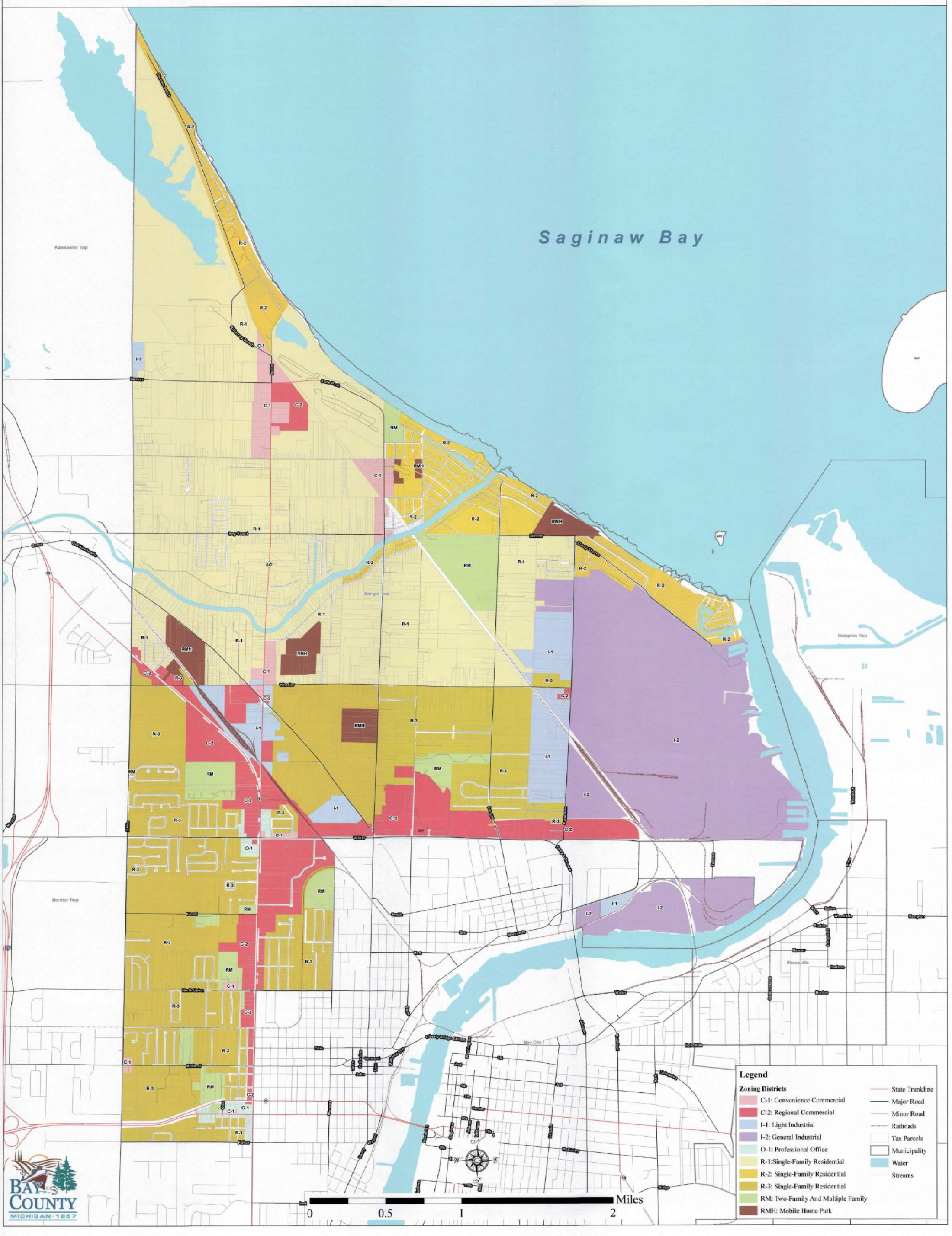
Basemap Source: Bangor Township, Bay County, MI
Data Source: McKenna Associates, Inc. 2/27/2001

Existing Land Use

0 Ft. 3000 Ft. 6000 Ft.

9/2001

BANGOR TOWNSHIP, MICHIGAN

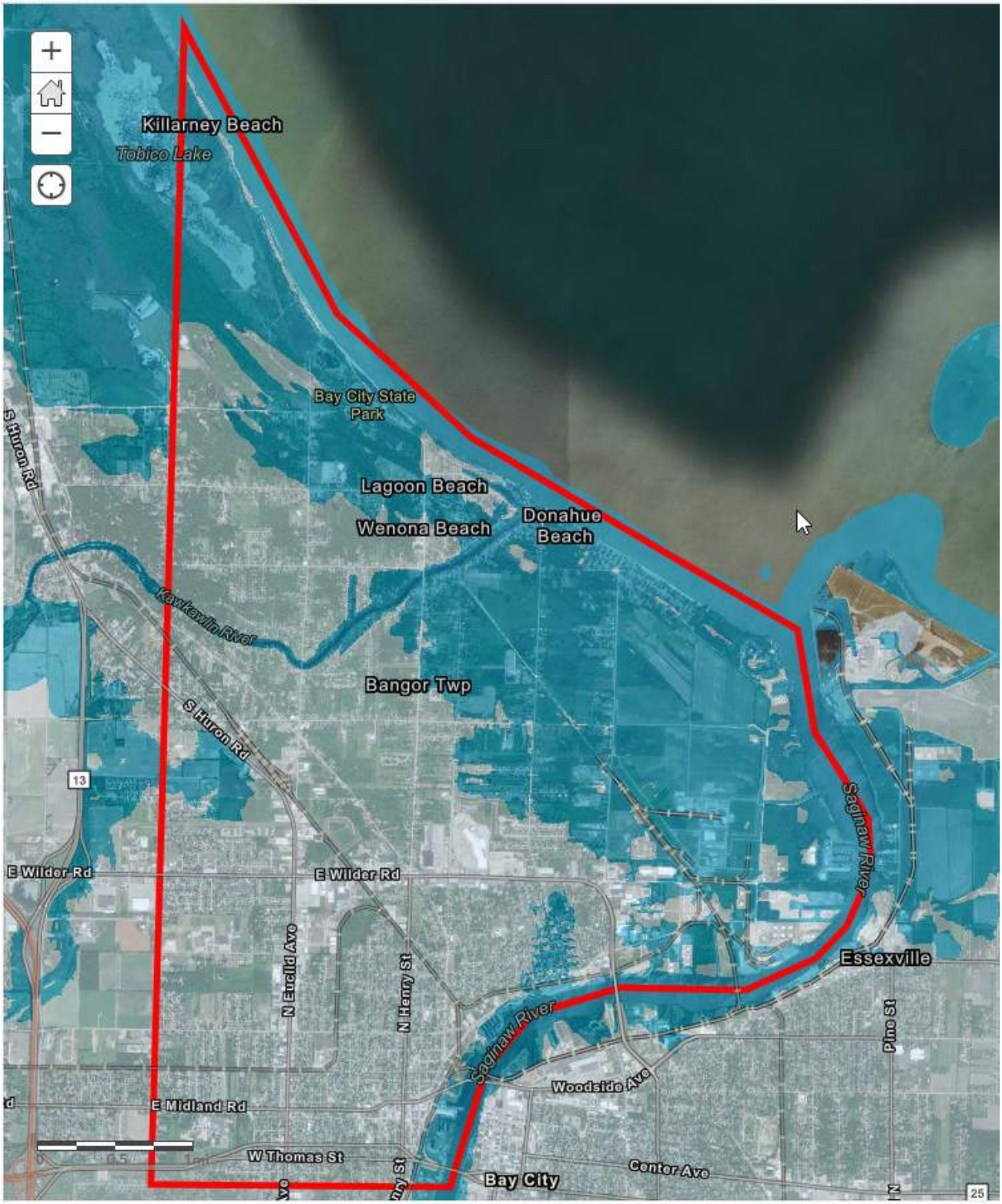


ZONING MAP

Appendix D

FEMA 100 year Flood Zone Map

FEMA 100 Year Flood Zone
Bangor Township, Bay County, Michigan



FEMA 100 year Flood Zones

100 Year Flood Zones

Appendix E

Contaminated Site Locations

Bangor Township List of Contaminated Sites

Location ID	Facility ID	Facility Name	LUST Name	Regulatory Program	Full Address	City	Township	County	Risk Condition	Release Status	Latitude	Longitude
4556	9000350	Euclid Ave. 300 S., Bay City		201	300 South Euclid Avenue, Bay City, MI, 48706	Bay City	Bangor	Bay	Risks Present and Immediate		43.5999	-83.915655
39800	35173	Texan Family Restaurant	Texan Restaurant - Bay City	213	101 N EUCLID AVE, BAY CITY, MI, 48706	BAY CITY	Bangor	Bay	Risks Not Determined	Closed	43.60222	-83.91543
39814	9000395	902 North Euclid Avenue		201	902 North Euclid, Bay City, MI, 48706	Bay City	Bangor	Bay	Risks Present but Not Immediate		43.61201	-83.914184
44441	12187	Admiral PetroleumII LLC #5832	Clark #769	213	212 S EUCLID AVE, BAY CITY, MI, 48706	BAY CITY	Bangor	Bay	Risks Not Determined	Open	43.60022	-83.915501
47099	12222	Mos Petroleum & Mart LLC	Pantall Gallup LLC	213	3895 Wilder Rd, Bay City, MI, 48706	Bay City	Bangor	Bay	Risks Present but Not Immediate	Open	43.62426	-83.898683
69981	9000457	3300 Wheeler Road		201	3300 Wheeler Road, Bay City, MI, 48706	Bay City	Bangor	Bay	Risks Not Determined		43.63782	-83.920943
69989	9000465	3815 South Huron Road		201	3815 South Huron Road, Bay City, MI, 48706	Bay City	Bangor	Bay	Risks Not Determined		43.63045	-83.915036
79328	9000512	3720 South Huron Road		201	3720 South Huron, Bay City, MI, 48706	Bay City	Bangor	Bay	Risks Not Determined		43.63321	-83.918604
69954	9000430	1645 Marquette Avenue		201	1645 Marquette Avenue, MI, 48706		Bangor	Bay	Risks Not Determined		43.61738	-83.871046
82331	9000521	3723, 3727, 3731 Wilder, Bay City		201	3723, 3727, & 3731 Wilder, MI, 48706		Bangor	Bay	Risks Not Determined		43.62466	-83.90535

Source: DEQ Web site for contaminated sites: https://www.egle.state.mi.us/RIDE/

FLEIS&VANDENBRINK
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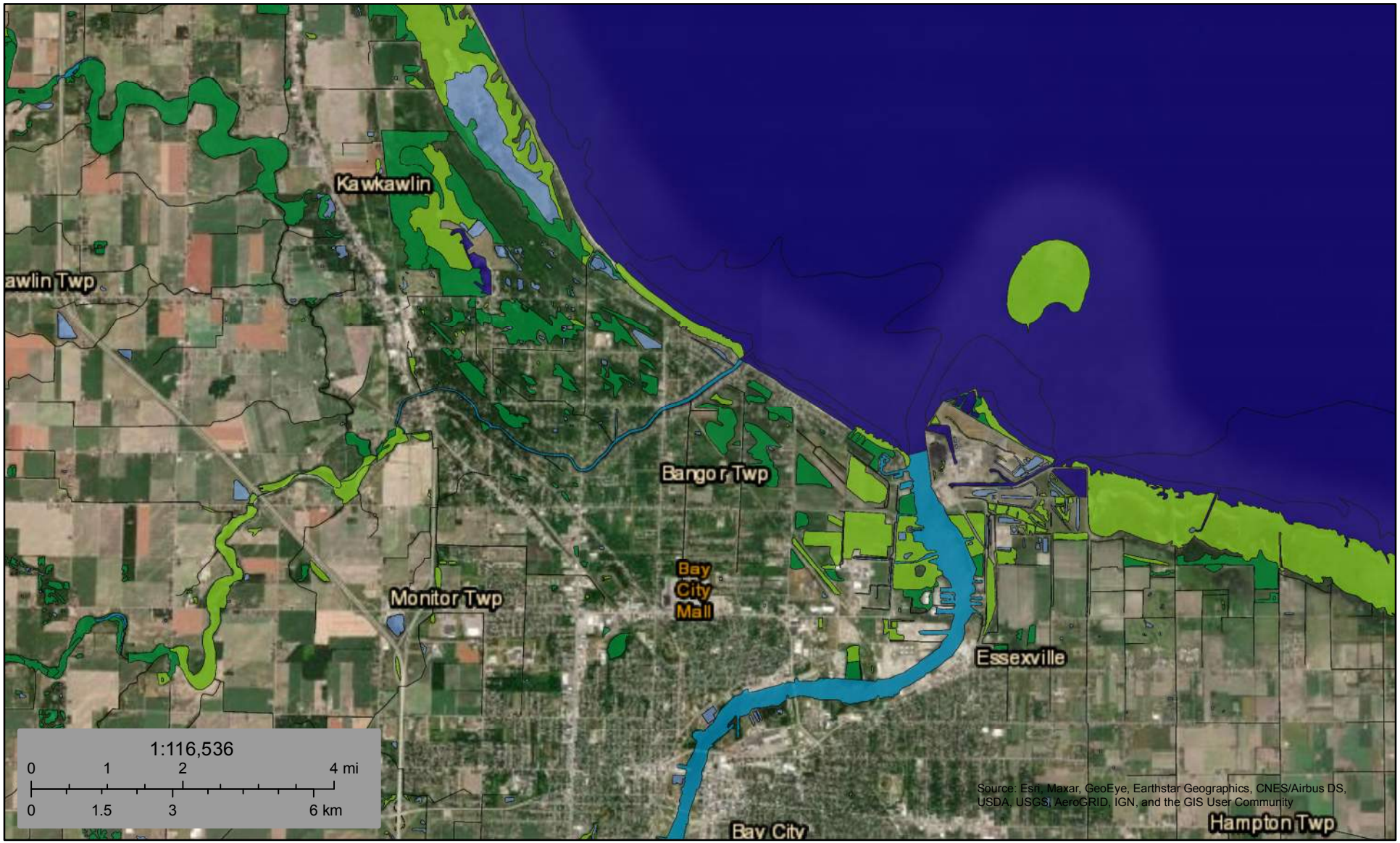
Appendix F

National Wetland Inventory

U.S. Fish and Wildlife Service

National Wetlands Inventory

Bangor Township



March 31, 2021

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Appendix G

FEMA FIRM Maps

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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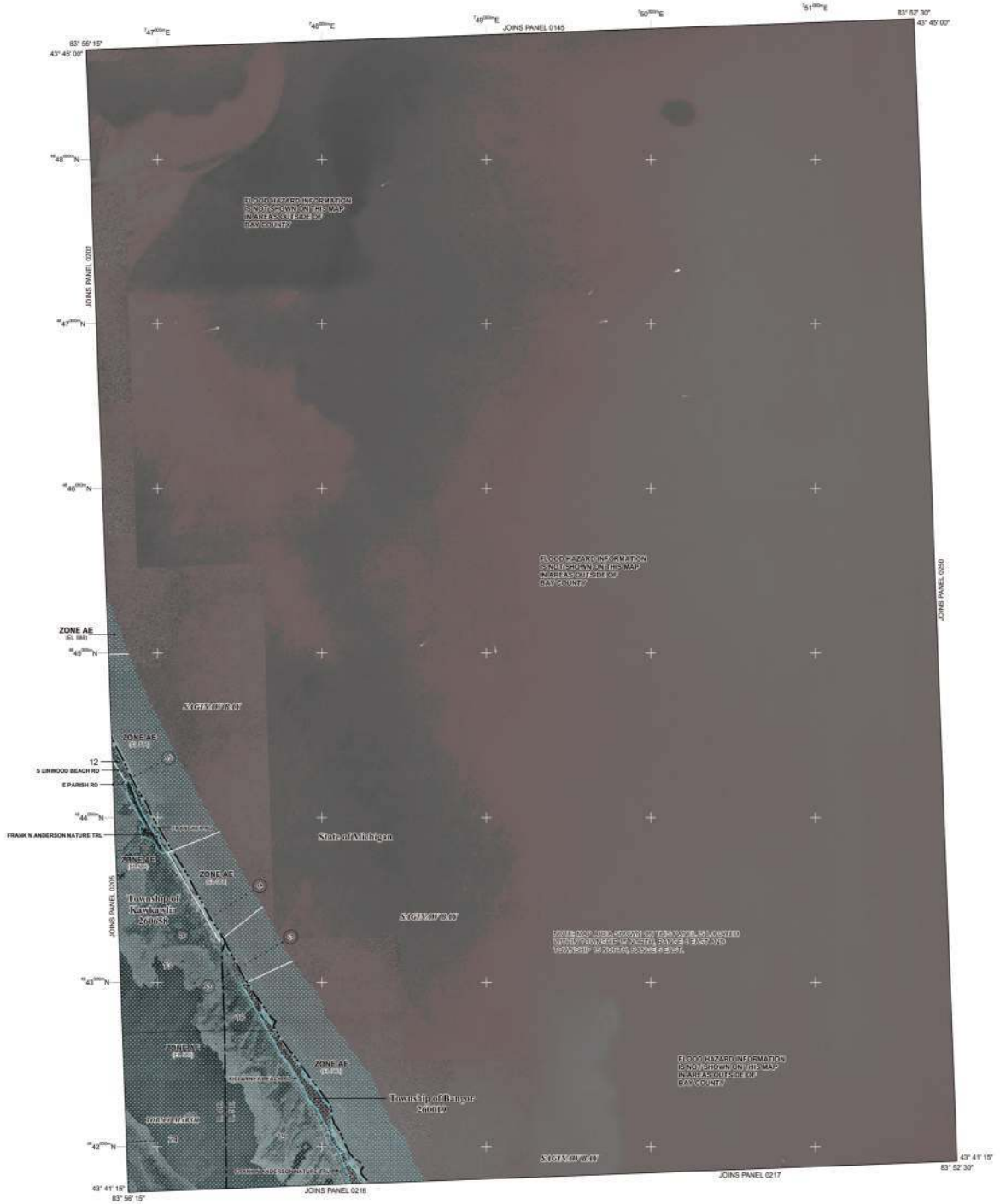

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 4987000 mN — 1000-meter Universal Transverse Mercator grid values, zone 16
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 17, 2010 – to add Special Flood Hazard Areas and roads and road names; to change Special Flood Hazard Areas; to update corporate limits and map format; to incorporate previously issued Letters of Map Revision; and to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET
300 0 300 600 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0210E

FIRM

FLOOD INSURANCE RATE MAP

BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 210 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0210	E
KAWKAWLIN, TOWNSHIP OF	260038	0210	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26017C0210E
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

NOTES TO USERS

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

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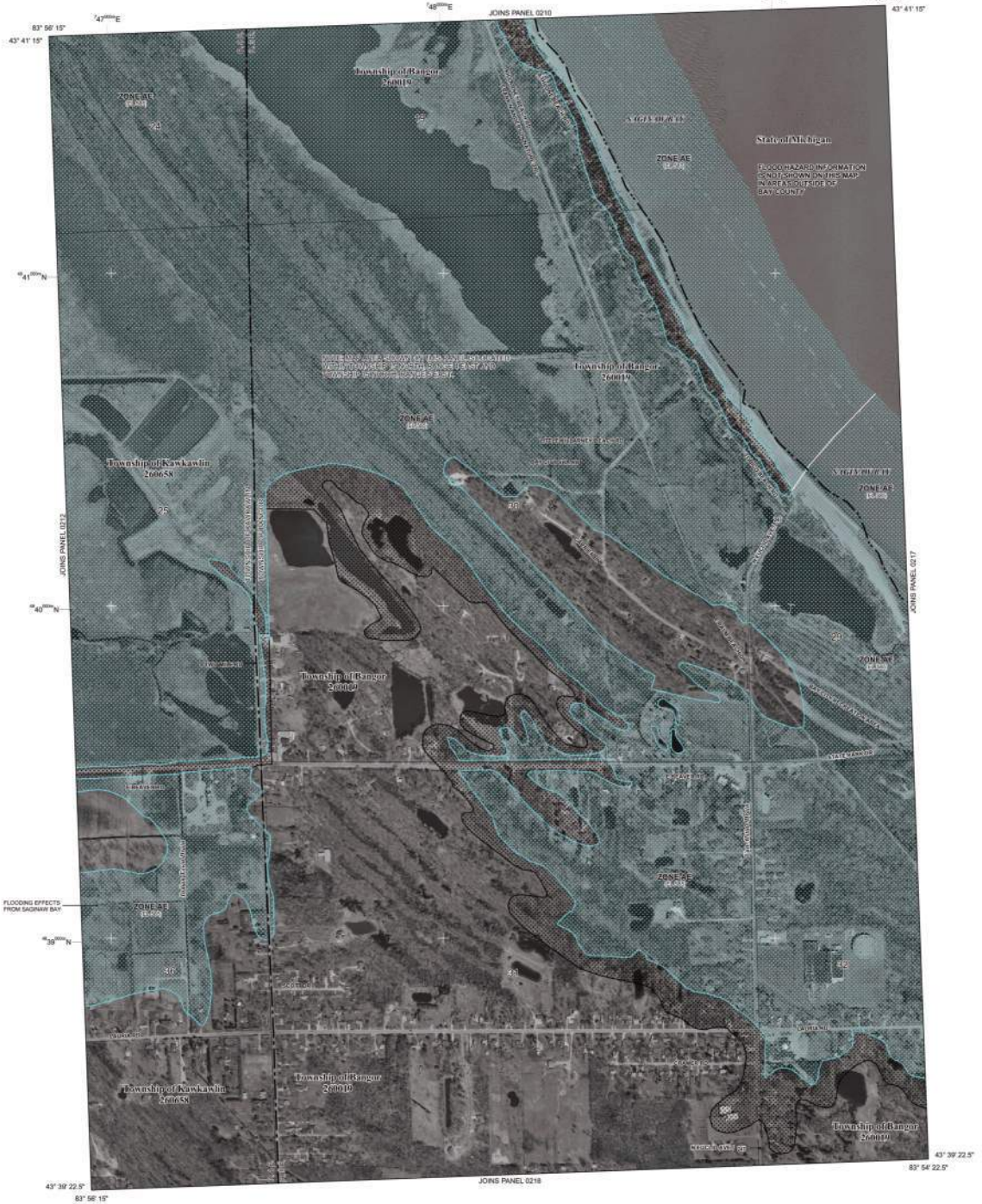

LEGEND

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ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A Cross section line

23 — 23 Transect line

45° 02' 08", 93° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

4,000mN 1000-meter Universal Transverse Mercator grid values, zone 16

DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 17, 2010 - to add Special Flood Hazard Areas and roads and road names; to change Special Flood Hazard Areas; to update corporate limits and map format; to incorporate previously issued Letters of Map Revision; and to reflect updated topographic information.

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

100 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0216E

FIRM

FLOOD INSURANCE RATE MAP

BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 216 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0216	E
KAWKAWLIN, TOWNSHIP OF	260658	0216	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26017C0216E
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

NOTES TO USERS

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Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

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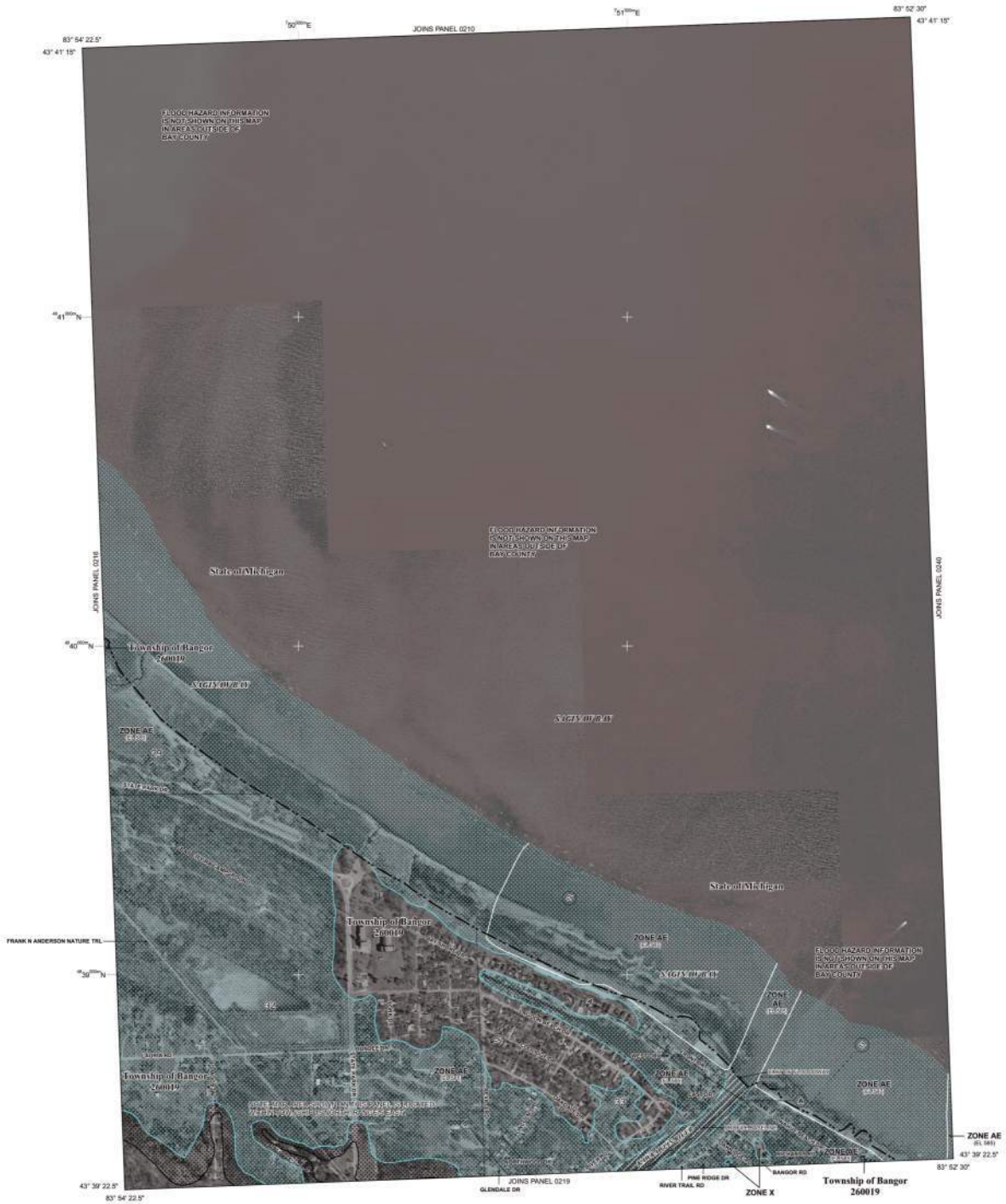

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
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ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

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- 1% Annual Chance Floodplain Boundary
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- A — A — Cross section line
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MAP REPOSITORIES
Refer to Map Repositories list on Map Index

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June 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0217E

FIRM

FLOOD INSURANCE RATE MAP

BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 217 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0217	E

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26017C0217E
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

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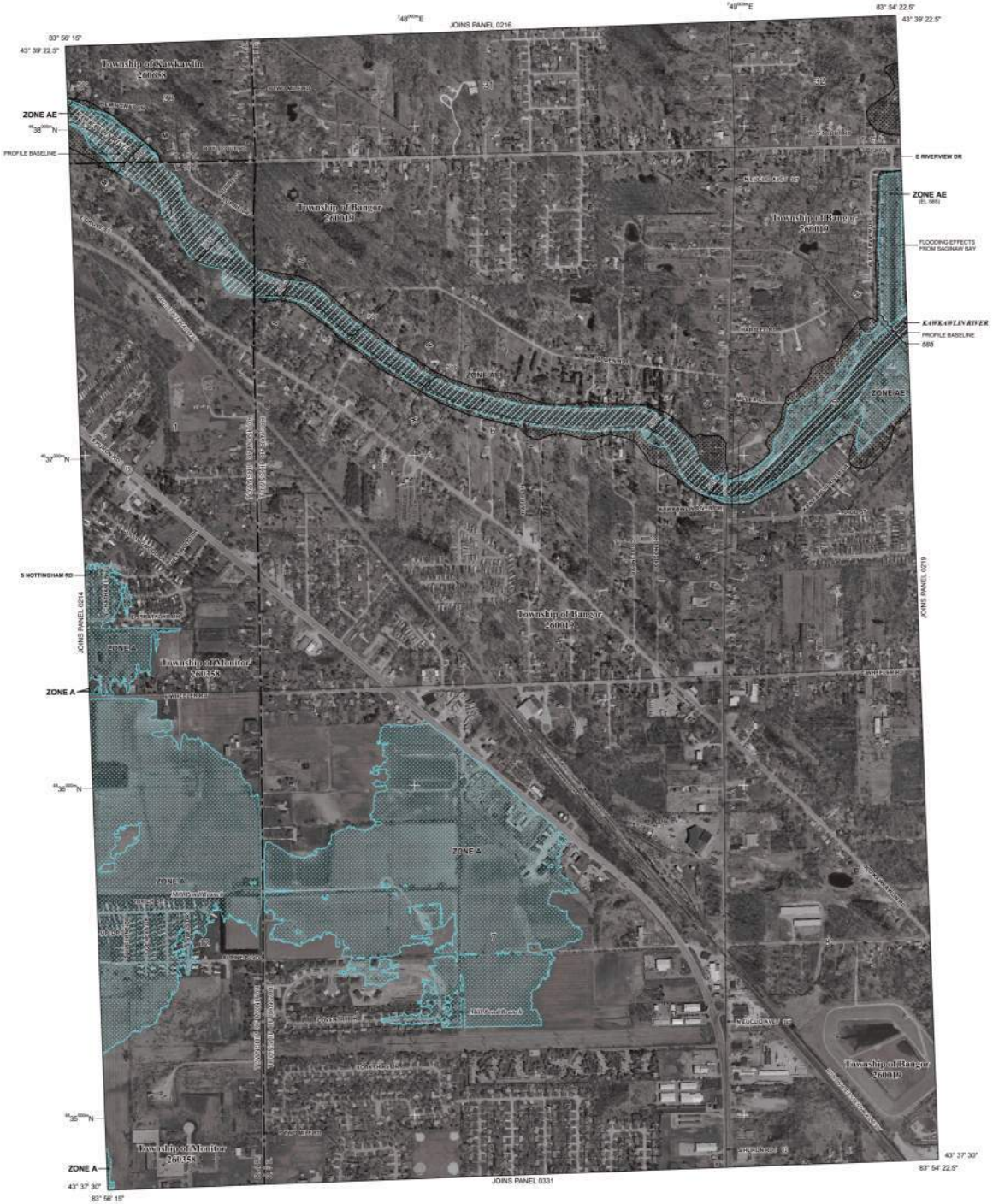

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A — Cross section line

23 — 23 — Transect line

45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

4982000 N — 1000-meter Universal Transverse Mercator grid values, zone 16

DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 17, 2010 - to add Special Flood Hazard Areas and roads and road names; to change Special Flood Hazard Areas; to update corporate limits and map format; to incorporate previously issued Letters of Map Revision; and to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0218E

FIRM

FLOOD INSURANCE RATE MAP

BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 218 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0218	E
KAWKAWLIN, TOWNSHIP OF	260036	0218	E
MONITOR, TOWNSHIP OF	260038	0218	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26017C0218E
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base Map information shown on this FIRM was provided in digital format by Bay County, Michigan. This information was photogrammetrically compiled at a scale of 1200 from aerial photography dated 2005.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

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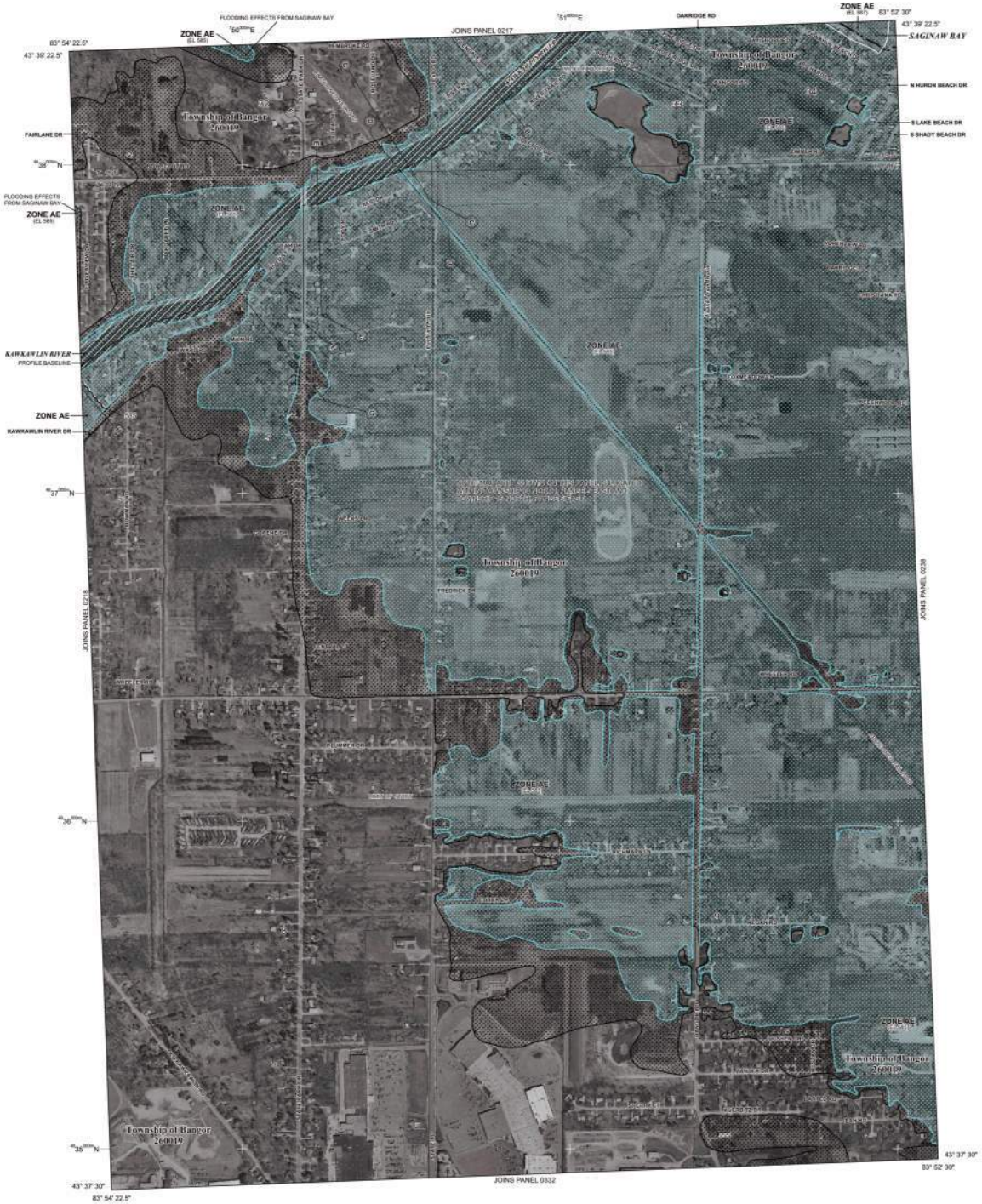

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
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ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
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ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A — Cross section line

23 — 23 — Transect line

45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

4982000 N — 1000-meter Universal Transverse Mercator grid values, zone 16

DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

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MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0219E

FIRM

FLOOD INSURANCE RATE MAP

BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 219 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0219	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26017C0219E
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

NOTES TO USERS

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Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

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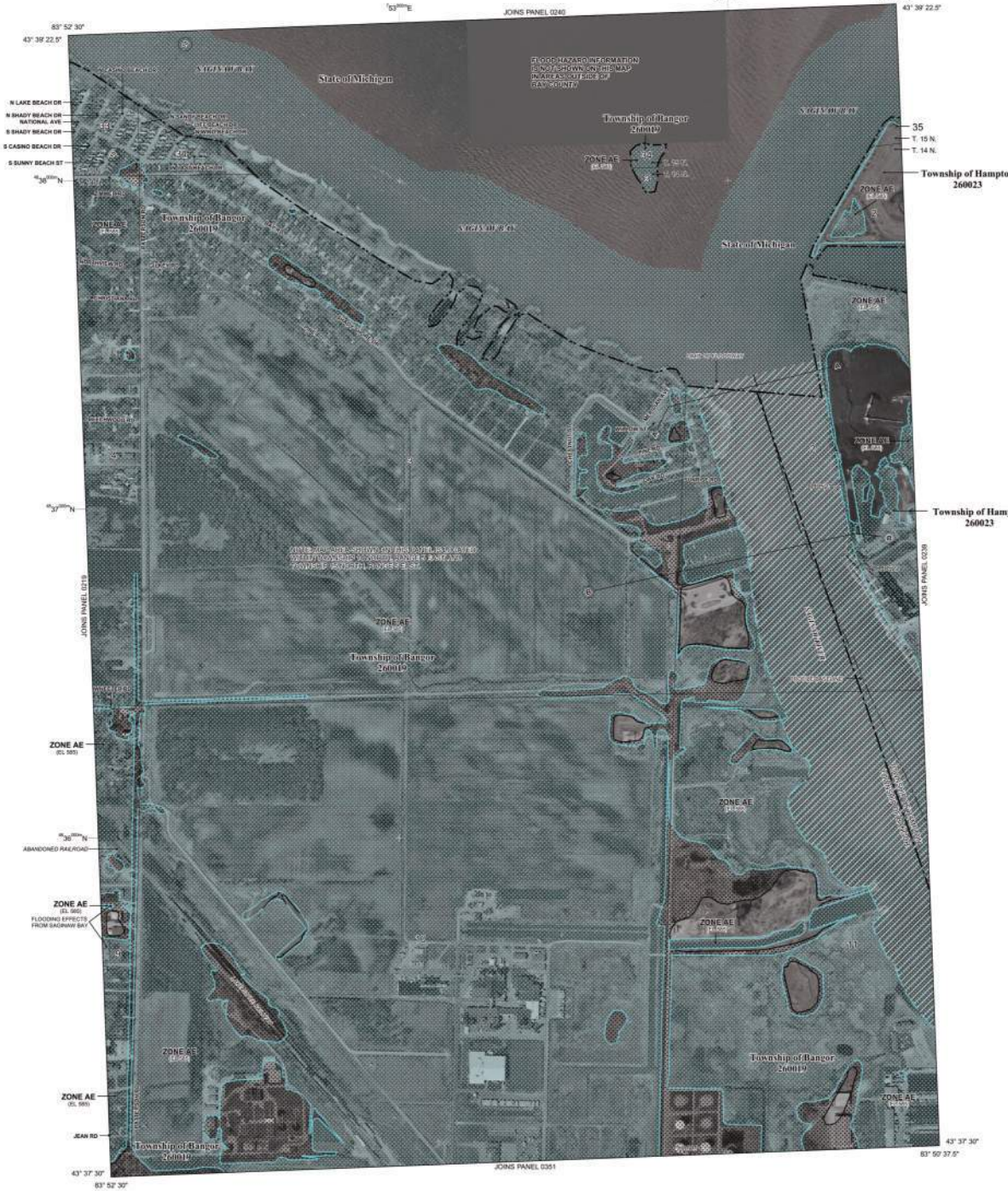

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

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ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
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COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 4851000 m — 1000-meter Universal Transverse Mercator grid values, zone 16R
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
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MAP REPOSITORIES
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EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

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250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0238E

FIRM

FLOOD INSURANCE RATE MAP

BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 238 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0238	E
HAMPTON, TOWNSHIP OF	260023	0238	E

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MAP NUMBER
26017C0238E
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

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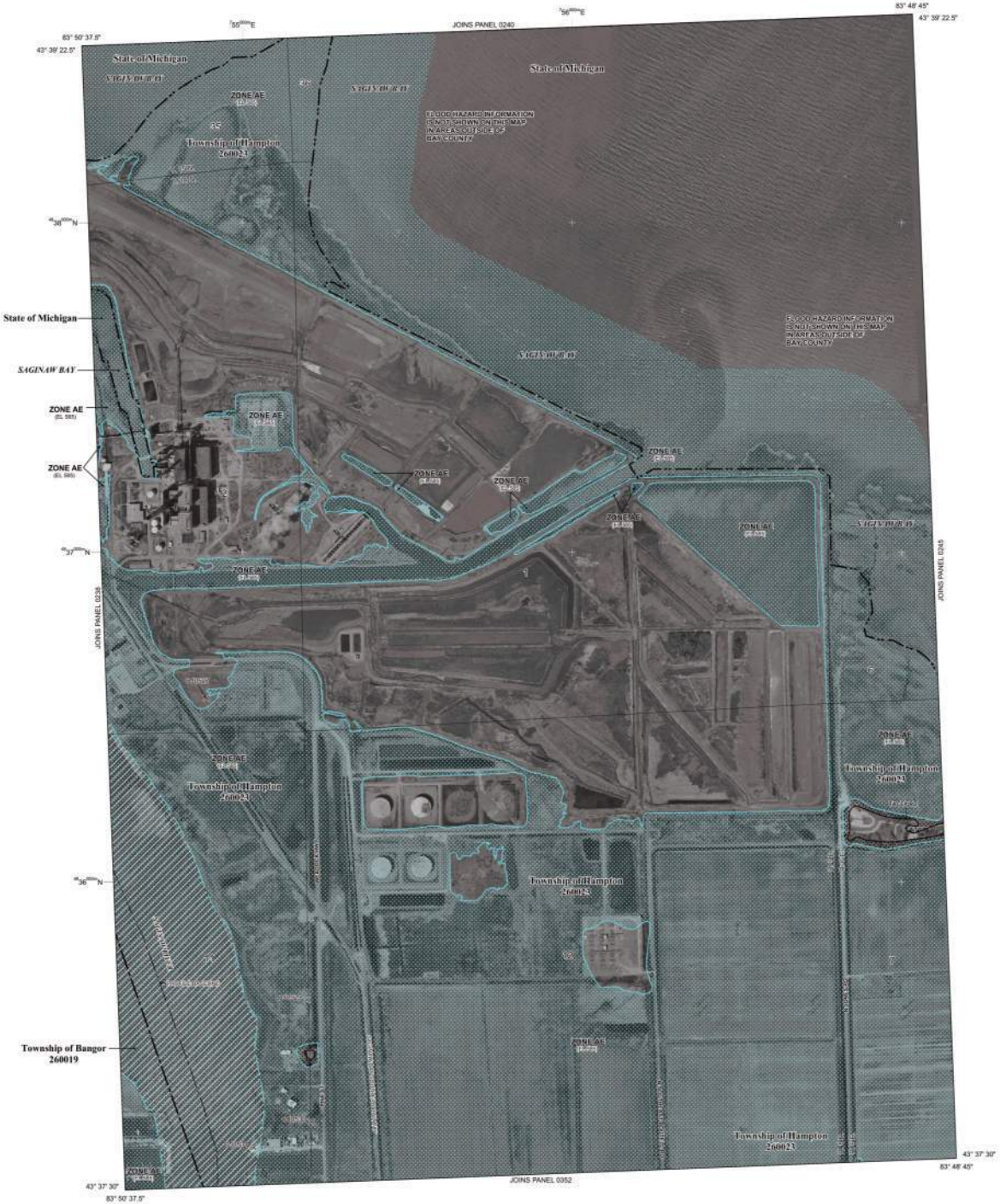

LEGEND

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ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal Flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A — Cross section line

23 — 23 — Transect line

45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

5962000 N — 1000-meter Universal Transverse Mercator grid values, zone 16R

DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
June 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 17, 2010 – to add Special Flood Hazard Areas and levels and road names; to change Special Flood Hazard Areas; to update corporate limits and map format; to incorporate previously issued Letters of Map Revision; and to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0239E

FIRM

FLOOD INSURANCE RATE MAP

BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 239 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0239	E
HAMPTON, TOWNSHIP OF	260023	0239	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26017C0239E
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base Map information shown on this FIRM was provided in digital format by Bay County, Michigan. This information was photogrammetrically compiled at a scale of 1200 from aerial photography dated 2005.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1- 877- FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 5962000 mN — 1000-meter Universal Transverse Mercator grid values, zone 16
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 17, 2010 – to add Special Flood Hazard Areas and roads and road names; to change Special Flood Hazard Areas; to update corporate limits and map format; to incorporate previously issued Letters of Map Revision; and to reflect updated topographic information.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
100 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0332E

FIRM

FLOOD INSURANCE RATE MAP

BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 332 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0332	E
BAY CITY, CITY OF	260020	0332	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26017C0332E
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

NOTES TO USERS

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Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 16. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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Base Map information shown on this FIRM was provided in digital format by Bay County, Michigan. This information was photogrammetrically compiled at a scale of 1200 from aerial photography dated 2005.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

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LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A Cross section line

23 — 23 Transect line

45° 02' 08", 93° 02' 12" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

4985000 N 1000-meter Universal Transverse Mercator grid values, zone 16

DX5510 × Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
June 18, 1996

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 17, 2010 - to add Special Flood Hazard Areas and roads and road names; to change Special Flood Hazard Areas; to update corporate limits and map format; to incorporate previously issued Letters of Map Revision; and to reflect updated topographic information.

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MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0351E

FIRM

FLOOD INSURANCE RATE MAP

BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 351 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0351	E
BAY CITY, CITY OF	260020	0351	E
ESSEXVILLE, CITY OF	260021	0351	E
HAMPTON, TOWNSHIP OF	260023	0351	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26017C0351E
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

NOTES TO USERS

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Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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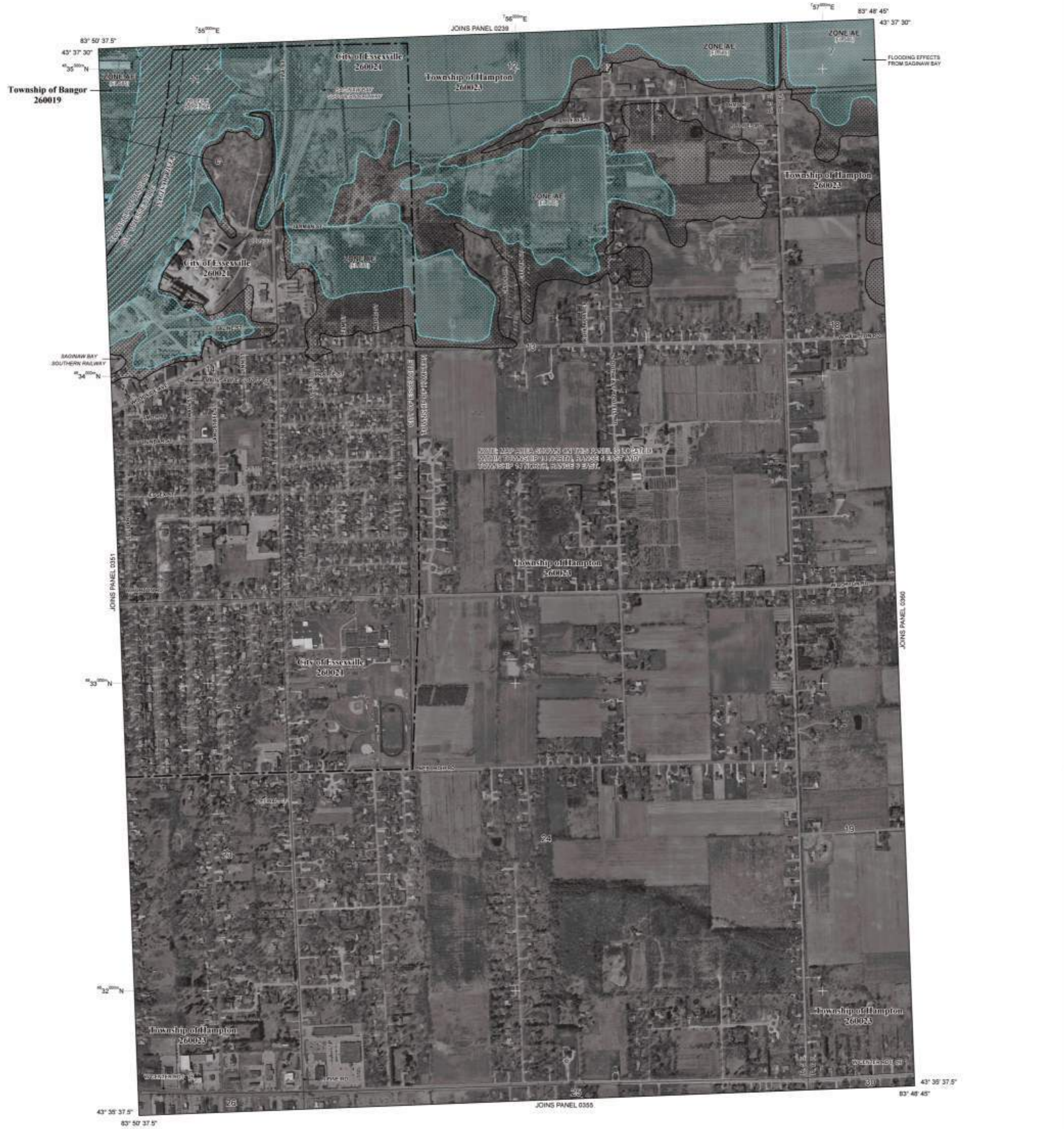

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
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ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
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ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% Annual Chance Floodplain Boundary

0.2% Annual Chance Floodplain Boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

~~513~~~	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

(A)———(A)	Cross section line
(23)- - - - -(23)	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4989000 N	1000-meter Universal Transverse Mercator grid values, zone 16
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
• M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
June 18, 1986

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 17, 2010 – to add Special Flood Hazard Areas and roads and road names; to change Special Flood Hazard Areas, to update corporate limits and map format, to incorporate previously issued Letters of Map Revision, and to reflect updated topographic information.

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MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0352E

FIRM
FLOOD INSURANCE RATE MAP
BAY COUNTY, MICHIGAN
ALL JURISDICTIONS

PANEL 352 OF 450
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BANGOR, TOWNSHIP OF	260019	0352	E
ESSEXVILLE, CITY OF	260021	0352	E
HAMPTON, TOWNSHIP OF	260023	0352	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
26017C0352E

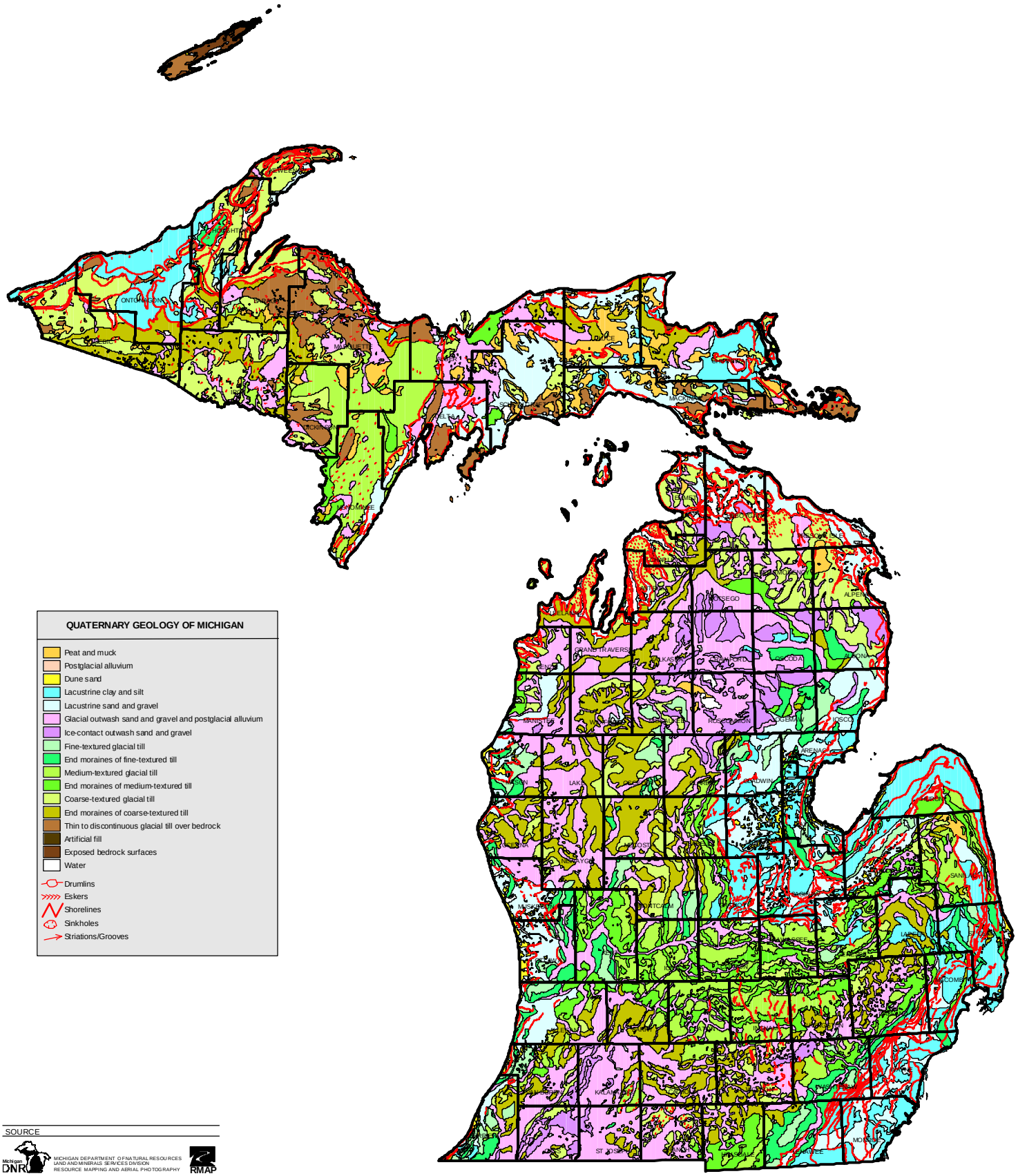
MAP REVISED
SEPTEMBER 17, 2010

Federal Emergency Management Agency

Appendix H

- 1982 Quaternary Geology of Michigan
- 1987 Bedrock Geology of Michigan

1982 QUATERNARY GEOLOGY OF MICHIGAN



SOURCE

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
LAND AND MINERALS SERVICES DIVISION
RESOURCE MAPPING AND AERIAL PHOTOGRAPHY

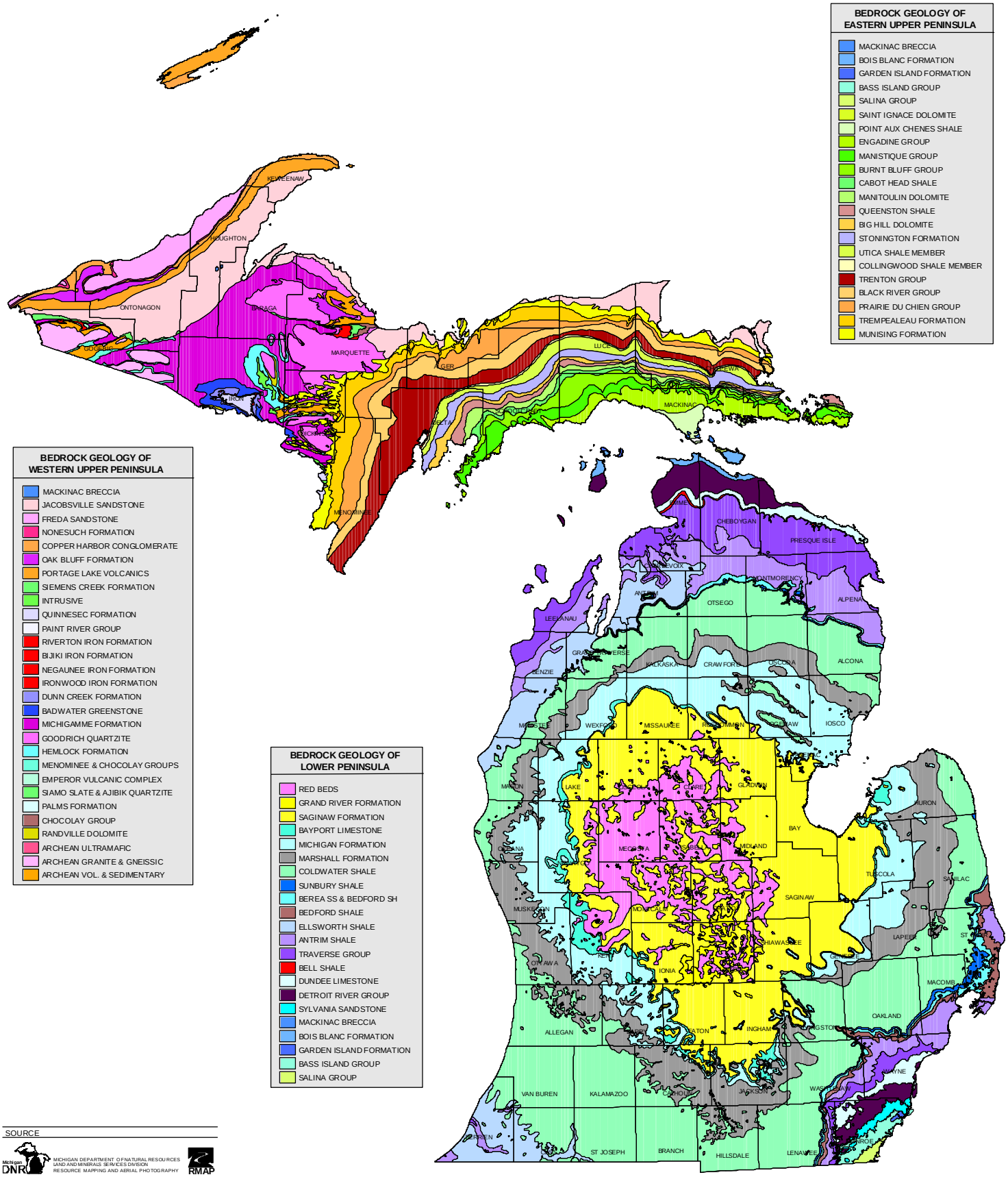
Michigan Resource Information System
Part 609, Resource Inventory, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

Automated from "Quaternary Geology of Michigan", 1982, 1:500,000 scale, which was compiled by W. R. Farrand, University of Michigan and the Michigan Department of Environmental Quality, Geological Survey Division.

Date 11/12/99

0 20 40 Miles

1987 BEDROCK GEOLOGY OF MICHIGAN



BEDROCK GEOLOGY OF EASTERN UPPER PENINSULA

- MACKINAC BRECCIA
- BOIS BLANC FORMATION
- GARDEN ISLAND FORMATION
- BASS ISLAND GROUP
- SALINA GROUP
- SAINT IGNACE DOLOMITE
- POINT AUX CHENES SHALE
- ENGADINE GROUP
- MANISTIQUE GROUP
- BURNT BLUFF GROUP
- CABOT HEAD SHALE
- MANITOULIN DOLOMITE
- QUEENSTON SHALE
- BIG HILL DOLOMITE
- STONINGTON FORMATION
- UTICA SHALE MEMBER
- COLLINGWOOD SHALE MEMBER
- TRENTON GROUP
- BLACK RIVER GROUP
- PRAIRIE DU CHIEN GROUP
- TREMPEALEAU FORMATION
- MUNISING FORMATION

BEDROCK GEOLOGY OF WESTERN UPPER PENINSULA

- MACKINAC BRECCIA
- JACOBSVILLE SANDSTONE
- FREDA SANDSTONE
- NONESUCH FORMATION
- COPPER HARBOR CONGLOMERATE
- OAK BLUFF FORMATION
- PORTAGE LAKE VOLCANICS
- SIEMENS CREEK FORMATION
- INTRUSIVE
- QUINNESEC FORMATION
- PAINT RIVER GROUP
- RIVERTON IRON FORMATION
- BIJIKI IRON FORMATION
- NEGAUNEE IRON FORMATION
- IRONWOOD IRON FORMATION
- DUNN CREEK FORMATION
- BADWATER GREENSTONE
- MICHIGAMME FORMATION
- GOODRICH QUARTZITE
- HEMLOCK FORMATION
- MENOMINEE & CHOCOLAY GROUPS
- EMPEROR VULCANIC COMPLEX
- SIAMO SLATE & AJIBIK QUARTZITE
- PALMS FORMATION
- CHOCOLAY GROUP
- RANDVILLE DOLOMITE
- ARCHEAN ULTRAMAFIC
- ARCHEAN GRANITE & GNEISSIC
- ARCHEAN VOL. & SEDIMENTARY

BEDROCK GEOLOGY OF LOWER PENINSULA

- RED BEDS
- GRAND RIVER FORMATION
- SAGINAW FORMATION
- BAYPORT LIMESTONE
- MICHIGAN FORMATION
- MARSHALL FORMATION
- COLDWATER SHALE
- SUNBURY SHALE
- BEREA SS & BEDFORD SH
- BEDFORD SHALE
- ELLSWORTH SHALE
- ANTRIM SHALE
- TRAVERSE GROUP
- BELL SHALE
- DUNDEE LIMESTONE
- DETROIT RIVER GROUP
- SYLVANIA SANDSTONE
- MACKINAC BRECCIA
- BOIS BLANC FORMATION
- GARDEN ISLAND FORMATION
- BASS ISLAND GROUP
- SALINA GROUP

SOURCE

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Automated from "Bedrock Geology of Michigan," 1987, 1:500,000 scale, which was compiled from a variety of sources by the Michigan Department of Environmental Quality, Geological Survey Division.

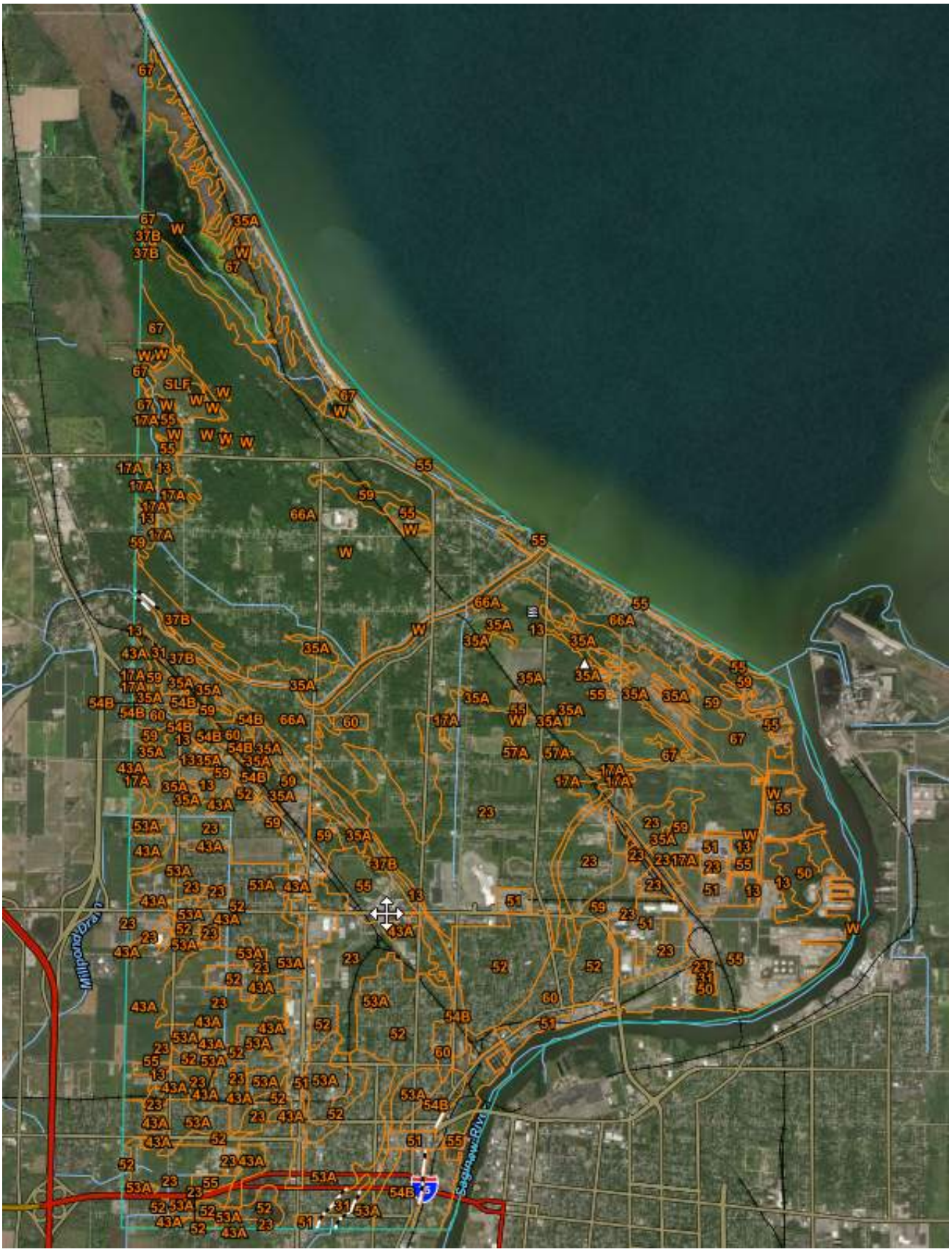
Date 11/12/99

0 20 40 Miles

Appendix I

Soils Map

Bangor Township Soils Map



Appendix J

Endangered and Threatened Species

IPaC resource list

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

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

Location

Bay County, Michigan

Local office

Michigan Ecological Services Field Office

(517) 351-2555
(517) 351-1443

2651 Coolidge Road Suite 101
East Lansing, MI 48823-6360

http://www.fws.gov/midwest/EastLansing/

Endangered species

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

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

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

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

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

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

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

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

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

Mammals

NAME	STATUS

Indiana Bat Myotis sodalis — Endangered
Wherever found
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/5949

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

Birds

NAME	STATUS

Piping Plover Charadrius melodus — Endangered
There is **final** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/6039

Red Knot Calidris canutus rufa — Threatened
Wherever found
This species only needs to be considered if the following condition applies:
- Only actions that occur along coastal areas during the Red Knot migratory window of MAY 1 - SEPTEMBER 30.

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/1864

Reptiles

NAME	STATUS

Eastern Massasauga (=rattlesnake) Sistrurus catenatus — Threatened
Wherever found
This species only needs to be considered if the following condition applies:
- For all Projects: Project is within EMR Range

No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2202

Flowering Plants

NAME	STATUS

Eastern Prairie Fringed Orchid Platanthera leucophaea — Threatened
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/601

Critical habitats

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

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

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

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

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

Additional information can be found using the following links:

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

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

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

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

American Bittern *Botaurus lentiginosus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6582	Breeds Apr 1 to Aug 31
American Golden-plover *Pluvialis dominica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Black Tern *Chlidonias niger* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Buff-breasted Sandpiper *Calidris subruficollis* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9488	Breeds elsewhere

Cerulean Warbler Dendroica cerulea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/2974	Breeds Apr 22 to Jul 20
Dunlin Calidris alpina arcticola This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Eastern Whip-poor-will Antrostomus vociferus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Golden-winged Warbler Vermivora chrysoptera This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20
Least Bittern Ixobrychus exilis This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6175	Breeds Aug 16 to Oct 31
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Long-eared Owl asio otus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3631	Breeds Mar 1 to Jul 15
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Ruddy Turnstone Arenaria interpres morinella This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere

Semipalmated Sandpiper Calidris pusilla This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds elsewhere
Willow Flycatcher Empidonax traillii This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/3482	Breeds May 20 to Aug 31
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

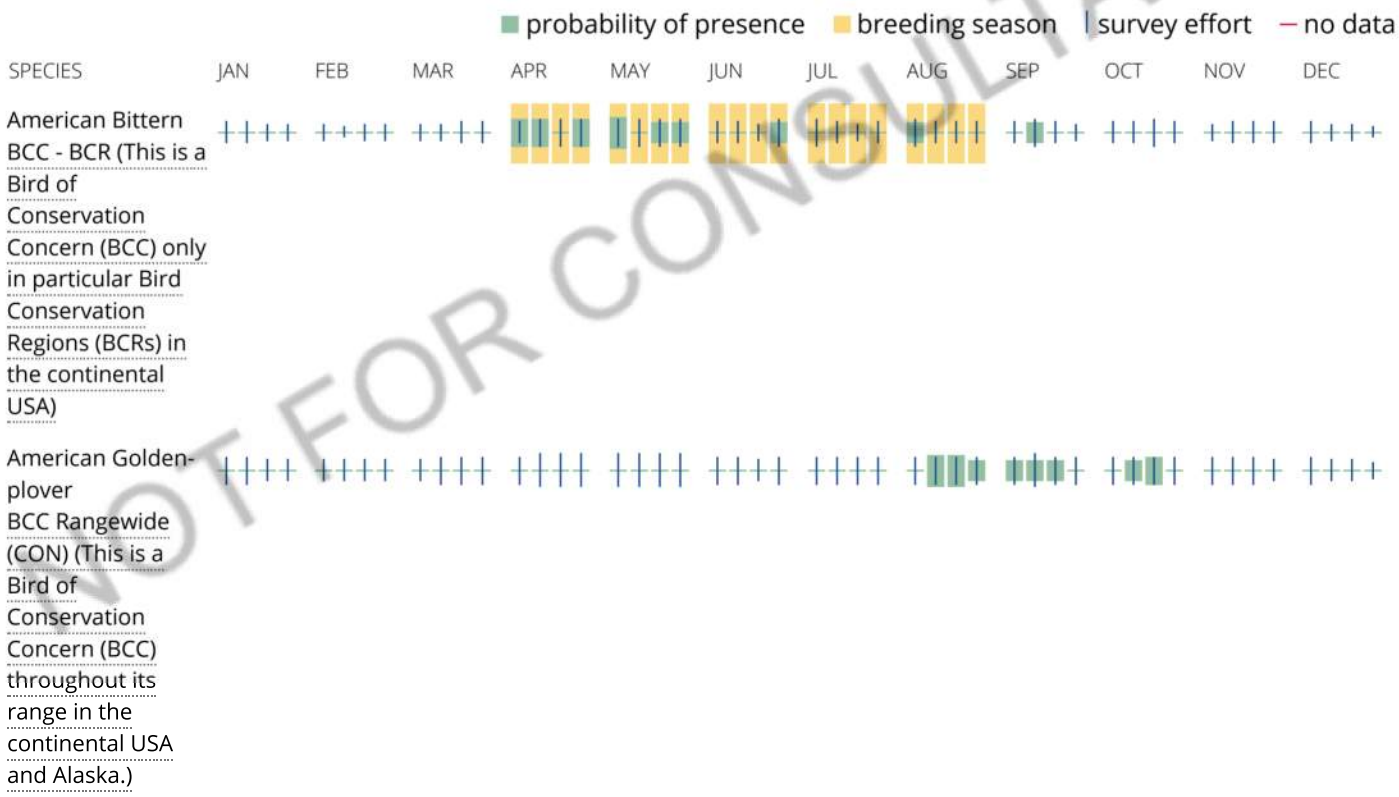
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

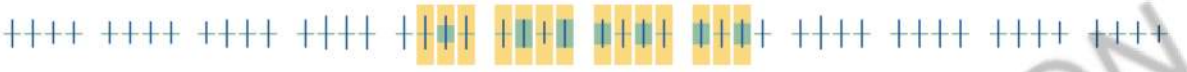
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)

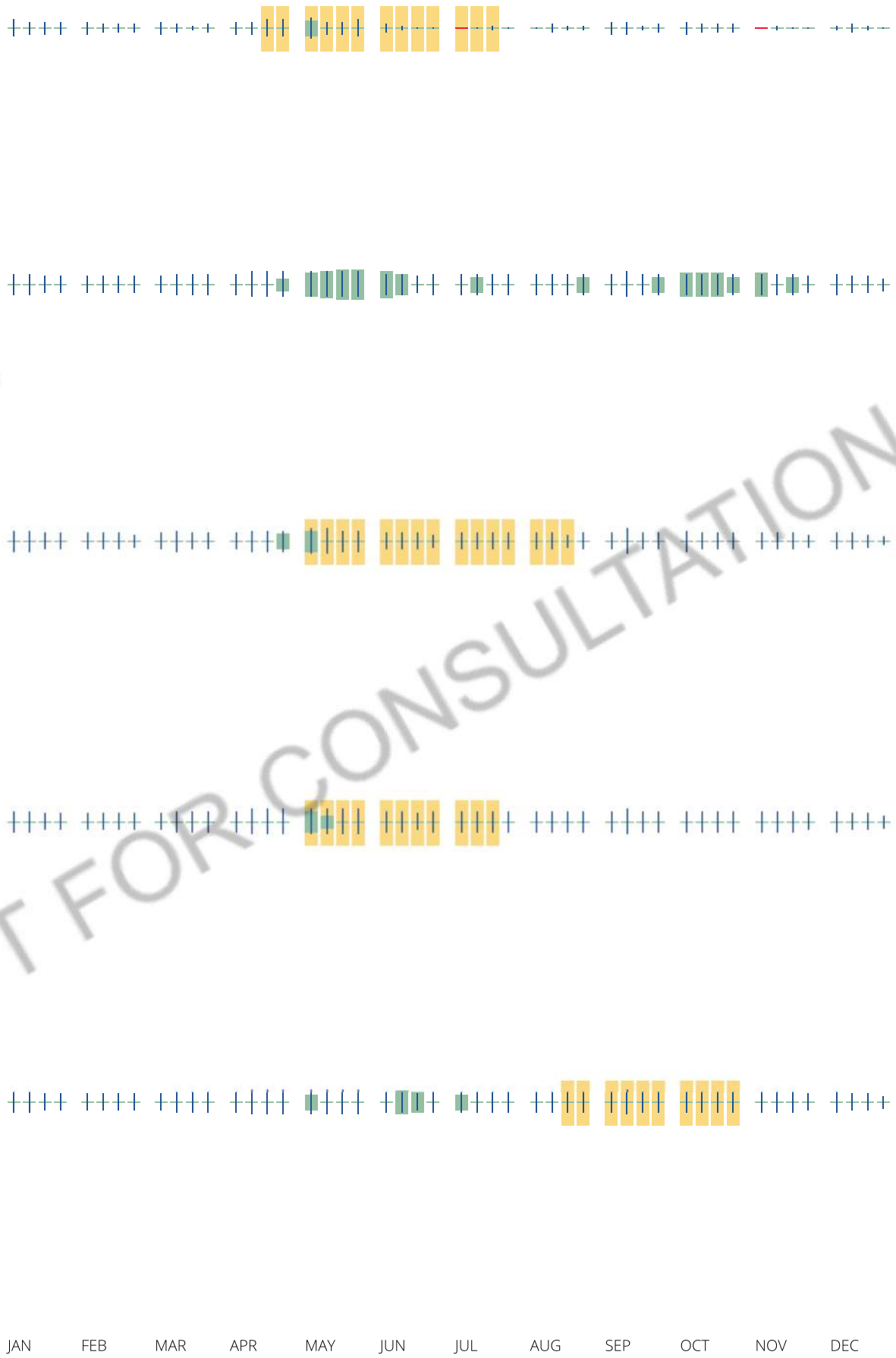
Black Tern
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



Black-billed Cuckoo
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Bobolink
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

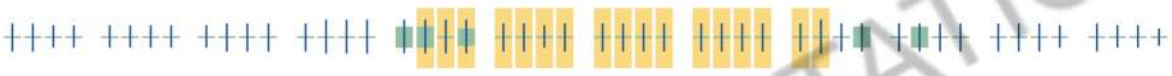
Buff-breasted Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Lesser Yellowlegs BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Long-eared Owl BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Red-headed Woodpecker BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Ruddy Turnstone BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Rusty Blackbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

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

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

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

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

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

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

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

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

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

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

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

What are the levels of concern for migratory birds?

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

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

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

Details about birds that are potentially affected by offshore projects

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

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

What if I have eagles on my list?

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

Proper Interpretation and Use of Your Migratory Bird Report

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

Facilities

National Wildlife Refuge lands

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

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

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

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

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

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1F
- PEM1Af
- PEM1C
- PEM1/ABF
- PEM1A

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1C
- PFO1/SS1C
- PSS1/EM1C
- PFO1C
- PFO1/EM1C

FRESHWATER POND

- PABG
- PUBGx
- PUBG
- PUBK
- PUBGh

LAKE

- L1UBH
- L2UBH
- L2ABH
- L2EM2G

RIVERINE

- R2UBH
- R5UBH
- R5UBFx
- R4SBC

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

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error

is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

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

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

Data exclusions

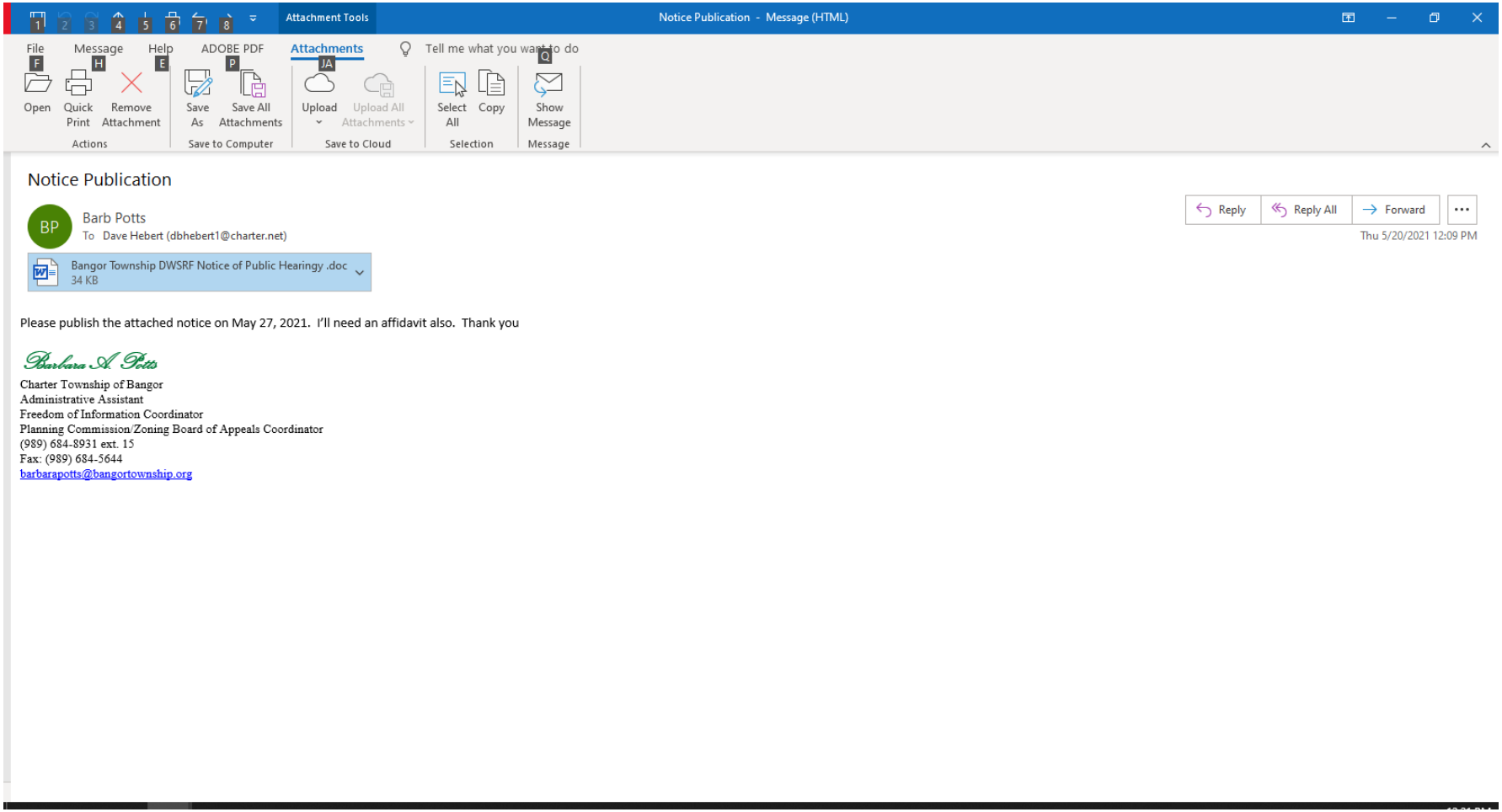
Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and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

Data precautions

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

Appendix K

- Proof of Publication
- Public Hearing Notice
- Public Hearing Transcript
  (under separate enclosure)


Attachment Tools
Notice Publication - Message (HTML)
File
Message
Help
ADOBE PDF
Attachments
Tell me what you want to do
Open
Quick Print
Remove Attachment
Save As
Save All Attachments
Upload
Upload All Attachments
Select All
Copy
Show Message
Actions
Save to Computer
Save to Cloud
Selection
Message
Notice Publication
BP
Barb Potts
To Dave Hebert (dbhebert1@charter.net)
Bangor Township DWSRF Notice of Public Hearingy .doc
34 KB
Reply
Reply All
Forward
Thu 5/20/2021 12:09 PM
Please publish the attached notice on May 27, 2021. I'll need an affidavit also. Thank you
Barbara A. Potts
Charter Township of Bangor
Administrative Assistant
Freedom of Information Coordinator
Planning Commission/Zoning Board of Appeals Coordinator
(989) 684-8931 ext. 15
Fax: (989) 684-5644
barbarapotts@bangortownship.org

NOTICE OF PROJECT PLAN PUBLIC HEARING

The Charter Township of Bangor will hold a public hearing on the proposed project for the purpose of receiving comments from interested persons.

The hearing will be held at **4:30 p.m. on Tuesday, June 29, 2021** at the following location: Charter Township of Bangor Administration Offices 180 State Park Drive, Bay City 48706

The purpose of the proposed project is to construct new water mains throughout the Township where undersized watermains exist.

Project construction will involve the construction new water mains and replacement of water services from the new main to the right of way line, associated pavement restoration and lawn restoration.

Impacts of the proposed project will improve water quality and system reliability within the community. Short term construction related impacts include increased noise and dust during construction of the improvements.

The estimated project cost for the project has been estimated at $4.7 Million Dollars. The project will be financed with low interest loans.

Copies of the plan detailing the proposed project are available for inspection at the following location: Charter Township of Bangor offices: 180 State Park Drive, Bay City 48706, or on our website at www.bangortownship.org.

Written comments received before the public hearing will be entered into the Public Hearing record and should be sent to Charter Township of Bangor, Attention Township Supervisor, 180 State Park Drive, Bay City 48706.

Appendix L

Resolution of Plan Adoption

RESOLUTION #21-010

A RESOLUTION ADOPTING A FINAL PROJECT PLAN FOR WATER SYSTEM IMPROVEMENTS AND DESIGNATING AN AUTHORIZED PROJECT REPRESENTATIVE

At the special meeting of the Township Board of the Charter Township of Bangor, County of Bay, State of Michigan, held in the Administration Building of the Charter Township of Bangor on Tuesday, June 29, 2021, at 4:30 p.m.

PRESENT: Banaszak, Bublitz, Koch, Maillette, Rowley, Taylor, Wardynski
ABSENT: None

The Following Resolution Was Offered By:

Member Clerk Bublitz and supported by Member Treasurer Wardynski

****

WHEREAS, the Charter Township of Bangor recognizes the need to make improvements to its existing water treatment and distribution system; and

WHEREAS, the Charter Township of Bangor authorized Fleis & Vanderbrink to prepare a Project Plan, which recommends the replacement of water mains.

WHEREAS, said Project Plan was presented at a Public Hearing held on Tuesday, June 29, 2021 and all public comments have been considered and addressed.

NOW THEREFORE BE IT RESOLVED, that the Charter Township of Bangor formally adopts said Project Plan and agrees to implement the selected Alternative B1 Water Main Replacement

BE IT FURTHER RESOLVED, that the Township Supervisor, a position currently held by Glenn Rowley, is designated as the authorized representative for all activities associated with the project referenced above, including the submittal of said Project Plan 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.

Roll Call Vote

YEAS: Banaszak, Koch, Wardynski, Bublitz, Maillette, Taylor, Rowley
NAYS: None
ABSENT: None

RESOLUTION DECLARED ADOPTED

Dawn Bublitz
Bangor Township Clerk

I hereby certify that the foregoing is a true and complete copy of a resolution adopted by the Charter Township of Bangor at a special meeting held on June 29, 2021, and that said meeting was conducted and public notice of said meeting was given pursuant to and in full compliance with the Open Meetings Act, being Act 267, Public Acts of Michigan, 1976, as amended, and that the minutes of said meeting were kept and will be or have been made available as required by said Act.

Dawn Bublitz

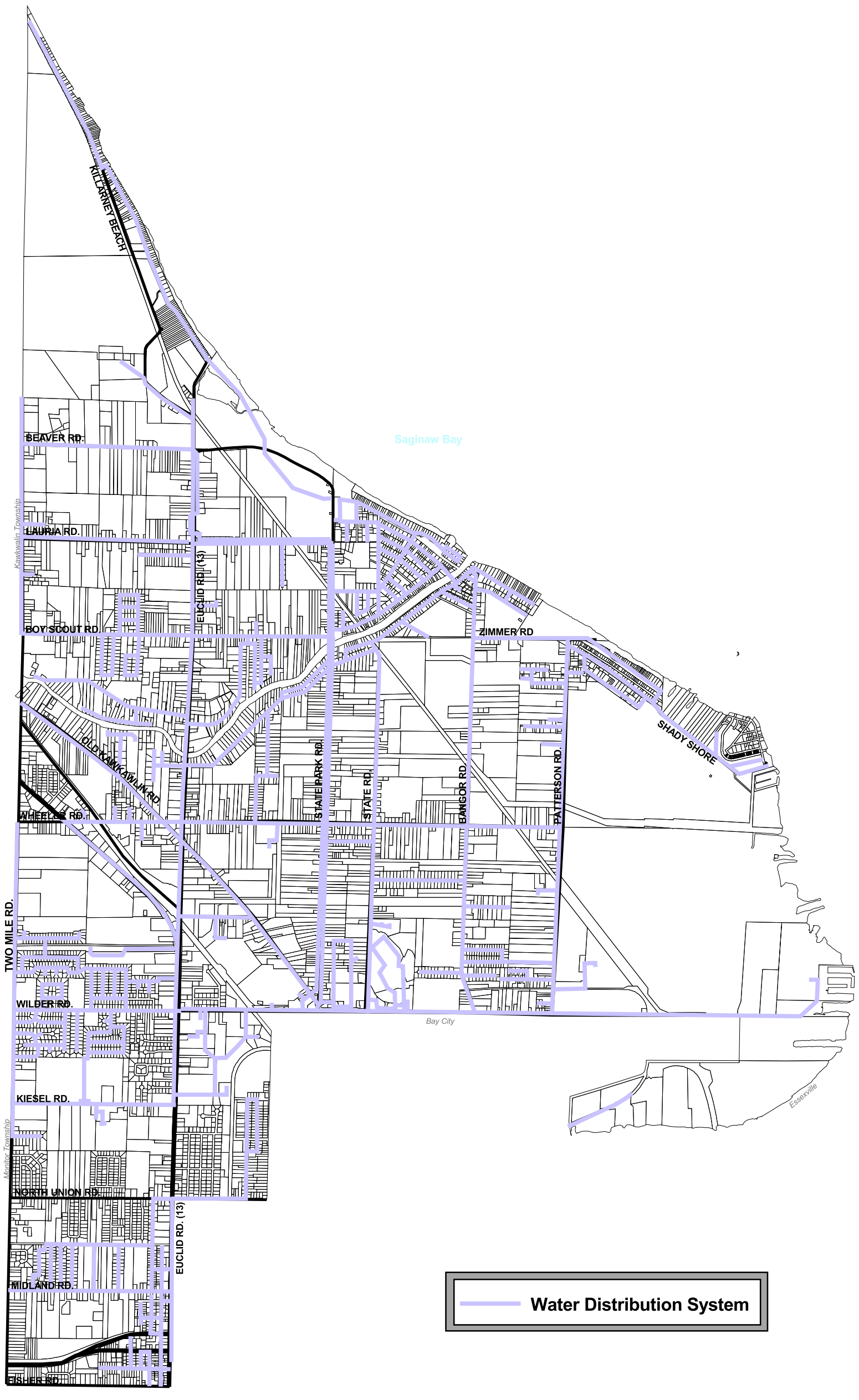
Dawn Bublitz
Bangor Township Clerk

Appendix M

Watermain Replacement Location Maps

McKenna ASSOCIATES, INC.
COMMUNITY PLANNING ▪ URBAN DESIGN

Bangor Township, Bay County, Michigan

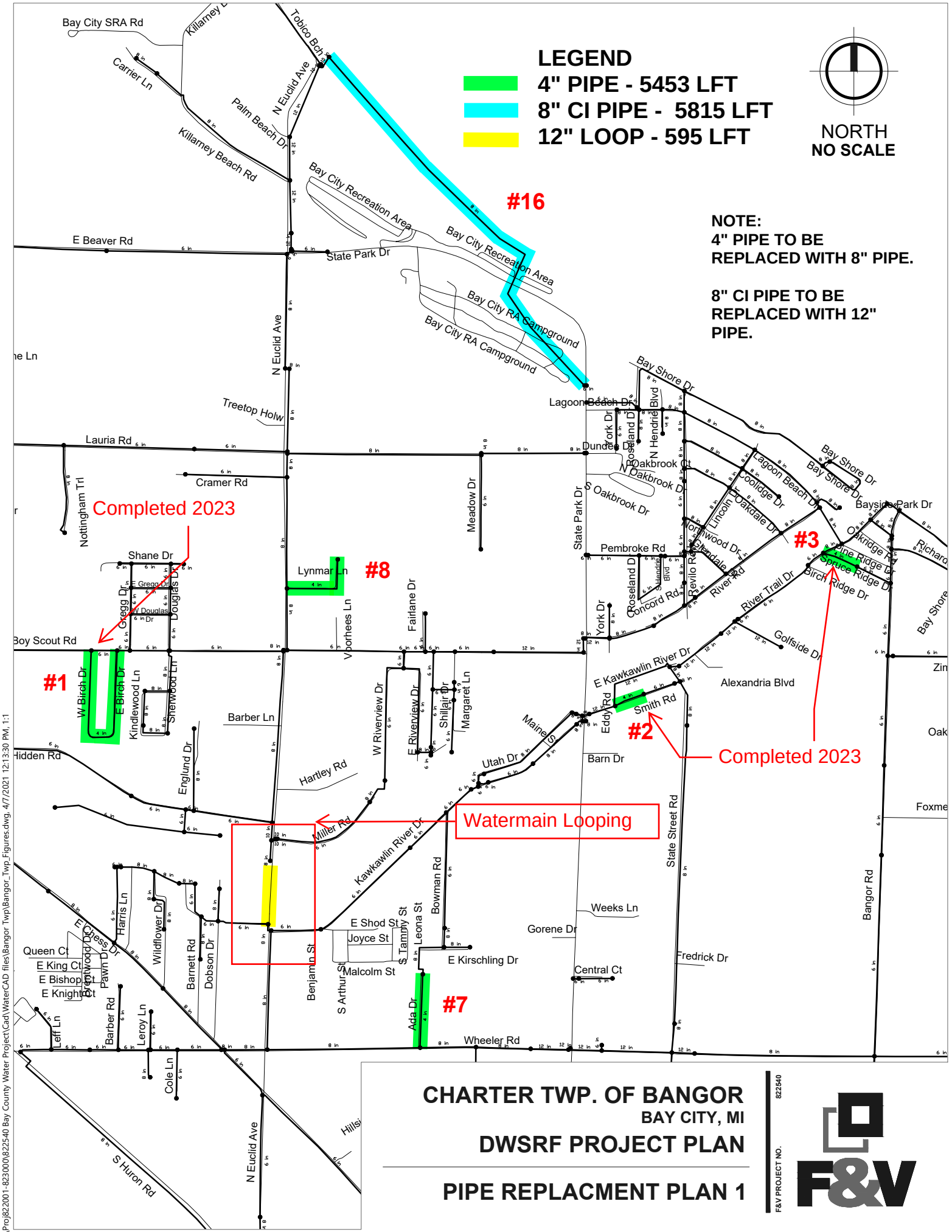


Basemap Source: Bangor Township, Bay County, Michigan
Data Source: Bay County Sewer and Water Department

Water Distribution System Map

0 Ft. 3000 Ft. 6000 Ft.

9/2001



CHARTER TWP. OF BANGOR
BAY CITY, MI

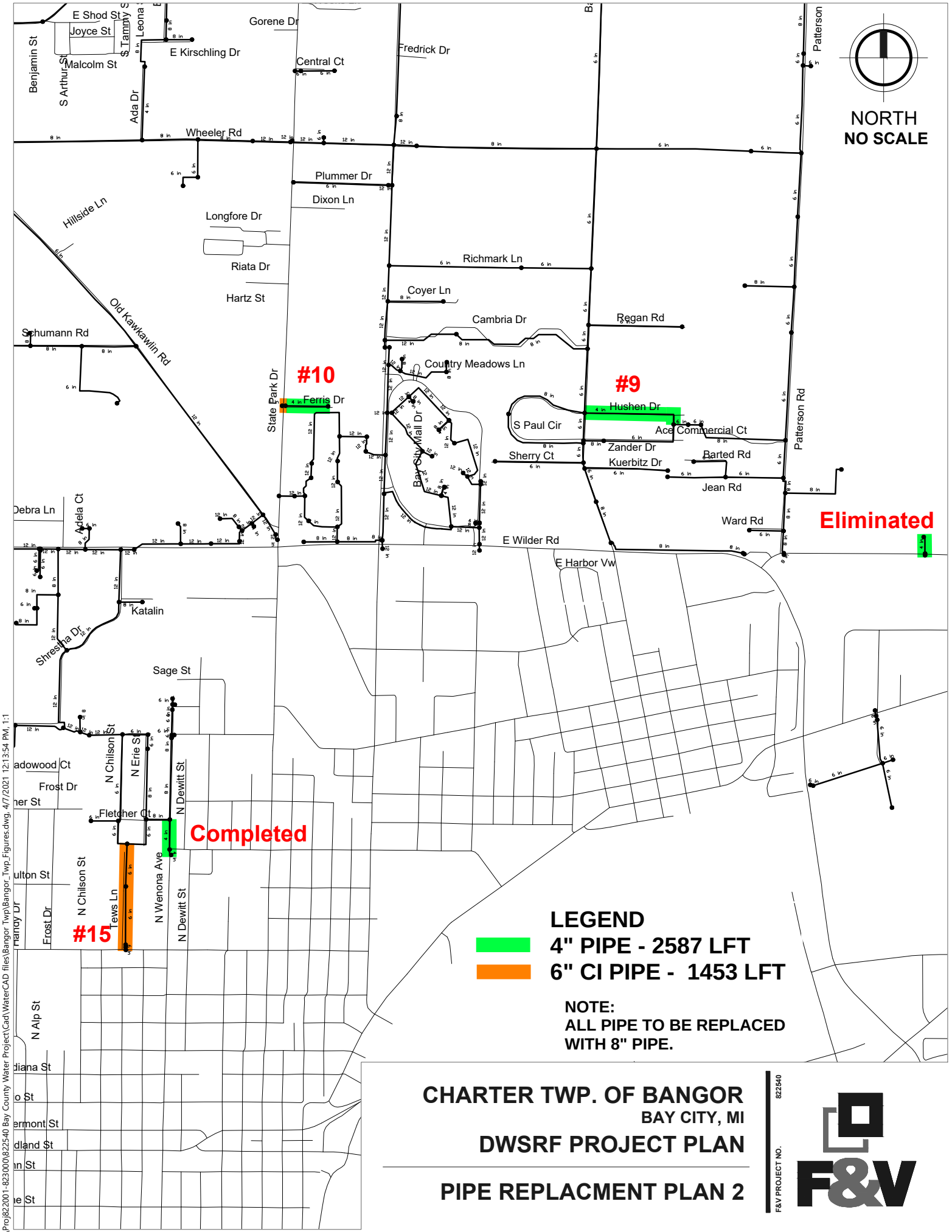
DWSRF PROJECT PLAN

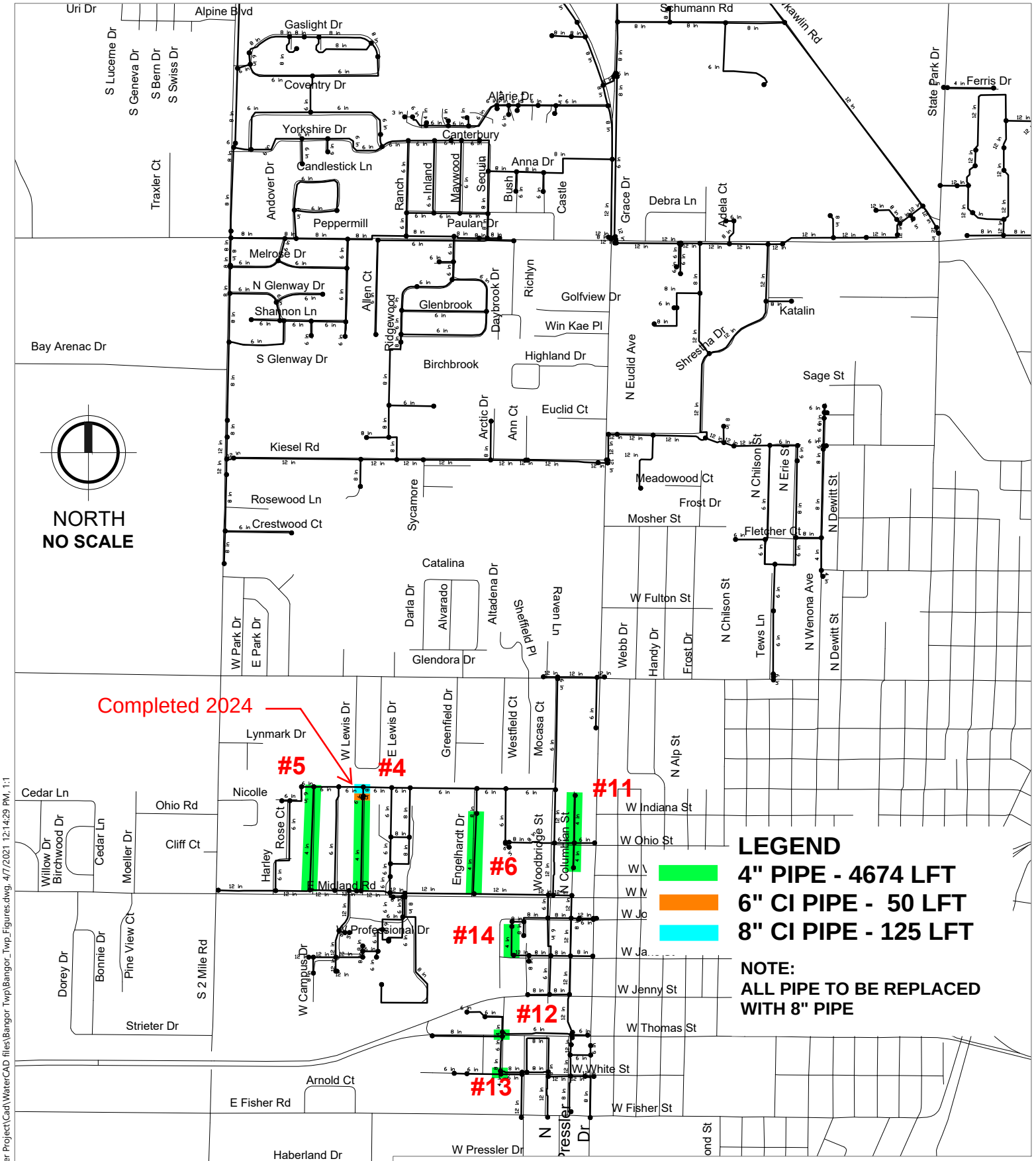
PIPE REPLACMENT PLAN 1

F&V PROJECT NO. 822540

F&V

M:\Proj\822001-823000\822540 Bay County Water Project\Cad\WaterCAD files\Bangor Twp\Bangor_Twp_Figures.dwg, 4/7/2021 12:13:30 PM, 1:1


NORTH
NO SCALE
E Shod St
Joyce St
Malcolm St
Benjamin St
S Arthur St
S Tammy St
Leona
E Kirschling Dr
Gorene Dr
Central Ct
Fredrick Dr
Patterson
Ada Dr
Wheeler Rd
Plummer Dr
Dixon Ln
Hillside Ln
Longfore Dr
Riata Dr
Hartz St
Richmark Ln
Coyer Ln
Cambria Dr
Regan Rd
Old Kawkawlin Rd
Schumann Rd
Country Meadows Ln
#10
#9
State Park Dr
Ferris Dr
Bay City Mall Dr
Hushen Dr
S Paul Cir
Ace Commercial Ct
Zander Dr
Sherry Ct
Kuerbitz Dr
Barted Rd
Jean Rd
Patterson Rd
Ward Rd
Eliminated
Debra Ln
Adela Ct
E Wilder Rd
E Harbor Vw
Katalin
Shrestha Dr
Sage St
N Chilson St
N Erie St
N Dewitt St
Frost Dr
Fletcher Ct
Completed
N Wenona Ave
Tews Ln
#15
N Alp St
LEGEND
4" PIPE - 2587 LFT
6" CI PIPE - 1453 LFT
NOTE:
ALL PIPE TO BE REPLACED
WITH 8" PIPE.
CHARTER TWP. OF BANGOR
BAY CITY, MI
DWSRF PROJECT PLAN
PIPE REPLACMENT PLAN 2
F&V PROJECT NO. 822540
F&V
M:\Proj\822001-823000\822540 Bay County Water Project\Cad\WaterCAD files\Bangor Twp\Bangor_Twp_Figures.dwg, 4/7/2021 12:13:54 PM, 1:1


Completed 2024
#5
#4
#11
#6
#14
#12
#13
NORTH
NO SCALE
LEGEND
4" PIPE - 4674 LFT
6" CI PIPE - 50 LFT
8" CI PIPE - 125 LFT
NOTE:
ALL PIPE TO BE REPLACED
WITH 8" PIPE
Uri Dr
Alpine Blvd
Gaslight Dr
Coventry Dr
Yorkshire Dr
Candlestick Ln
Peppermill
Melrose Dr
N Glenway Dr
Shannon Ln
S Glenway Dr
Bay Arenac Dr
Kiesel Rd
Rosewood Ln
Crestwood Ct
Lynmark Dr
Cedar Ln
Ohio Rd
Cliff Ct
Nicolle
Rose Ct
Harley
E Midland Rd
Professional Dr
W Campus Dr
S 2 Mile Rd
Strieter Dr
Dorey Dr
Bonnie Dr
Pine View Ct
Willow Dr
Birchwood Dr
Cedar Ln
Moeller Dr
Arnold Ct
E Fisher Rd
Haberland Dr
Oakhurst Ct
Maplegrove Ct
Kasemeyer Rd
Oakbrook St
Summerhill St
Pepper Berry Dr
Queen Annes Ln
Prairie Creek
Schumann Rd
Kawlin Rd
State Park Dr
Ferris Dr
Alarie Dr
Canterbury
Anna Dr
Andover Dr
Traxler Ct
Ranch
Inland
Maywood
Sequin
Bush
Castle
Grace Dr
Debra Ln
Adela Ct
Paulan Dr
Allen Ct
Ridgewood
Glenbrook
Daybrook Dr
Richlyn
Golfview Dr
Win Kae Pl
Katalin
Shrestha Dr
N Euclid Ave
Highland Dr
Birchbrook
Arctic Dr
Ann Ct
Euclid Ct
Sage St
Meadowood Ct
Frost Dr
Mosher St
Fletcher Ct
N Chilson St
N Erie St
N Dewitt St
Sycamore
Catalina
Darla Dr
Alvarado
Altadena Dr
Sheffield Pl
Raven Ln
Glendora Dr
W Park Dr
E Park Dr
W Fulton St
Webb Dr
Handy Dr
Frost Dr
Tews Ln
N Wenona Ave
W Lewis Dr
E Lewis Dr
Greenfield Dr
Westfield Ct
Mocasa Ct
N Alp St
Engelhardt Dr
Woodbridge St
N Columbian St
W Indiana St
W Ohio St
W Jenny St
W Thomas St
W White St
W Fisher St
W Pressler Dr
N Pressler Dr
CHARTER TWP. OF BANGOR
BAY CITY, MI
DWSRF PROJECT PLAN
PIPE REPLACMENT PLAN 3
F&V PROJECT NO. 822540
F&V
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Appendix N:

Water System Sanitary Survey

GRETCHEN WHITMER
GOVERNOR

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

EGLE

LIESL EICHLER CLARK
DIRECTOR

May 7, 2020

Mr. Trevor Jacobs
Bangor Township
3933 Patterson Road
Bay City, Michigan 48706

WSSN: 00390
County: Bay

Dear Mr. Jacobs:

SUBJECT: Bangor Township Water System Sanitary Survey (Survey)

This letter confirms the Department of Environment, Great Lakes, and Energy's (EGLE's) staff meeting via phone, with Mr. Trevor Jacobs on April 29, 2020, to conduct a Survey of Bangor Township's Water Supply, (Township) and to present the final findings, discuss areas for improvement, and identify timelines for corrective action 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's records, provide technical assistance, and identify potential risks that may adversely affect drinking water quality. Enclosed, is a copy of the Sanitary Survey Report (Report) for your reference.

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

Survey Element	Findings
Source	Not Applicable
Treatment	Not Applicable
Distribution System	Recommendation
Finished Water Storage	Not Applicable
Pumps	Not Applicable
Monitoring & Reporting	No Deficiencies/Recommendations
Management & Operations	No Deficiencies/Recommendations
Operator Compliance	No Deficiencies/Recommendations
Security	No Deficiencies/Recommendations
Financial	No Deficiencies/Recommendations
Other	No Deficiencies/Recommendations

No deficiencies of Act 399 were identified at the time of the Survey. Thank you for your efforts in maintaining compliance with the Township's water system.

Recommendation:

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 recommendation was identified:

1. Distribution System:

   The Cross Connection Control Program should be revised to include residential systems. EGLE recommends testing residential lawn irrigation systems at a minimum of once every 5 years.

If you have any questions, please feel free to contact me at the phone number listed below, or by email at BaileyK11@Michigan.gov.

Sincerely,

Kristin Bailey

Kristin Bailey
District Engineer
Field Operations Section
Drinking Water and Environmental Health Division
989-280-1291

Enclosure
cc/enc: Mr. Glenn Rowley, Bangor Township

Appendix O:

Asset Management Plan

Bangor Township
Water Asset Management Plan

CONTENTS

List of Tables

EXECUTIVE SUMMARY

OVERVIEW

This report summarizes the Asset Management Program (AMP) for the Bangor Township water utility system. It is submitted to comply with Rule 1606 of Act 399 in which a community water supply that serves more than 1,000 people shall implement an asset management program as defined in R 325.10102 beginning January 1, 2018. The WSSN for Bangor Township is 00390.

Bangor Township, located in the central portion of Bay County in Mid-Michigan, has a type 1 public water supply and distribution system which is currently serving a population of 11,938. The Township has a contract with Bay County DWS to operate and maintain the distribution system.

ASSET INVENTORY

The system contains the following:

- Water Main 3-inches to 12-inches in diameter – over 428,000 feet
- Fire hydrants with valves – 654
- Main line valves – 707.

The Township gets treated water from the Bay Area Water Treatment Plant.

The water asset inventory is included in Table 2 and provides source asset description, year installed, location, manufacturer (where applicable), replacement cost, useful life and condition rating on a scale of 1-5. Approximately 6.8% of the distribution system has an unknown installation date.

There are certain sections of water main within the system where the actual pipe material cannot be confirmed. The Bay County DWS staff is in the process to further investigate these areas to confirm what the actual pipe material is. These areas for the time being have been identified as Unknown. The Unknown pipe makes up 1.2% for the distribution pipe. The report will be updated after the investigation is completed.

The Department is in the process to determine the locations of existing lead water services within the district. Once the lead services are identified, the Water Asset Management Plan will be updated to address a replacement program.

CRITICALITY ASSESSMENT

The criticality of the assets of the Township water utility system are based on a numerical (1-5) rating system of performance for Probability of Failure and Consequence of Failure. To determine criticality the following formula is used:

Criticality Factor = Probability of Failure x Consequence of Failure

Details of the asset rating system are included in Table 1. The water asset inventory in Table 2 contains the Criticality Factor for each asset in the Bangor Township water supply system.

LEVEL OF SERVICE GOALS

Level of Service (LOS) goals were developed in collaboration with Township and County administrative staff. The LOS goals are detailed in Table 3.

CAPITAL IMPROVEMENT PLAN

A five (5) year and twenty (20) year Capital Improvement Plan (CIP) was developed for Bangor Township based on the criticality assessment within this report. As a part of the AMP process, the CIP was reviewed with the Bangor Township Board. The water supply system CIP is included in Table 4. The CIP for Bangor Twp is quite large due to the age of the system. The Township will be monitoring available grant/loan funding sources for replacement of the aged water main.

Funding Structure and Rate Methodology

The MDEQ requires a summary detailing the funding structure and rate methodology that provides sufficient resources to meet current operating expenses. For Bangor Township the current rate structure, and previous years' summary of revenues and expenditures are included in Appendix A.

The Township has approved raising the commodity rate by $0.27/CCF on January 1, 2018 to cover the water fund deficit. The Bay Co DWS finance director has determined the approved increase is sufficient to cover future water fund deficits.

Asset Management Team

Utility Information

Utility Name:	Bangor Township Distribution System
Street Address:	180 State Park Drive
City:	Bay City
Zip Code:	48706
Phone Number:	989-684-8931
Email:	glennrowley@bangortownship.org
Number of Connections:	5,213
Number of Customers:	11,938

Personnel

Contact Person:	Bill Bohlen
Title:	Bay County DWS Director
Email:	bboh@baycodws.org
Team Member:	Ryan Goebel
Title:	Bay County WTP Superintendent
Email:	rgoebel@baycodws.org
Team Member:	Trevor Jacobs
Title:	Bay County Distribution Supervisor
Email:	tjac@baycodws.org
Team Member:	Fleis & VandenBrink Engineering – Gary Bartow
Role:	Engineer
Email:	gbartow@fveng.com
Team Member:	Fleis & VandenBrink Engineering – Doug Stevens, PE
Role:	Engineer
Email:	dstevens@fveng.com
Team Member:	Jim Marter
Title:	Finance Director
Email:	jmar@baycodws.org

Probability of Failure	
Performance Rating	**Description**
5	Imminent - Likely to occur in the life of the item
4	Probable - Will occur several times in the life of an item
3	Occasional - Likely to occur some- time in the life of an item
2	Remote - Unlikely but possible to occur in the life of an item
1	Improbable - So unlikely, it can be assumed occurrence may not be experienced

*Consequence of Failure**	
Performance Rating	**Description**
5	Catastrophic disruption
4	Major disruption
3	Moderate disruption
2	Minor disruption
1	Insignificant disruption

FLEIS&VANDENBRINK

Table 2
Water Asset Inventory

Bangor Township Water Asset Management Program
Project # 822540

Current Year: 2018

Source Assets

Source Assets	Year Installed	Location	Latitude	Longitude	Manufacturer	Replacement Cost	Remaining Useful Life In Years	Probability of Failure	Consequence of Failure	Criticality Factor
N/A										

If Criticality Factor is greater than 16 cell will turn RED
If Criticality Factor is greater than 16 add to CIP table

Treatment Assets

Treatment Assets	Year Installed	Location	Latitude	Longitude	Manufacturer	Replacement Cost	Remaining Useful Life In Years	Probability of Failure	Consequence of Failure	Criticality Factor
Water Treatment Equipment - Useful life 15 years										
N/A										

If Criticality Factor is greater than 16 cell will turn RED
If Criticality Factor is greater than 16 add to CIP table

Storage Assets

Storage Assets	Year Installed	Material	Location / Label	Capacity	Manufacturer	Replacement Cost	Remaining Useful Life In Years	Probability of Failure	Consequence of Failure	Criticality Factor
Water Storage - Useful life: 90 years										
N/A										

Distribution Assets

Distribution Assets	Year Installed	Material	Diameter (in)	Total Length (ft)/Quantity	Manufacturer	Replacement Cost	Remaining Useful Life In Years	Probability of Failure	Consequence of Failure	Criticality Factor
Watermain - Useful Life Based on Material										
Replacement cost*:	1953	AC	6	9,836		$ 1,180,320.00	15	5	1	5
8" @ $120 per foot	1953	AC	8	3,910		$ 469,200.00	15	5	2	10
10" @ $130 per foot	1953	DI	6	5,882		$ 705,840.00	10	5	1	5
12" @ $130 per foot	1953	DI	8	149		$ 17,880.00	10	5	2	10
16" @ $160 per foot	1955	AC	4	967		$ 116,040.00	17	4	1	4
	1955	AC	6	52,480		$ 6,297,600.00	17	4	1	4
	1955	AC	8	17,070		$ 2,048,400.00	17	4	2	8
	1955	DI	6	5,581		$ 669,720.00	12	5	1	5
	1955	DI	8	1,609		$ 193,080.00	12	5	2	10
	1956	AC	6	5,680		$ 681,600.00	18	4	1	4
	1957	AC	6	2,417		$ 290,040.00	19	4	1	4
	1957	AC	8	6,458		$ 774,960.00	19	4	2	8
	1957	CI	8	5,815		$ 697,800.00	9	5	2	10
	1957	PVC	8	652		$ 78,240.00	9	5	2	10
	1958	AC	6	3,325		$ 399,000.00	20	4	1	4
	1959	AC	6	2,187		$ 262,440.00	21	4	1	4
	1960	AC	6	2,470		$ 296,400.00	22	4	1	4
	1960	AC	8	94		$ 11,280.00	22	4	2	8
	1961	AC	6	3,943		$ 473,160.00	23	4	1	4
	1961	AC	8	890		$ 106,800.00	23	4	2	8
	1962	AC	6	6,750		$ 810,000.00	24	4	1	4

FLEIS&VANDENBRINK

Table 2
Water Asset Inventory

Bangor Township Water Asset Management Program
Project # 822540

Distribution Assets										
Distribution Assets	Year Installed	Material	Diameter (in)	Total Length (ft)/Quantity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
	1962	AC	8	1,154		$ 138,480.00	24	4	2	8
	1963	AC	6	3,252		$ 390,240.00	25	4	1	4
	1963	AC	8	3,864		$ 463,680.00	25	4	2	8
	1964	AC	6	8,206		$ 984,720.00	26	4	1	4
	1964	AC	12	2,062		$ 268,060.00	26	4	3	12
	1965	AC	4	1,046		$ 125,520.00	27	4	1	4
	1965	AC	6	2,536		$ 304,320.00	27	4	1	4
	1965	AC	8	2,884		$ 346,080.00	27	4	2	8
	1965	AC	12	447		$ 58,110.00	27	4	3	12
	1966	AC	4	1,307		$ 156,840.00	28	4	1	4
	1966	AC	6	6,254		$ 750,480.00	28	4	1	4
	1966	DI	6	134		$ 16,080.00	23	4	1	4
	1967	AC	6	7,491		$ 898,920.00	29	4	1	4
	1967	CI	4	259		$ 31,080.00	19	4	1	4
	1968	AC	6	8,172		$ 980,640.00	30	4	1	4
	1968	DI	10	26		$ 3,380.00	25	4	3	12
	1969	AC	6	10,250		$ 1,230,000.00	31	4	1	4
	1969	AC	8	2,330		$ 279,600.00	31	4	2	8
	1969	DI	6	157		$ 18,840.00	26	4	1	4
	1970	AC	3	96		$ 11,520.00	32	3	1	3
	1970	AC	6	2,663		$ 319,560.00	32	3	1	3
	1970	AC	12	4,489		$ 583,570.00	32	3	3	9
	1970	CI	4	446		$ 53,520.00	22	4	1	4
	1970	CI	12	133		$ 17,290.00	22	4	3	12
	1971	AC	4	375		$ 45,000.00	33	3	1	3
	1972	AC	6	4,745		$ 569,400.00	34	3	1	3
	1972	AC	8	1,034		$ 124,080.00	34	3	2	6
	1972	CI	4	983		$ 117,960.00	24	4	1	4
	1973	AC	6	2,754		$ 330,480.00	35	3	1	3
	1974	AC	6	1,710		$ 205,200.00	36	3	1	3
	1975	AC	6	430		$ 51,600.00	37	3	1	3
	1975	DI	8	32		$ 3,840.00	32	3	2	6
	1975	PVC	8	1,044		$ 125,280.00	27	4	2	8
	1976	AC	6	460		$ 55,200.00	38	3	1	3
	1977	AC	6	1,043		$ 125,160.00	39	3	1	3
	1977	AC	8	3,927		$ 471,240.00	39	3	2	6
	1977	PVC	6	35		$ 4,200.00	29	3	1	3
	1977	PVC	8	974		$ 116,880.00	29	3	2	6
	1980	AC	6	1,162		$ 139,440.00	42	3	1	3
	1980	AC	8	1,992		$ 239,040.00	42	3	2	6
	1980	AC	12	88		$ 11,440.00	42	3	3	9
	1980	PVC	6	73		$ 8,760.00	32	3	1	3
	1982	AC	6	1,101		$ 132,120.00	44	3	1	3
	1982	CI	6	685		$ 82,200.00	34	3	1	3
	1982	PVC	6	1,237		$ 148,440.00	34	3	1	3
	1983	AC	6	829		$ 99,480.00	45	3	1	3
	1983	AC	8	888		$ 106,560.00	45	3	2	6
	1983	PVC	8	2,622		$ 314,640.00	35	3	2	6
	1984	AC	6	647		$ 77,640.00	46	3	1	3
	1984	AC	8	165		$ 19,800.00	46	3	2	6
	1984	DI	8	3,061		$ 367,320.00	41	3	2	6

Distribution Assets										
Distribution Assets	Year Installed	Material	Diameter (in)	Total Length (ft)/Quantity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
	1984	DI	10	11,680		$ 1,518,400.00	41	3	3	9
	1984	PVC	6	314		$ 37,680.00	36	3	1	3
	1984	PVC	8	1,834		$ 220,080.00	36	3	2	6
	1984	Unknown	8	743		$ 89,160.00	#N/A	#N/A	2	#N/A
	1985	AC	6	833		$ 99,960.00	47	3	1	3
	1985	CI	6	119		$ 14,280.00	37	3	1	3
	1986	AC	6	495		$ 59,400.00	48	2	1	2
	1986	AC	10	238		$ 30,940.00	48	2	3	6
	1986	AC	12	2,198		$ 285,740.00	48	2	3	6
	1986	DI	10	103		$ 13,390.00	43	3	3	9
	1986	DI	12	84		$ 10,920.00	43	3	3	9
	1986	PVC	6	305		$ 36,600.00	38	3	1	3
	1986	PVC	8	2,074		$ 248,880.00	38	3	2	6
	1986	PVC	12	962		$ 125,060.00	38	3	3	9
	1987	AC	8	2,715		$ 325,800.00	49	2	2	4
	1987	AC	12	2,396		$ 311,480.00	49	2	3	6
	1987	DI	12	576		$ 74,880.00	44	3	3	9
	1987	PVC	6	163		$ 19,560.00	39	3	1	3
	1987	PVC	8	1,287		$ 154,440.00	39	3	2	6
	1988	AC	12	1,757		$ 228,410.00	50	2	3	6
	1988	DI	6	725		$ 87,000.00	45	2	1	2
	1988	PVC	4	50		$ 6,000.00	40	3	1	3
	1988	PVC	8	2,329		$ 279,480.00	40	3	2	6
	1989	PVC	8	650		$ 78,000.00	41	3	2	6
	1990	AC	6	470		$ 56,400.00	52	2	1	2
	1990	AC	12	3,253		$ 422,890.00	52	2	3	6
	1990	DI	6	88		$ 10,560.00	47	2	1	2
	1990	DI	8	2,495		$ 299,400.00	47	2	2	4
	1990	DI	12	233		$ 30,290.00	47	2	3	6
	1990	PVC	4	439		$ 52,680.00	42	2	1	2
	1990	PVC	8	2,430		$ 291,600.00	42	2	2	4
	1990	PVC	12	7,853		$ 1,020,890.00	42	2	3	6
	1990	Unknown	12	222		$ 28,860.00	#N/A	#N/A	3	#N/A
	1991	AC	12	636		$ 82,680.00	53	2	3	6
	1991	DI	8	2,627		$ 315,240.00	48	2	2	4
	1991	PVC	12	936		$ 121,680.00	43	2	3	6
	1992	DI	8	310		$ 37,200.00	49	2	2	4
	1992	PVC	8	2,288		$ 274,560.00	44	2	2	4
	1992	PVC	12	1,938		$ 251,940.00	44	2	3	6
	1993	DI	6	41		$ 4,920.00	50	2	1	2
	1993	DI	8	903		$ 108,360.00	50	2	2	4
	1993	PVC	6	93		$ 11,160.00	45	2	1	2
	1993	PVC	8	1,949		$ 233,880.00	45	2	2	4
	1993	PVC	12	1,161		$ 150,930.00	45	2	3	6
	1993	Unknown	8	608		$ 72,960.00	#N/A	#N/A	2	#N/A
	1994	DI	8	663		$ 79,560.00	51	2	2	4
	1994	PVC	8	3,561		$ 427,320.00	46	2	2	4
	1994	PVC	12	123		$ 15,990.00	46	2	3	6
	1995	AC	12	300		$ 39,000.00	57	2	3	6
	1995	DI	12	44		$ 5,720.00	52	2	3	6
	1995	PVC	8	1,533		$ 183,960.00	47	2	2	4

FLEIS&VANDENBRINK

Table 2
Water Asset Inventory

Bangor Township Water Asset Management Program
Project # 822540

Distribution Assets										
Distribution Assets	Year Installed	Material	Diameter (in)	Total Length (ft)/Quantity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
	1995	PVC	12	3,007		$ 390,910.00	47	2	3	6
	1996	AC	6	446		$ 53,520.00	58	2	1	2
	1996	CI	4	609		$ 73,080.00	48	2	1	2
	1996	DI	4	45		$ 5,400.00	53	2	1	2
	1996	DI	8	57		$ 6,840.00	53	2	2	4
	1996	DI	12	105		$ 13,650.00	53	2	3	6
	1996	PVC	8	3,032		$ 363,840.00	48	2	2	4
	1996	PVC	12	984		$ 127,920.00	48	2	3	6
	1997	AC	8	114		$ 13,680.00	59	2	2	4
	1997	AC	12	245		$ 31,850.00	59	2	3	6
	1997	CI	4	1,414		$ 169,680.00	49	2	1	2
	1997	CI	6	42		$ 5,040.00	49	2	1	2
	1997	CI	8	109		$ 13,080.00	49	2	2	4
	1997	DI	8	1,837		$ 220,440.00	54	2	2	4
	1997	PVC	8	7,272		$ 872,640.00	49	2	2	4
	1997	PVC	12	7,479		$ 972,270.00	49	2	3	6
	1997	Unknown	8	1,184		$ 142,080.00	#N/A	#N/A	2	#N/A
	1998	PVC	8	3,479		$ 417,480.00	50	2	2	4
	1998	PVC	12	6,199		$ 805,870.00	50	2	3	6
	1999	DI	8	604		$ 72,480.00	56	2	2	4
	1999	PVC	12	1,083		$ 140,790.00	51	2	3	6
	2000	DI	12	34		$ 4,420.00	57	2	3	6
	2000	PVC	8	495		$ 59,400.00	52	2	2	4
	2000	PVC	12	1,230		$ 159,900.00	52	2	3	6
	2000	Unknown	12	471		$ 61,230.00	#N/A	#N/A	3	#N/A
	2001	AC	12	85		$ 11,050.00	63	2	3	6
	2001	DI	6	706		$ 84,720.00	58	2	1	2
	2001	DI	8	396		$ 47,520.00	58	2	2	4
	2001	PVC	8	6,034		$ 724,080.00	53	2	2	4
	2001	Unknown	8	293		$ 35,160.00	#N/A	#N/A	2	#N/A
	2002	CI	12	1,182		$ 153,660.00	54	2	3	6
	2002	DI	6	66		$ 7,920.00	59	2	1	2
	2002	DI	8	593		$ 71,160.00	59	2	2	4
	2002	DI	12	255		$ 33,150.00	59	2	3	6
	2002	PVC	8	1,052		$ 126,240.00	54	2	2	4
	2002	PVC	12	1,276		$ 165,880.00	54	2	3	6
	2002	Unknown	8	722		$ 86,640.00	#N/A	#N/A	2	#N/A
	2003	DI	12	22		$ 2,860.00	60	1	3	3
	2003	PVC	8	3,749		$ 449,880.00	55	2	2	4
	2003	PVC	12	650		$ 84,500.00	55	2	3	6
	2004	PVC	8	2,682		$ 321,840.00	56	1	2	2
	2004	PVC	12	183		$ 23,790.00	56	1	3	3
	2005	DI	8	192		$ 23,040.00	62	1	2	2
	2005	DI	12	328		$ 42,640.00	62	1	3	3
	2005	PVC	8	1,432		$ 171,840.00	57	1	2	2
	2005	PVC	12	1,482		$ 192,660.00	57	1	3	3
	2006	PVC	8	2,855		$ 342,600.00	58	1	2	2
	2007	PVC	8	3,794		$ 455,280.00	59	1	2	2
	2007	PVC	12	2,622		$ 340,860.00	59	1	3	3
	2009	PVC	8	3,187		$ 382,440.00	61	1	2	2
	2009	PVC	12	2,927		$ 380,510.00	61	1	3	3

Distribution Assets										
Distribution Assets	Year Installed	Material	Diameter (in)	Total Length (ft)/Quantity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
	2012	PVC	8	2,287		$ 274,440.00	64	1	2	2
	2014	PVC	6	364		$ 43,680.00	66	1	1	1
	2014	PVC	8	1,283		$ 153,960.00	66	1	2	2
	2015	PVC	8	299		$ 35,880.00	67	1	2	2
	2016	PVC	8	930		$ 111,600.00	68	1	2	2
	?	AC	4	3,110		$ 373,200.00	Undetermined	1	1	1
	?	AC	6	6,028		$ 723,360.00	Undetermined	1	1	1
	?	AC	8	321		$ 38,520.00	Undetermined	1	2	2
	?	AC	12	3,084		$ 400,920.00	Undetermined	1	3	3
	?	CI	4	2,855		$ 342,600.00	Undetermined	1	1	1
	?	CI	6	2,656		$ 318,720.00	#VALUE!	#VALUE!	1	#VALUE!
	?	DI	4	52		$ 6,240.00	#VALUE!	#VALUE!	1	#VALUE!
	?	DI	6	4,104		$ 492,480.00	#VALUE!	#VALUE!	1	#VALUE!
	?	DI	8	1,509		$ 181,080.00	Undetermined	1	2	2
	?	DI	12	44		$ 5,720.00	Undetermined	1	3	3
	?	PVC	6	1,304		$ 156,480.00	Undetermined	1	1	1
	?	PVC	8	3,492		$ 419,040.00	Undetermined	1	2	2
	?	PVC	12	95		$ 12,350.00	Undetermined	1	3	3
	?	Unknown	6	689		$ 82,680.00	Undetermined	#N/A	1	#N/A
	?	Unknown	8	151		$ 18,120.00	Undetermined	#N/A	2	#N/A
Total				428,744		$ 52,239,380.00				
Hydrants - Useful Life: 90 Years										
Replacement @ $3,000 each	1953			34		$ 102,000.00	25	4	2	8
	1955			119		$ 357,000.00	27	4	2	8
	1956			8		$ 24,000.00	28	4	2	8
	1957			12		$ 36,000.00	29	4	2	8
	1958			5		$ 15,000.00	30	4	2	8
	1959			2		$ 6,000.00	31	4	2	8
	1960			5		$ 15,000.00	32	4	2	8
	1961			8		$ 24,000.00	33	4	2	8
	1962			14		$ 42,000.00	34	4	2	8
	1963			10		$ 30,000.00	35	4	2	8
	1964			12		$ 36,000.00	36	3	2	6
	1965			8		$ 24,000.00	37	3	2	6
	1966			12		$ 36,000.00	38	3	2	6
	1967			11		$ 33,000.00	39	3	2	6
	1968			13		$ 39,000.00	40	3	2	6
	1969			15		$ 45,000.00	41	3	2	6
	1970			10		$ 30,000.00	42	3	2	6
	1972			10		$ 30,000.00	44	3	2	6
	1973			3		$ 9,000.00	45	3	2	6
	1974			2		$ 6,000.00	46	3	2	6
	1975			5		$ 15,000.00	47	3	2	6
	1976			2		$ 6,000.00	48	3	2	6
	1977			13		$ 39,000.00	49	3	2	6
	1980			6		$ 18,000.00	52	3	2	6
	1982			5		$ 15,000.00	54	2	2	4
	1983			7		$ 21,000.00	55	2	2	4
	1984			27		$ 81,000.00	56	2	2	4
	1985			1		$ 3,000.00	57	2	2	4
	1986			13		$ 39,000.00	58	2	2	4

FLEIS&VANDENBRINK

Table 2
Water Asset Inventory

Bangor Township Water Asset Management Program
Project # 822540

Distribution Assets										
Distribution Assets	Year Installed	Material	Diameter (in)	Total Length (ft)/Quantity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
	1987			13		$ 39,000.00	59	2	2	4
	1988			7		$ 21,000.00	60	2	2	4
	1989			3		$ 9,000.00	61	2	2	4
	1990			40		$ 120,000.00	62	2	2	4
	1991			6		$ 18,000.00	63	2	2	4
	1992			10		$ 30,000.00	64	2	2	4
	1993			14		$ 42,000.00	65	2	2	4
	1994			6		$ 18,000.00	66	2	2	4
	1995			12		$ 36,000.00	67	2	2	4
	1996			9		$ 27,000.00	68	2	2	4
	1997			34		$ 102,000.00	69	2	2	4
	1998			19		$ 57,000.00	70	2	2	4
	1999			4		$ 12,000.00	71	2	2	4
	2000			1		$ 3,000.00	72	1	2	2
	2001			12		$ 36,000.00	73	1	2	2
	2002			4		$ 12,000.00	74	1	2	2
	2003			3		$ 9,000.00	75	1	2	2
	2005			4		$ 12,000.00	77	1	2	2
	2006			4		$ 12,000.00	78	1	2	2
	2007			5		$ 15,000.00	79	1	2	2
	2009			5		$ 15,000.00	81	1	2	2
	2016			1		$ 3,000.00	88	1	2	2
	?			46		$ 138,000.00	Undetermined	1	2	2
Total				654		$ 1,962,000.00				
Valves - Useful Life: 70 Years										
Replacement cost:	1953		6	19		$ 34,200.00	5	5	2	10
6" @ $1,800	1953		8	6		$ 12,000.00	5	5	2	10
8" @ $2,000	1955		4	1		$ 1,800.00	7	5	2	10
10" @ $2,500	1955		6	65		$ 117,000.00	7	5	2	10
12" @ $3,000	1955		8	20		$ 40,000.00	7	5	2	10
16" @ $4,000	1956		6	7		$ 12,600.00	8	5	2	10
	1957		6	7		$ 12,600.00	9	5	2	10
	1957		8	8		$ 16,000.00	9	5	2	10
	1958		6	6		$ 10,800.00	10	5	2	10
	1958		8	1		$ 2,000.00	10	5	2	10
	1959		6	6		$ 10,800.00	11	5	2	10
	1960		6	4		$ 7,200.00	12	5	2	10
	1960		8	1		$ 2,000.00	12	5	2	10
	1961		6	9		$ 16,200.00	13	5	2	10
	1962		6	12		$ 21,600.00	14	4	2	8
	1962		8	3		$ 6,000.00	14	4	2	8
	1963		6	4		$ 7,200.00	15	4	2	8
	1963		8	4		$ 8,000.00	15	4	2	8
	1964		6	14		$ 25,200.00	16	4	2	8
	1964		12	2		$ 6,000.00	16	4	2	8
	1965		4	1		$ 1,800.00	17	4	2	8
	1965		6	7		$ 12,600.00	17	4	2	8
	1965		8	5		$ 10,000.00	17	4	2	8
	1965		12	4		$ 12,000.00	17	4	2	8
	1966		4	2		$ 3,600.00	18	4	2	8
	1966		6	8		$ 14,400.00	18	4	2	8

Distribution Assets										
Distribution Assets	Year Installed	Material	Diameter (in)	Total Length (ft)/Quantity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
	1967		4	1		$ 1,800.00	19	4	2	8
	1967		6	11		$ 19,800.00	19	4	2	8
	1968		6	14		$ 25,200.00	20	4	2	8
	1969		6	11		$ 19,800.00	21	4	2	8
	1969		8	3		$ 6,000.00	21	4	2	8
	1970		6	1		$ 1,800.00	22	4	2	8
	1970		12	1		$ 3,000.00	22	4	2	8
	1971		12	2		$ 6,000.00	23	4	2	8
	1972		6	11		$ 19,800.00	24	4	2	8
	1972		8	7		$ 14,000.00	24	4	2	8
	1973		6	2		$ 3,600.00	25	4	2	8
	1974		6	2		$ 3,600.00	26	4	2	8
	1975		6	2		$ 3,600.00	27	4	2	8
	1975		8	1		$ 2,000.00	27	4	2	8
	1976		6	2		$ 3,600.00	28	3	2	6
	1977		6	2		$ 3,600.00	29	3	2	6
	1977		8	3		$ 6,000.00	29	3	2	6
	1980		6	1		$ 1,800.00	32	3	2	6
	1980		8	2		$ 4,000.00	32	3	2	6
	1982		6	6		$ 10,800.00	34	3	2	6
	1982		8	1		$ 2,000.00	34	3	2	6
	1983		6	3		$ 5,400.00	35	3	2	6
	1983		8	6		$ 12,000.00	35	3	2	6
	1984		4	1		$ 1,800.00	36	3	2	6
	1984		6	1		$ 1,800.00	36	3	2	6
	1984		8	12		$ 24,000.00	36	3	2	6
	1984		10	10		$ 25,000.00	36	3	2	6
	1985		6	2		$ 3,600.00	37	3	2	6
	1986		6	2		$ 3,600.00	38	3	2	6
	1986		8	3		$ 6,000.00	38	3	2	6
	1986		12	3		$ 9,000.00	38	3	2	6
	1987		6	1		$ 1,800.00	39	3	2	6
	1987		8	7		$ 14,000.00	39	3	2	6
	1987		12	4		$ 12,000.00	39	3	2	6
	1988		4	3		$ 5,400.00	40	3	2	6
	1988		6	2		$ 3,600.00	40	3	2	6
	1988		8	5		$ 10,000.00	40	3	2	6
	1988		12	7		$ 21,000.00	40	3	2	6
	1989		8	1		$ 2,000.00	41	3	2	6
	1989		12	3		$ 9,000.00	41	3	2	6
	1990		6	1		$ 1,800.00	42	2	2	4
	1990		8	12		$ 24,000.00	42	2	2	4
	1990		12	28		$ 84,000.00	42	2	2	4
	1991		8	4		$ 8,000.00	43	2	2	4
	1991		12	7		$ 21,000.00	43	2	2	4
	1992		8	7		$ 14,000.00	44	2	2	4
	1992		12	4		$ 12,000.00	44	2	2	4
	1993		6	2		$ 3,600.00	45	2	2	4
	1993		8	7		$ 14,000.00	45	2	2	4
	1993		12	3		$ 9,000.00	45	2	2	4
	1994		8	9		$ 18,000.00	46	2	2	4

Distribution Assets										
Distribution Assets	Year Installed	Material	Diameter (in)	Total Length (ft)/Quantity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Probability of Failure	Consequence of Failure	Criticality Factor
	1995		8	4		$ 8,000.00	47	2	2	4
	1995		12	9		$ 27,000.00	47	2	2	4
	1996		8	7		$ 14,000.00	48	2	2	4
	1996		12	2		$ 6,000.00	48	2	2	4
	1997		8	26		$ 52,000.00	49	2	2	4
	1997		12	11		$ 33,000.00	49	2	2	4
	1998		8	6		$ 12,000.00	50	2	2	4
	1998		12	9		$ 27,000.00	50	2	2	4
	1999		8	2		$ 4,000.00	51	2	2	4
	1999		12	2		$ 6,000.00	51	2	2	4
	2000		8	1		$ 2,000.00	52	2	2	4
	2000		12	3		$ 9,000.00	52	2	2	4
	2001		8	12		$ 24,000.00	53	2	2	4
	2002		8	9		$ 18,000.00	54	2	2	4
	2002		10	2		$ 5,000.00	54	2	2	4
	2002		12	15		$ 45,000.00	54	2	2	4
	2003		6	1		$ 1,800.00	55	2	2	4
	2003		8	6		$ 12,000.00	55	2	2	4
	2003		12	5		$ 15,000.00	55	2	2	4
	2003		?	1		#N/A	55	2	2	4
	2004		6	1		$ 1,800.00	56	1	2	2
	2004		8	2		$ 4,000.00	56	1	2	2
	2004		12	1		$ 3,000.00	56	1	2	2
	2005		8	3		$ 6,000.00	57	1	2	2
	2005		12	8		$ 24,000.00	57	1	2	2
	2006		8	4		$ 8,000.00	58	1	2	2
	2007		8	8		$ 16,000.00	59	1	2	2
	2007		12	6		$ 18,000.00	59	1	2	2
	2009		8	5		$ 10,000.00	61	1	2	2
	2009		12	4		$ 12,000.00	61	1	2	2
	2010		10	1		$ 2,500.00	62	1	2	2
	2010		12	1		$ 3,000.00	62	1	2	2
	2012		8	8		$ 16,000.00	64	1	2	2
	2014		8	1		$ 2,000.00	66	1	2	2
	2016		8	3		$ 6,000.00	68	1	2	2
	?		4	2		$ 3,600.00	Undetermined	1	2	2
	?		6	24		$ 43,200.00	Undetermined	1	2	2
	?		8	15		$ 30,000.00	Undetermined	1	2	2
	?		10	1		$ 2,500.00	Undetermined	1	2	2
	?		12	4		$ 12,000.00	Undetermined	1	2	2
Total				707		#N/A				

*Assume all watermain less than 8" in diameter will be replaced with 8" watermain

If Criticality Factor is greater than 16 cell will turn RED

If Criticality Factor is greater than 16 add to CIP table

The following usefull life of different pipe materials are used based on department experience and knowledge of existing ground conditions:

- Cast Iron (CI) = 70 years
- Ductile Iron (DI) = 75 years
- Asbestos Cement (AC) = 80 years
- Polyvinylchloride (PVC) = 70 years
- High Density Polyethylene (HDPE) = 70 years

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE

We commit to maintaining and improving our water system to provide clean, safe drinking water and fire protection to the community while minimizing the long-term costs for their operation. The most cost effective means of the maintanence and improvements will be sought without sacrificing quality. We are committed to providing excellent customer service to our constituants.

LOS Determinants	Define the goal	How do you measure it
Safety	Safe work environment.	Staff safety meetings and discussion. No MIOSHA violations.
Security	Secure water assets from tampering.	Maintain fenced, locked, and lit facilties on a daily basis.
Operator certification	Competent certified operators to operate and maintain system.	Maintain a minimum of two certified operators at all times.
Customer complaints	Provide excellent customer service.	Respond to customer complaints within 2 business days of report, then provide results to the customer.
Upcoming regulatory changes	Monitor regulatory changes and comply in a timely fashion.	Attend conferences and training to keep regulatory compliance current. Maintain open communication with MDEQ to ensure compliance.
Response time	Provide exemplary customer service.	Respond to customer emergencies within 8 hours of receiving report. Give a minimum of 8 hour advance notice of planned service interruptions.
Operating Reserves	Funds to address unexpected expenditures.	Review operating reserves for adequacy of user.
Internal versus external funding	Maximize use of external low interest loans and grants.	Seek external funding for major projects as they present themselves.
Water Supply	Maintain agreements with BCDWS and/or BAWTP.	Review agreements as necessary.
Water Quality	Maintain industry leading water quality.	Analyze test sample reports and make necessary adjustments to exceed regulatory requirements.
Water Storage	Maintain agreements to be in compliance with the current water transmission standard with BAWTP.	Inspect facilities within minimum regulatory requirements.
Distribution	Maintain pipes, hydrants, valves, and pump stations to ensure good working order.	Maintain system in accordance with AWWA Standards.
Administrative	Maintain customer confidence and ensure accurate billing by continuous improvement of customer education and communication.	Continuously work to diminish customer complaints and obtain feedback from customers.

FLEIS&VANDENBRINK

Table 4
Capital Improvement Project Plan

Bangor Township Water Asset Management Program
Project # 822540

Directions

A. List projects to be completed
B. Determine how long before the project must begin
C. Enter the total projected cost of the project
D. To add more CIP's use insert function and add rows then copy first CIP row to new rows to transfer formulas
E. Enter information in highlighed cells
F. Remaining cells will calculate automatically.

Projects	Years Until Project Begins	Projected Cost	Reserve Required Each Year to pay Cash
Replace 1 - 4" main line valves	6	$ 1,800	$ 300
Replace 91 - 6" main line valves	6	$ 163,800	$ 27,300
Replace 26 - 8" main line valves	6	$ 52,000	$ 8,667
Replace 5,815' - 8" CI water main	9	$ 697,800	$ 77,533
Repalce 652' - 8" PVC water main	9	$ 78,240	$ 8,693
Replace 5,882' - 6" DI water main with 8" water main	10	$ 705,840	$ 70,584
Replace 149' - 8"DI water main	10	$ 17,880	$ 1,788
Replace 23 - 6" main line valves	10	$ 41,400	$ 4,140
Replace 10 - 8" main line valves	10	$ 20,000	$ 2,000
Replace 5,581 - 6" DI water main with 8" water main	12	$ 669,720	$ 55,810
Replace 1,609' - 8" DI water main	12	$ 193,080	$ 16,090
Replace 9,836' - 6" AC water main with 8" water main	15	$ 1,180,320	$ 78,688
Replace 3,910' - 8" AC water main	15	$ 469,200	$ 31,280
Repalce 39 - 6" main line valves	16	$ 70,200	$ 4,388
Replace 7 - 8" main line valves	16	$ 14,000	$ 875
Replace 2 - 12" main line valves	16	$ 6,000	$ 375
Replace 967' - 4" AC water main with 8"water main	17	$ 116,040	$ 6,826
Replace 52,480' - 6" AC water main with 8" water main	17	$ 6,297,400	$ 370,435
Replace 17,070' - 8" AC water main	17	$ 2,048,400	$ 120,494
Replace 4 - 4" main line valves	18	$ 7,200	$ 400
Replace 26 - 6" main line valves	18	$ 46,800	$ 2,600
Replace 5 - 8" main line valves	18	$ 10,000	$ 556
Replace 4 - 12" main line valves	18	$ 12,000	$ 667
Replace 5,680' - 6" AC water main with 8" water main	18	$ 681,600	$ 37,867
Replace 2,417' - 6" AC water main with 8" water main	19	$ 290,040	$ 15,265
Replace 6,458' - 8" AC water main	19	$ 774,960	$ 40,787
Replace 259' - 4" CI water main with 8" water main	19	$ 31,080	$ 1,636
Suggested total Capital Improvement reserve required in the current year in dollars.			**$ 986,043**

Click Total to add to Budget

APPENDIX A

CURRENT REVENUES AND EXPENDITURE
CURRENT RATES

Bay County Water & Sewer, MI

Budget Report

Group Summary

For Fiscal: 2018 Period Ending: 12/31/2018

Classificatio...	Original Total Budget	Current Total Budget	Period Activity	Fiscal Activity	Variance Favorable (Unfavorable)	Percent Used
Fund: 402 - Bangor Water						
Revenue						
500 - Gross service charges	1,842,000.00	1,842,000.00	2,561.60	1,976,599.79	134,599.79	107.31 %
600 - Service connections	13,000.00	13,000.00	1,330.00	28,378.00	15,378.00	218.29 %
610 - Charges, fees, etc.	27,400.00	27,400.00	6,370.26	26,465.68	-934.32	96.59 %
810 - Interest income	19,000.00	19,000.00	-6,305.98	8,837.95	-10,162.05	46.52 %
830 - Payment by local unit	0.00	0.00	59,253.08	67,511.93	67,511.93	0.00 %
Revenue Total:	**1,901,400.00**	**1,901,400.00**	**63,208.96**	**2,107,793.35**	**206,393.35**	**110.85 %**
Expense						
500 - Gross service charges	84,000.00	84,000.00	20,699.78	82,606.26	1,393.74	98.34 %
550 - Water costs	1,388,000.00	1,388,000.00	88,945.16	1,512,736.92	-124,736.92	108.99 %
700 - Personal services	460,929.00	460,929.00	97,662.56	456,859.28	4,069.72	99.12 %
710 - Utilities	5,680.00	5,680.00	878.50	6,301.16	-621.16	110.94 %
720 - Operation and maintenance	61,400.00	61,400.00	11,644.15	76,276.36	-14,876.36	124.23 %
730 - Administration	55,500.00	55,500.00	9,677.28	66,381.16	-10,881.16	119.61 %
740 - Fiscal and other charges	15,000.00	15,000.00	24,981.88	24,981.88	-9,981.88	166.55 %
770 - Depreciation	0.00	0.00	153,952.00	153,952.00	-153,952.00	0.00 %
Expense Total:	**2,070,509.00**	**2,070,509.00**	**408,441.31**	**2,380,095.02**	**-309,586.02**	**114.95 %**
Fund: 402 - Bangor Water Surplus (Deficit):	**-169,109.00**	**-169,109.00**	**-345,232.35**	**-272,301.67**	**-103,192.67**	**161.02 %**

Rate Code by Service Category Totals

B1-8-2-C - B1 6 COM C	1	7,354.17	0.00	0.00	3986.000000	0.0000	3,986.0000
B1-SD1 - B1-SEWER DEBT 1	2115	45,536.68	0.00	0.00	0.000000	0.0000	0.0000
B1-SD1-U - B1-SEWER DEBT 1-U	2	32.45	0.00	0.00	0.000000	0.0000	0.0000
B1-U-1-C - B1-U RES C	1	63.60	0.00	0.00	0.000000	0.0000	0.0000
B1-U-2-C - B1-U COM C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B1-U-4-C - B1-U INSTITUTIONAL C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B1-Unmetered Sewer - B1-Unmetered..	1	63.60	0.00	0.00	0.000000	0.0000	0.0000
S Category Totals:	4191	140,388.11	0.00	0.00	32854.000000	0.0000	32,854.0000

Service Category: W - Water

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-0-1-C - B1 5/8 RES C	2246	136,277.75	0.00	0.00	26529.000000	0.0000	26,529.0000
B1-0-2-C - B1 5/8 COM C	22	1,425.88	0.00	0.00	281.000000	0.0000	281.0000
B1-0-4-C - B1 5/8 INSTITUTIONAL C	3	145.77	0.00	0.00	27.000000	0.0000	27.0000
B1-0-5-C - B1 5/8 GOV C	1	52.89	0.00	0.00	10.000000	0.0000	10.0000
B1-0-S-C - B1 5/8 SPRINKLER C	162	6,435.38	0.00	0.00	1124.000000	0.0000	1,124.0000
B1-1-1-C - B1 3/4 RES C	122	8,826.18	0.00	0.00	1772.000000	0.0000	1,772.0000
B1-1-2-C - B1 3/4 COM C	3	253.27	0.00	0.00	52.000000	0.0000	52.0000
B1-1-4-C - B1 3/4 INSTITUTIONAL C	2	153.08	0.00	0.00	31.000000	0.0000	31.0000
B1-1-5-C - B1 3/4 GOV C	2	49.88	0.00	0.00	7.000000	0.0000	7.0000
B1-1-S-C - B1 3/4 SPRINKLER C	92	5,872.08	0.00	0.00	1154.000000	0.0000	1,154.0000
B1-2-1-C - B1 1 RES C	11	1,480.49	0.00	0.00	319.000000	0.0000	319.0000
B1-2-2-C - B1 1 COM C	5	191.35	0.00	0.00	33.000000	0.0000	33.0000
B1-2-4-C - B1 1 INSTITUTIONAL C	2	208.98	0.00	0.00	44.000000	0.0000	44.0000
B1-2-S-C - B1 1 SPRINKLER C	8	388.72	0.00	0.00	72.000000	0.0000	72.0000
B1-4-2-C - B1 1.5 COM C	3	5,047.77	0.00	0.00	1167.000000	0.0000	1,167.0000
B1-4-4-C - B1 1.5 INSTITUTIONAL C	2	832.48	0.00	0.00	189.000000	0.0000	189.0000
B1-4-5-C - B1 1.5 GOV C	6	1,353.64	0.00	0.00	301.000000	0.0000	301.0000
B1-4-S-C - B1 1.5 SPRINKLER C	1	143.19	0.00	0.00	31.000000	0.0000	31.0000
B1-5-1-C - B1 2 RES C	1	65.79	0.00	0.00	13.000000	0.0000	13.0000
B1-5-5-C - B1 2 GOV C	1	70.09	0.00	0.00	14.000000	0.0000	14.0000
B1-6-2-C - B1 3 COM C	1	5,922.39	0.00	0.00	1375.000000	0.0000	1,375.0000
B1-6-5-C - B1 3 GOV C	1	113.09	0.00	0.00	24.000000	0.0000	24.0000
B1-7-2-C - B1 4 COM C	1	5,449.39	0.00	0.00	1265.000000	0.0000	1,265.0000
B1-7-5-C - B1 4 GOV C	1	805.39	0.00	0.00	185.000000	0.0000	185.0000
B1-8-2-C - B1 6 COM C	1	17,149.69	0.00	0.00	3986.000000	0.0000	3,986.0000
B1-U-1-C - B1 U RES C	1	9.89	0.00	0.00	0.000000	0.0000	0.0000
W Category Totals:	2701	198,724.50	0.00	0.00	40005.000000	0.0000	40,005.0000
Totals:	6895	347,832.46	0.00	0.00	77525.000000	0.0000	77,525.0000

Revenue Totals

Revenue Code	Total Billed	Taxable
B1-FIRE HYDRANTS - B1-FIRE HYDRANTS	100.00	0.00
B1-FROZEN METER - B1-FROZEN METER	105.00	0.00
B1-OTH CUTOFF - B1-OTHER CUTOFF	350.00	0.00
B1-SD1 - B1-SEWER DEBT 1	45,569.13	0.00
B1-SW - B1-SEWER	103,438.83	0.00
B1-WA - B1-WATER	198,724.50	0.00
Revenue Totals:	348,287.46	

Read Groups

Read Group	# of Accounts	Total Bill Amount	Total Meter Consumption	Total Demand Consumption	Total KVAR Consumption
B1001	162	41,869.80	10768.000000	0.000000	0.000000
B1002	166	23,591.68	5372.000000	0.000000	0.000000
B1003	120	11,713.68	2318.000000	0.000000	0.000000
B1004	168	16,862.69	3303.000000	0.000000	0.000000
B1005	256	27,207.41	5558.000000	0.000000	0.000000
B1006	165	17,424.51	3422.000000	0.000000	0.000000
B1007	185	22,968.82	4685.000000	0.000000	0.000000
B1008	159	24,399.31	5518.000000	0.000000	0.000000
B1009	112	13,660.81	2941.000000	0.000000	0.000000
B1010	160	19,959.24	4470.000000	0.000000	0.000000
B1011	152	26,505.82	7750.000000	0.000000	0.000000
B1012	121	10,849.08	2111.000000	0.000000	0.000000
B1013	213	21,274.14	4262.000000	0.000000	0.000000
B1014	162	17,151.28	3475.000000	0.000000	0.000000
B1015	132	12,941.04	2675.000000	0.000000	0.000000
B1016	177	15,929.77	3296.000000	0.000000	0.000000
B1017	149	23,978.38	5601.000000	0.000000	0.000000

Rate Code by Service Category Totals

B2-U-2-C - B2 U COM C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-U-4-C - B2-U-4-C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-Unmetered Sewer - B2-Unmetered..	5	318.00	0.00	0.00	0.000000	0.0000	0.0000
S Category Totals:	4261	168,208.27	0.00	0.00	44244.000000	0.0000	44,244.0000

Service Category: W - Water

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B2-0-1-C - B2 5/8 RES C	1716	108,507.06	0.00	0.00	21292.000000	0.0000	21,292.0000
B2-0-2-C - B2 5/8 COM C	146	8,202.25	0.00	0.00	1574.000000	0.0000	1,574.0000
B2-0-4-C - B2 5/8 INSTITUTIONAL C	10	619.20	0.00	0.00	121.000000	0.0000	121.0000
B2-0-5-C - B2 5/8 GOV C	1	27.09	0.00	0.00	4.000000	0.0000	4.0000
B2-0-S-C - B2 5/8 SPRINKLER C	126	2,635.04	0.00	0.00	323.000000	0.0000	323.0000
B2-1-1-C - B2 3/4 RES C	50	3,715.20	0.00	0.00	749.000000	0.0000	749.0000
B2-1-2-C - B2 3/4 COM C	75	5,036.16	0.00	0.00	1001.000000	0.0000	1,001.0000
B2-1-4-C - B2 3/4 INSTITUTIONAL C	3	128.57	0.00	0.00	23.000000	0.0000	23.0000
B2-1-S-C - B2 3/4 SPRINKLER C	76	1,868.35	0.00	0.00	262.000000	0.0000	262.0000
B2-2-1-C - B2 1 RES C	3	382.27	0.00	0.00	82.000000	0.0000	82.0000
B2-2-2-C - B2 1 COM C	55	7,737.85	0.00	0.00	1673.000000	0.0000	1,673.0000
B2-2-4-C - B2 1 INSTITUTIONAL C	7	1,402.23	0.00	0.00	310.000000	0.0000	310.0000
B2-2-5-C - B2 1 GOV C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-2-S-C - B2 1 SPRINKLER C	19	1,181.21	0.00	0.00	231.000000	0.0000	231.0000
B2-4-2-C - B2 1.5 COM C	23	11,373.07	0.00	0.00	2592.000000	0.0000	2,592.0000
B2-4-4-C - B2 1.5 INSTITUTIONAL C	4	409.36	0.00	0.00	86.000000	0.0000	86.0000
B2-4-5-C - B2 1.5 GOV C	1	14.19	0.00	0.00	1.000000	0.0000	1.0000
B2-4-S-C - B2 1.5 SPRINKLER C	11	2,989.79	0.00	0.00	670.000000	0.0000	670.0000
B2-5-2-C - B2 2 COM C	28	20,972.82	0.00	0.00	4813.000000	0.0000	4,813.0000
B2-5-3-C - B2 2 INDUSTRIAL C	1	3,256.39	0.00	0.00	755.000000	0.0000	755.0000
B2-5-4-C - B2 2 INSTITUTIONAL C	5	5,476.05	0.00	0.00	1262.000000	0.0000	1,262.0000
B2-5-S-C - B2 2 SPRINKLER C	4	555.56	0.00	0.00	120.000000	0.0000	120.0000
B2-6-2-C - B2 3 COM C	19	23,979.81	0.00	0.00	5533.000000	0.0000	5,533.0000
B2-6-4-C - B2 3 INSTITUTIONAL C	3	979.97	0.00	0.00	221.000000	0.0000	221.0000
B2-6-5-C - B2 3 GOV C	1	2,804.89	0.00	0.00	650.000000	0.0000	650.0000
B2-6-S-C - B2 3 SPRINKLER C	1	1,028.99	0.00	0.00	237.000000	0.0000	237.0000
B2-7-2-C - B2 4 COM C	1	3,643.39	0.00	0.00	845.000000	0.0000	845.0000
B2-7-4-C - B2 4 INSTITUTIONAL C	3	6,015.27	0.00	0.00	1392.000000	0.0000	1,392.0000
B2-8-4-C - B2 6 INSTITUTIONAL C	1	1,347.19	0.00	0.00	311.000000	0.0000	311.0000
W Category Totals:	2393	226,289.22	0.00	0.00	47133.000000	0.0000	47,133.0000
Totals:	6659	394,834.39	0.00	0.00	91378.000000	0.0000	91,378.0000

Revenue Totals

Revenue Code	Total Billed	Taxable
B2-FIRE HYDRANTS - B2-FIRE HYDRANTS	300.00	0.00
B2-OTH CUTOFF - B2-OTHER CUTOFF	25.00	0.00
B2-SD1 - B2-SEWER DEBT 1	52,574.79	0.00
B2-SW - B2-SEWER	115,670.38	0.00
B2-WA - B2-WATER	226,289.22	0.00
Revenue Totals:	394,859.39	

Read Groups

Read Group	# of Accounts	Total Bill Amount	Total Meter Consumption	Total Demand Consumption	Total KVAR Consumption
B2001	187	38,381.60	9331.000000	0.000000	0.000000
B2002	198	31,564.42	7171.000000	0.000000	0.000000
B2003	215	24,858.16	5317.000000	0.000000	0.000000
B2004	197	46,569.96	11360.000000	0.000000	0.000000
B2005	152	16,202.94	3341.000000	0.000000	0.000000
B2006	163	19,371.93	4341.000000	0.000000	0.000000
B2007	191	29,744.64	6768.000000	0.000000	0.000000
B2008	179	17,703.06	3906.000000	0.000000	0.000000
B2009	144	16,595.37	3464.000000	0.000000	0.000000
B2010	119	28,867.40	7324.000000	0.000000	0.000000
B2011	178	33,479.74	8048.000000	0.000000	0.000000
B2012	120	15,681.34	3408.000000	0.000000	0.000000
B2013	118	13,841.74	2888.000000	0.000000	0.000000
B2014	153	18,014.45	3757.000000	0.000000	0.000000
B2015	134	43,982.64	10954.000000	0.000000	0.000000
Read Group Totals:	2,448	394,859.39	91378.000000	0.000000	0.000000

Rate Code by Service Category Totals

B1-7-5-C - B1 4 GOV C	1	428.04	0.00	0.00	5.000000	0.0000	5.0000
B1-8-2-C - B1 6 COM C	1	5,891.09	0.00	0.00	3193.000000	0.0000	3,193.0000
B1-SD1 - B1-SEWER DEBT 1	2115	46,131.31	0.00	0.00	0.000000	0.0000	0.0000
B1-SD1-U - B1-SEWER DEBT 1-U	2	33.00	0.00	0.00	0.000000	0.0000	0.0000
B1-U-1-C - B1-U RES C	1	63.60	0.00	0.00	0.000000	0.0000	0.0000
B1-U-2-C - B1-U COM C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B1-U-4-C - B1-U INSTITUTIONAL C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B1-Unmetered Sewer - B1-Unmetered..	1	63.60	0.00	0.00	0.000000	0.0000	0.0000
S Category Totals:	4181	142,058.70	0.00	0.00	32048.000000	0.0000	32,048.0000

Service Category: W - Water

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-0-1-C - B1 5/8 RES C	2227	134,963.24	0.00	0.00	26267.000000	4.0000	26,271.0000
B1-0-2-C - B1 5/8 COM C	19	2,165.91	0.00	0.00	460.000000	0.0000	460.0000
B1-0-4-C - B1 5/8 INSTITUTIONAL C	2	28.38	0.00	0.00	2.000000	0.0000	2.0000
B1-0-5-C - B1 5/8 GOV C	1	48.59	0.00	0.00	9.000000	0.0000	9.0000
B1-0-S-C - B1 5/8 SPRINKLER C	162	2,131.08	0.00	0.00	123.000000	0.0000	123.0000
B1-1-1-C - B1 3/4 RES C	121	7,534.89	0.00	0.00	1474.000000	0.0000	1,474.0000
B1-1-2-C - B1 3/4 COM C	3	218.87	0.00	0.00	44.000000	0.0000	44.0000
B1-1-4-C - B1 3/4 INSTITUTIONAL C	2	165.98	0.00	0.00	34.000000	0.0000	34.0000
B1-1-5-C - B1 3/4 GOV C	2	58.48	0.00	0.00	9.000000	0.0000	9.0000
B1-1-S-C - B1 3/4 SPRINKLER C	90	1,079.30	0.00	0.00	44.000000	0.0000	44.0000
B1-2-1-C - B1 1 RES C	12	1,000.18	0.00	0.00	205.000000	0.0000	205.0000
B1-2-2-C - B1 1 COM C	4	211.56	0.00	0.00	40.000000	0.0000	40.0000
B1-2-4-C - B1 1 INSTITUTIONAL C	2	282.08	0.00	0.00	61.000000	0.0000	61.0000
B1-2-S-C - B1 1 SPRINKLER C	6	67.94	0.00	0.00	2.000000	0.0000	2.0000
B1-4-2-C - B1 1.5 COM C	3	5,185.37	0.00	0.00	1199.000000	0.0000	1,199.0000
B1-4-4-C - B1 1.5 INSTITUTIONAL C	2	630.38	0.00	0.00	142.000000	0.0000	142.0000
B1-4-5-C - B1 1.5 GOV C	6	1,336.44	0.00	0.00	297.000000	0.0000	297.0000
B1-4-S-C - B1 1.5 SPRINKLER C	1	9.89	0.00	0.00	0.000000	0.0000	0.0000
B1-5-1-C - B1 2 RES C	1	74.39	0.00	0.00	15.000000	0.0000	15.0000
B1-5-5-C - B1 2 GOV C	1	48.59	0.00	0.00	9.000000	0.0000	9.0000
B1-6-2-C - B1 3 COM C	1	7,767.09	0.00	0.00	1804.000000	0.0000	1,804.0000
B1-6-5-C - B1 3 GOV C	1	9.89	0.00	0.00	0.000000	0.0000	0.0000
B1-7-2-C - B1 4 COM C	1	4,331.39	0.00	0.00	1005.000000	0.0000	1,005.0000
B1-7-5-C - B1 4 GOV C	1	31.39	0.00	0.00	5.000000	0.0000	5.0000
B1-8-2-C - B1 6 COM C	1	13,739.79	0.00	0.00	3193.000000	0.0000	3,193.0000
B1-U-1-C - B1 U RES C	1	9.89	0.00	0.00	0.000000	0.0000	0.0000
W Category Totals:	2673	183,130.98	0.00	0.00	36443.000000	4.0000	36,447.0000
Totals:	6856	332,084.82	0.00	0.00	72174.000000	5.0000	72,179.0000

Revenue Totals

Revenue Code	Total Billed	Taxable
B1-FIRE HYDRANTS - B1-FIRE HYDRANTS	100.00	0.00
B1-ON CALL - B1-ON CALL CHARGE	100.00	0.00
B1-OTH CUTOFF - B1-OTHER CUTOFF	775.00	0.00
B1-SD1 - B1-SEWER DEBT 1	46,164.31	0.00
B1-SW - B1-SEWER	102,689.53	0.00
B1-WA - B1-WATER	183,130.98	0.00
Revenue Totals:	332,959.82	

Read Groups

Read Group	# of Accounts	Total Bill Amount	Total Meter Consumption	Total Demand Consumption	Total KVAR Consumption
B1001	164	36,740.22	9279.000000	0.000000	0.000000
B1002	164	21,512.95	4721.000000	0.000000	0.000000
B1003	119	10,564.47	1988.000000	0.000000	0.000000
B1004	168	17,064.29	3323.000000	0.000000	0.000000
B1005	256	25,563.82	4988.000000	0.000000	0.000000
B1006	165	24,816.28	5540.000000	0.000000	0.000000
B1007	185	19,908.50	3598.000000	0.000000	0.000000
B1008	158	23,762.82	5303.000000	0.000000	0.000000
B1009	112	12,860.38	2659.000000	0.000000	0.000000
B1010	162	18,373.46	3956.000000	0.000000	0.000000
B1011	152	23,516.17	6436.000000	0.000000	0.000000
B1012	121	9,197.88	1636.000000	0.000000	0.000000
B1013	212	19,786.09	3852.000000	0.000000	0.000000
B1014	161	16,450.76	3171.000000	0.000000	0.000000
B1015	132	12,580.28	2528.000000	0.000000	0.000000
B1016	177	14,528.96	2975.000000	0.000000	0.000000

Rate Code by Service Category Totals

B2-7-4-C - B2 4 INSTITUTIONAL C	3	2,363.46	0.00	0.00	1281.000000	0.0000	1,281.0000
B2-8-4-C - B2 6 INSTITUTIONAL C	1	950.18	0.00	0.00	271.000000	0.0000	271.0000
B2-SD1 - B2-SEWER DEBT 1	2154	51,413.39	0.00	0.00	0.000000	0.0000	0.0000
B2-SD1-U - B2-SEWER DEBT 1-U	5	82.50	0.00	0.00	0.000000	0.0000	0.0000
B2-U-1-C - B2 U RES C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-U-2-C - B2 U COM C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-U-4-C - B2-U-4-C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-Unmetered Sewer - B2-Unmetered..	5	318.00	0.00	0.00	0.000000	0.0000	0.0000
S Category Totals:	4262	164,426.35	0.00	0.00	40782.000000	0.0000	40,782.0000

Service Category: W - Water

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B2-0-1-C - B2 5/8 RES C	1713	102,437.61	0.00	0.00	19892.000000	0.0000	19,892.0000
B2-0-2-C - B2 5/8 COM C	145	7,763.65	0.00	0.00	1472.000000	0.0000	1,472.0000
B2-0-4-C - B2 5/8 INSTITUTIONAL C	10	726.70	0.00	0.00	146.000000	0.0000	146.0000
B2-0-5-C - B2 5/8 GOV C	1	35.69	0.00	0.00	6.000000	0.0000	6.0000
B2-0-S-C - B2 5/8 SPRINKLER C	126	1,362.24	0.00	0.00	27.000000	0.0000	27.0000
B2-1-1-C - B2 3/4 RES C	50	3,719.50	0.00	0.00	750.000000	0.0000	750.0000
B2-1-2-C - B2 3/4 COM C	76	5,365.54	0.00	0.00	1073.000000	0.0000	1,073.0000
B2-1-4-C - B2 3/4 INSTITUTIONAL C	3	502.67	0.00	0.00	110.000000	0.0000	110.0000
B2-1-S-C - B2 3/4 SPRINKLER C	76	764.54	0.00	0.00	3.000000	0.0000	3.0000
B2-2-1-C - B2 1 RES C	3	227.47	0.00	0.00	46.000000	0.0000	46.0000
B2-2-2-C - B2 1 COM C	55	6,675.75	0.00	0.00	1426.000000	0.0000	1,426.0000
B2-2-4-C - B2 1 INSTITUTIONAL C	7	1,101.23	0.00	0.00	240.000000	0.0000	240.0000
B2-2-5-C - B2 1 GOV C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-2-S-C - B2 1 SPRINKLER C	18	281.22	0.00	0.00	24.000000	0.0000	24.0000
B2-4-2-C - B2 1.5 COM C	23	9,932.57	0.00	0.00	2257.000000	0.0000	2,257.0000
B2-4-4-C - B2 1.5 INSTITUTIONAL C	3	188.77	0.00	0.00	37.000000	0.0000	37.0000
B2-4-5-C - B2 1.5 GOV C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-4-S-C - B2 1.5 SPRINKLER C	10	98.90	0.00	0.00	0.000000	0.0000	0.0000
B2-5-2-C - B2 2 COM C	27	19,763.23	0.00	0.00	4534.000000	0.0000	4,534.0000
B2-5-3-C - B2 2 INDUSTRIAL C	1	1,536.39	0.00	0.00	355.000000	0.0000	355.0000
B2-5-4-C - B2 2 INSTITUTIONAL C	5	5,686.75	0.00	0.00	1311.000000	0.0000	1,311.0000
B2-5-S-C - B2 2 SPRINKLER C	4	39.56	0.00	0.00	0.000000	0.0000	0.0000
B2-6-2-C - B2 3 COM C	19	19,305.71	0.00	0.00	4446.000000	0.0000	4,446.0000
B2-6-4-C - B2 3 INSTITUTIONAL C	3	881.07	0.00	0.00	198.000000	0.0000	198.0000
B2-6-5-C - B2 3 GOV C	1	2,512.49	0.00	0.00	582.000000	0.0000	582.0000
B2-6-S-C - B2 3 SPRINKLER C	1	9.89	0.00	0.00	0.000000	0.0000	0.0000
B2-7-2-C - B2 4 COM C	1	3,428.39	0.00	0.00	795.000000	0.0000	795.0000
B2-7-4-C - B2 4 INSTITUTIONAL C	3	5,537.97	0.00	0.00	1281.000000	0.0000	1,281.0000
B2-8-4-C - B2 6 INSTITUTIONAL C	1	1,175.19	0.00	0.00	271.000000	0.0000	271.0000
W Category Totals:	2385	201,060.69	0.00	0.00	41282.000000	0.0000	41,282.0000
Totals:	6652	365,823.94	0.00	0.00	82066.000000	0.0000	82,066.0000

Revenue Totals

Revenue Code	Total Billed	Taxable
B2-CONT - B2-CONT	140.00	0.00
B2-FIRE HYDRANTS - B2-FIRE HYDRANTS	300.00	0.00
B2-ON CALL - B2-ON CALL CHARGE	200.00	0.00
B2-OTH CUTOFF - B2-OTHER CUTOFF	1,400.00	0.00
B2-SD1 - B2-SEWER DEBT 1	51,495.89	0.00
B2-SW - B2-SEWER	112,967.36	0.00
B2-WA - B2-WATER	201,060.69	0.00
Revenue Totals:	367,563.94	

Read Groups

Read Group	# of Accounts	Total Bill Amount	Total Meter Consumption	Total Demand Consumption	Total KVAR Consumption
B2001	187	35,927.41	8541.000000	0.000000	0.000000
B2002	199	30,979.49	6926.000000	0.000000	0.000000
B2003	216	24,822.89	5292.000000	0.000000	0.000000
B2004	196	43,307.11	10275.000000	0.000000	0.000000
B2005	153	16,072.38	3240.000000	0.000000	0.000000
B2006	163	18,259.65	3902.000000	0.000000	0.000000
B2007	191	25,391.99	5340.000000	0.000000	0.000000
B2008	179	17,101.95	3674.000000	0.000000	0.000000
B2009	144	16,137.82	3282.000000	0.000000	0.000000
B2010	119	24,880.16	5994.000000	0.000000	0.000000
B2011	178	31,224.99	7288.000000	0.000000	0.000000
B2012	121	15,342.94	3182.000000	0.000000	0.000000

Rate Code by Service Category Totals

Service Category: FH - FIRE HYDRANTS

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-FIRE HYDRANT - B1-FIRE HYDRANT	1	100.00	0.00	0.00	0.000000	0.0000	0.0000
FH Category Totals:	1	100.00	0.00	0.00	0.000000	0.0000	0.0000

Service Category: MS - Metered Sewer

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-0-2-C - B1 S/B COM C	1	22.14	0.00	0.00	10.000000	0.0000	10.0000
B1-Z-S-C - B1 Z GOV C	1	11,267.42	0.00	0.00	6107.000000	0.0000	6,107.0000
MS Category Totals:	2	11,2B9.56	0.00	0.00	6117.000000	0.0000	6,117.0000

Service Category: S - Sewer/WasteWater

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-0-1-C - B1 5/8 RE5 C	1924	74,632.99	0.00	0.00	25010.000000	0.0000	25,010.0000
B1-0-2-C - B1 S/B COM C	19	963.11	0.00	0.00	3SB.000000	0.0000	3SB.0000
B1-0-4-C - B1 S/B IN5TITUTIONAL C	1	36.90	0.00	0.00	2.000000	0.0000	2.0000
B1-0-S-C - B1 S/B GOV C	1	36.90	0.00	0.00	14.000000	0.0000	14.0000
B1-1.5-5-C - B1 1.5 GOV C	2	73.B0	0.00	0.00	29.000000	0.0000	29.0000
B1-1-1-C - B1 3/4 RES C	93	3,749.10	0.00	0.00	13B5.000000	0.0000	1,3B5.0000
B1-1-2-C - B1 3/4 COM C	2	79.34	0.00	0.00	30.000000	0.0000	30.0000
B1-1-4-C - B1 3/4 INSTITUTIONAL C	1	6B.27	0.00	0.00	37.000000	0.0000	37.0000
B1-1-5-C - B1 3/4 GOV C	2	73.B0	0.00	0.00	11.000000	0.0000	11.0000
B1-2-1-C - B1 1 RES C	7	239.B6	0.00	0.00	102.000000	0.0000	102.0000
B1-2-2-C - B1 1 COM C	2	127.31	0.00	0.00	34.000000	0.0000	34.0000
B1-2-4-C - B1 1 IN5TITUTIONAL C	2	167.90	0.00	0.00	72.000000	0.0000	72.0000
B1-4-2-C - B1 1.5 COM C	2	422.S1	0.00	0.00	213.000000	0.0000	213.0000
B1-4-4-C - B1 1.5 IN5TITUTIONAL C	2	322.BB	0.00	0.00	17S.000000	0.0000	175.0000
B1-4-S-C - B1 1.S GOV C	3	202.96	0.00	0.00	99.000000	0.0000	99.0000
B1-5-1-C - B1 2 RE5 C	1	40.59	0.00	0.00	22.000000	0.0000	22.0000
B1-6-2-C - B1 3 COM C	2	4,61B.04	0.00	0.00	2503.000000	0.0000	2,S03.0000
B1-6-S-C - B1 3 GOV C	1	341.33	0.00	0.00	171.000000	0.0000	171.0000
B1-7-2-C - B1 4 COM C	1	2,98B.90	0.00	0.00	1620.000000	0.0000	1,620.0000
B1-7-5-C - B1 4 GOV C	1	466.79	0.00	0.00	210.000000	0.0000	210.0000
B1-B-2-C - B1 6 COM C	1	6,311.75	0.00	0.00	3421.000000	0.0000	3,421.0000
B1-5D1 - B1-5EWER DEBT 1	2109	46,0B7.9B	0.00	0.00	0.000000	0.0000	0.0000
B1-5D1-U - B1-5EWER DEBT 1-U	2	33.00	0.00	0.00	0.000000	0.0000	0.0000
B1-U-1-C - B1-U RE5 C	1	63.60	0.00	0.00	1.000000	0.0000	1.0000
B1-U-2-C - B1-U COM C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B1-U-4-C - B1-U INSTITUTIONAL C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B1-Unmetered 5ewer - B1-Unmetered..	1	63.60	0.00	0.00	0.000000	0.0000	0.0000
S Category Totals:	4183	142,213.21	0.00	0.00	3SS19.000000	0.0000	35,519.0000

Service Category: W - Water

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-0-1-C - B1 S/B RE5 C	2242	147,B70.9B	0.00	0.00	2925S.000000	0.0000	29,2S5.0000
B1-0-2-C - B1 S/B COM C	21	1,B97.S9	0.00	0.00	393.000000	0.0000	393.0000
B1-0-4-C - B1 S/B IN5TITUTIONAL C	2	2B.3B	0.00	0.00	2.000000	0.0000	2.0000
B1-0-5-C - B1 S/B GOV C	2	79.9B	0.00	0.00	14.000000	0.0000	14.0000
B1-0-S-C - B1 5/B 5PRINKLER C	160	8,410.B0	0.00	0.00	15BB.000000	0.0000	1,SBB.0000
B1-1-1-C - B1 3/4 RE5 C	123	9,769.17	0.00	0.00	19B9.000000	0.0000	1,989.0000
B1-1-2-C - B1 3/4 COM C	3	236.07	0.00	0.00	4B.000000	0.0000	4B.0000
B1-1-4-C - B1 3/4 IN5TITUTIONAL C	2	17B.8B	0.00	0.00	37.000000	0.0000	37.0000
B1-1-S-C - B1 3/4 GOV C	2	67.0B	0.00	0.00	11.000000	0.0000	11.0000
B1-1-5-C - B1 3/4 SPRINKLER C	94	6,311.97	0.00	0.00	1254.000000	0.0000	1,254.0000
B1-2-1-C - B1 1 RE5 C	12	B32.4B	0.00	0.00	166.000000	0.0000	166.0000
B1-2-2-C - B1 1 COM C	S	212.B5	0.00	0.00	3B.000000	0.0000	38.0000
B1-2-4-C - B1 1 IN5TITUTIONAL C	2	329.3B	0.00	0.00	72.000000	0.0000	72.0000
B1-2-5-C - B1 1 5PRINKLER C	B	1,029.42	0.00	0.00	221.000000	0.0000	221.0000
B1-4-2-C - B1 1.5 COM C	3	5,331.57	0.00	0.00	1233.000000	0.0000	1,233.0000
B1-4-4-C - B1 1.5 INSTITUTIONAL C	2	772.2B	0.00	0.00	175.000000	0.0000	175.0000
B1-4-S-C - B1 1.5 GOV C	6	1,796.S4	0.00	0.00	404.000000	0.0000	404.0000
B1-4-S-C - B1 1.S 5PRINKLER C	1	16B.99	0.00	0.00	37.000000	0.0000	37.0000
B1-5-1-C - B1 2 RES C	1	104.49	0.00	0.00	22.000000	0.0000	22.0000
B1-5-5-C - B1 2 GOV C	1	61.49	0.00	0.00	12.000000	0.0000	12.0000
B1-6-2-C - B1 3 COM C	1	6,3B6.79	0.00	0.00	14B3.000000	0.0000	1,4B3.0000
B1-6-5-C - B1 3 GOV C	1	74S.19	0.00	0.00	171.000000	0.0000	171.0000
B1-7-2-C - B1 4 COM C	1	6,97S.B9	0.00	0.00	1620.000000	0.0000	1,620.0000
B1-7-5-C - B1 4 GOV C	1	912.B9	0.00	0.00	210.000000	0.0000	210.0000
B1-B-2-C - B1 6 COM C	1	14,720.19	0.00	0.00	3421.000000	0.0000	3,421.0000

Rate Code by Service Category Totals

B1-U-1-C - B1 U RES C	1	14.19	0.00	0.00	1.000000	0.0000	1.0000
W Category Totals:	2698	215,245.53	0.00	0.00	43877.000000	0.0000	43,877.0000
Totals:	6884	368,848.30	0.00	0.00	85513.000000	0.0000	85,513.0000

Revenue Totals

Revenue Code	Total Billed	Taxable
B1-FIRE HYDRANTS - B1-FIRE HYDRANTS	100.00	0.00
B1-FROZEN METER - B1-FROZEN METER	105.00	0.00
B1-OTH CUTOFF - B1-OTHER CUTOFF	900.00	0.00
B1-SD1 - B1-SEWER DEBT 1	46,120.98	0.00
B1-SW - B1-SEWER	107,381.79	0.00
B1-WA - B1-WATER	215,245.53	0.00
Revenue Totals:	369,853.30	

Read Groups

Read Group	# of Accounts	Total Bill Amount	Total Meter Consumption	Total Demand Consumption	Total KVAR Consumption
B1001	162	40,112.64	10239.000000	0.000000	0.000000
B1002	164	26,775.73	6362.000000	0.000000	0.000000
B1003	118	12,107.27	2469.000000	0.000000	0.000000
B1004	164	17,187.46	3510.000000	0.000000	0.000000
B1005	256	28,509.70	6006.000000	0.000000	0.000000
B1006	165	19,002.19	4038.000000	0.000000	0.000000
B1007	185	23,108.49	4938.000000	0.000000	0.000000
B1008	159	26,452.04	6235.000000	0.000000	0.000000
B1009	112	13,937.28	3030.000000	0.000000	0.000000
B1010	162	20,927.86	4825.000000	0.000000	0.000000
B1011	152	30,044.05	9453.000000	0.000000	0.000000
B1012	121	11,399.88	2299.000000	0.000000	0.000000
B1013	214	23,749.89	4961.000000	0.000000	0.000000
B1014	162	19,617.08	4268.000000	0.000000	0.000000
B1015	132	14,710.48	3231.000000	0.000000	0.000000
B1016	176	17,142.65	3683.000000	0.000000	0.000000
B1017	149	25,068.61	5966.000000	0.000000	0.000000
Read Group Totals:	2,753	369,853.30	85513.000000	0.000000	0.000000

Abnormal Consumption

Account Number	Service	Expected Consumption	Current Consumption	Percent Warning
B1001-14004-01	100	6.0000	15.0000	150.00 Abnormal Consumption
B1001-14015-03	100	7.0000	28.0000	300.00 Abnormal Consumption
B1001-14020-02	100	3.0000	6.0000	100.00 Abnormal Consumption
B1001-16269-07	100	5.0000	1.0000	80.00 Abnormal Consumption
B1001-16315-01	100	7.0000	13.0000	85.71 Abnormal Consumption
B1001-16322-01	100	7.0000	16.0000	128.57 Abnormal Consumption
B1001-16325-00	100	5.0000	13.0000	160.00 Abnormal Consumption
B1001-16327-00	100	1.0000	4.0000	300.00 Abnormal Consumption
B1001-16331-14	100	9.0000	17.0000	88.89 Abnormal Consumption
B1001-16367-04	100	6.0000	11.0000	83.33 Abnormal Consumption
B1001-16384-06	100	8.0000	18.0000	125.00 Abnormal Consumption
B1001-16385-00	100	5.0000	9.0000	80.00 Abnormal Consumption
B1001-16386-00	100	17.0000	33.0000	94.12 Abnormal Consumption
B1001-16390-03	100	16.0000	29.0000	81.25 Abnormal Consumption
B1001-16391-01	100	10.0000	28.0000	180.00 Abnormal Consumption
B1001-16394-08	100	12.0000	3.0000	75.00 Abnormal Consumption
B1001-16399-00	100	2.0000	13.0000	550.00 Abnormal Consumption
B1001-16731-00	100	15.0000	56.0000	273.33 Abnormal Consumption
B1001-16737-00	100	27.0000	60.0000	122.22 Abnormal Consumption
B1001-16859-06	100	13.0000	2.0000	84.62 Abnormal Consumption
B1001-16862-00	100	5.0000	11.0000	120.00 Abnormal Consumption
B1001-16992-00	100	1.0000	4.0000	300.00 Abnormal Consumption
B1001-18424-01	100	5.0000	12.0000	140.00 Abnormal Consumption
B1001-18425-05	100	5.0000	16.0000	220.00 Abnormal Consumption
B1001-18430-18	100	8.0000	71.0000	787.50 Abnormal Consumption
B1001-19606-01	100	9.0000	16.0000	77.78 Abnormal Consumption
B1001-20008-00	100	13.0000	26.0000	100.00 Abnormal Consumption
B1002-14039-02	100	5.0000	16.0000	220.00 Abnormal Consumption
B1002-16105-00	100	15.0000	29.0000	93.33 Abnormal Consumption
B1002-16107-04	100	6.0000	35.0000	483.33 Abnormal Consumption
B1002-16116-02	100	4.0000	1.0000	75.00 Abnormal Consumption

Rate Code by Service Category Totals

B2-7-2-C - B2 4 COM C	1	1,697.40	0.00	0.00	920.000000	0.0000	920.0000
B2-7-4-C - B2 4 INSTITUTIONAL C	3	2,459.39	0.00	0.00	1333.000000	0.0000	1,333.0000
B2-8-4-C - B2 6 INSTITUTIONAL C	1	763.83	0.00	0.00	414.000000	0.0000	414.0000
B2-SD1 - B2-SEWER DEBT 1	2160	53,255.98	0.00	0.00	0.000000	0.0000	0.0000
B2-SD1-U - B2-SEWER DEBT 1-U	5	82.50	0.00	0.00	0.000000	0.0000	0.0000
B2-U-1-C - B2 U RES C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-U-2-C - B2 U COM C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-U-4-C - B2-U-4-C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-Unmetered Sewer - B2-Unmetered..	5	318.00	0.00	0.00	0.000000	0.0000	0.0000
S Category Totals:	4279	170,728.71	0.00	0.00	47511.000000	0.0000	47,511.0000

Service Category: W - Water

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B2-0-1-C - B2 5/8 RES C	1720	123,573.40	0.00	0.00	24782.000000	4.0000	24,786.0000
B2-0-2-C - B2 5/8 COM C	145	9,062.25	0.00	0.00	1774.000000	0.0000	1,774.0000
B2-0-4-C - B2 5/8 INSTITUTIONAL C	10	812.70	0.00	0.00	166.000000	0.0000	166.0000
B2-0-5-C - B2 5/8 GOV C	1	35.69	0.00	0.00	6.000000	0.0000	6.0000
B2-0-S-C - B2 5/8 SPRINKLER C	127	6,889.03	0.00	0.00	1310.000000	0.0000	1,310.0000
B2-1-1-C - B2 3/4 RES C	51	4,580.79	0.00	0.00	948.000000	0.0000	948.0000
B2-1-2-C - B2 3/4 COM C	75	5,562.05	0.00	0.00	1121.000000	0.0000	1,121.0000
B2-1-4-C - B2 3/4 INSTITUTIONAL C	3	128.57	0.00	0.00	23.000000	0.0000	23.0000
B2-1-S-C - B2 3/4 SPRINKLER C	77	5,938.73	0.00	0.00	1204.000000	0.0000	1,204.0000
B2-2-1-C - B2 1 RES C	3	558.57	0.00	0.00	123.000000	0.0000	123.0000
B2-2-2-C - B2 1 COM C	56	8,581.94	0.00	0.00	1867.000000	0.0000	1,867.0000
B2-2-4-C - B2 1 INSTITUTIONAL C	7	1,182.93	0.00	0.00	259.000000	0.0000	259.0000
B2-2-5-C - B2 1 GOV C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-2-S-C - B2 1 SPRINKLER C	20	4,876.20	0.00	0.00	1088.000000	0.0000	1,088.0000
B2-4-2-C - B2 1.5 COM C	23	10,134.67	0.00	0.00	2304.000000	0.0000	2,304.0000
B2-4-4-C - B2 1.5 INSTITUTIONAL C	4	542.66	0.00	0.00	117.000000	0.0000	117.0000
B2-4-5-C - B2 1.5 GOV C	1	27.09	0.00	0.00	4.000000	0.0000	4.0000
B2-4-S-C - B2 1.5 SPRINKLER C	12	10,546.18	0.00	0.00	2425.000000	0.0000	2,425.0000
B2-5-2-C - B2 2 COM C	28	26,231.72	0.00	0.00	6036.000000	0.0000	6,036.0000
B2-5-3-C - B2 2 INDUSTRIAL C	1	1,463.29	0.00	0.00	338.000000	0.0000	338.0000
B2-5-4-C - B2 2 INSTITUTIONAL C	6	4,320.64	0.00	0.00	991.000000	0.0000	991.0000
B2-5-S-C - B2 2 SPRINKLER C	4	2,060.56	0.00	0.00	470.000000	0.0000	470.0000
B2-6-2-C - B2 3 COM C	19	24,586.11	0.00	0.00	5674.000000	0.0000	5,674.0000
B2-6-4-C - B2 3 INSTITUTIONAL C	3	971.37	0.00	0.00	219.000000	0.0000	219.0000
B2-6-5-C - B2 3 GOV C	1	3,578.89	0.00	0.00	830.000000	0.0000	830.0000
B2-6-S-C - B2 3 SPRINKLER C	1	2,052.39	0.00	0.00	475.000000	0.0000	475.0000
B2-7-2-C - B2 4 COM C	1	3,965.89	0.00	0.00	920.000000	0.0000	920.0000
B2-7-4-C - B2 4 INSTITUTIONAL C	3	5,761.57	0.00	0.00	1333.000000	0.0000	1,333.0000
B2-8-4-C - B2 6 INSTITUTIONAL C	1	1,790.09	0.00	0.00	414.000000	0.0000	414.0000
W Category Totals:	2403	269,815.97	0.00	0.00	57221.000000	4.0000	57,225.0000
Totals:	6687	440,881.58	0.00	0.00	104737.000000	4.0000	104,741.0000

Revenue Totals

Revenue Code	Total Billed	Taxable
B2-CONT - B2-CONT	70.00	0.00
B2-FIRE HYDRANTS - B2-FIRE HYDRANTS	300.00	0.00
B2-OTH CUTOFF - B2-OTHER CUTOFF	850.00	0.00
B2-SD1 - B2-SEWER DEBT 1	53,338.48	0.00
B2-SW - B2-SEWER	117,427.13	0.00
B2-WA - B2-WATER	269,815.97	0.00
Revenue Totals:	441,801.58	

Read Groups

Read Group	# of Accounts	Total Bill Amount	Total Meter Consumption	Total Demand Consumption	Total KVAR Consumption
B2001	188	39,250.40	9628.000000	0.000000	0.000000
B2002	200	35,845.52	8594.000000	0.000000	0.000000
B2003	219	29,184.82	6773.000000	0.000000	0.000000
B2004	197	47,087.85	11586.000000	0.000000	0.000000
B2005	153	18,944.47	4230.000000	0.000000	0.000000
B2006	163	22,370.15	5258.000000	0.000000	0.000000
B2007	194	40,913.52	9489.000000	0.000000	0.000000
B2008	178	22,320.41	5221.000000	0.000000	0.000000
B2009	146	18,570.19	4100.000000	0.000000	0.000000
B2010	118	28,871.53	7375.000000	0.000000	0.000000
B2011	178	36,242.65	8991.000000	0.000000	0.000000
B2012	121	17,116.63	3800.000000	0.000000	0.000000

Rate Code by Service Category Totals

Service Category: S - Sewer/WasteWater

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B2-0-1-C - B2 5/8 RES C	1686	68,216.23	0.00	0.00	25566.000000	0.0000	25,566.0000
B2-0-2-C - B2 5/8 COM C	141	7,075.67	0.00	0.00	2308.000000	0.0000	2,308.0000
B2-0-4-C - B2 5/8 INSTITUTIONAL C	10	496.31	0.00	0.00	184.000000	0.0000	184.0000
B2-0-5-C - B2 5/8 GOV C	1	36.90	0.00	0.00	15.000000	0.0000	15.0000
B2-1-1-C - B2 3/4 RES C	47	1,985.26	0.00	0.00	849.000000	0.0000	849.0000
B2-1-2-C - B2 3/4 COM C	68	3,684.52	0.00	0.00	1280.000000	0.0000	1,280.0000
B2-1-4-C - B2 3/4 INSTITUTIONAL C	3	110.70	0.00	0.00	16.000000	0.0000	16.0000
B2-2-1-C - B2 1 RES C	3	162.37	0.00	0.00	88.000000	0.0000	88.0000
B2-2-2-C - B2 1 COM C	55	5,549.86	0.00	0.00	2317.000000	0.0000	2,317.0000
B2-2-4-C - B2 1 INSTITUTIONAL C	7	538.75	0.00	0.00	189.000000	0.0000	189.0000
B2-2-5-C - B2 1 GOV C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-4-2-C - B2 1.5 COM C	22	5,440.96	0.00	0.00	2866.000000	0.0000	2,866.0000
B2-4-3-C - B2 1.5 INDUSTRIAL C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-4-4-C - B2 1.5 INSTITUTIONAL C	4	328.42	0.00	0.00	159.000000	0.0000	159.0000
B2-4-5-C - B2 1.5 GOV C	1	36.90	0.00	0.00	3.000000	0.0000	3.0000
B2-5-2-C - B2 2 COM C	27	11,678.91	0.00	0.00	6213.000000	0.0000	6,213.0000
B2-5-3-C - B2 2 INDUSTRIAL C	1	531.36	0.00	0.00	288.000000	0.0000	288.0000
B2-5-4-C - B2 2 INSTITUTIONAL C	6	2,444.65	0.00	0.00	1009.000000	0.0000	1,009.0000
B2-6-2-C - B2 3 COM C	18	9,870.80	0.00	0.00	5305.000000	0.0000	5,305.0000
B2-6-4-C - B2 3 INSTITUTIONAL C	3	367.17	0.00	0.00	199.000000	0.0000	199.0000
B2-6-5-C - B2 3 GOV C	1	1,202.94	0.00	0.00	652.000000	0.0000	652.0000
B2-7-2-C - B2 4 COM C	1	1,642.05	0.00	0.00	890.000000	0.0000	890.0000
B2-7-4-C - B2 4 INSTITUTIONAL C	3	2,391.13	0.00	0.00	1269.000000	0.0000	1,269.0000
B2-8-4-C - B2 6 INSTITUTIONAL C	1	1,654.97	0.00	0.00	897.000000	0.0000	897.0000
B2-SD1 - B2-SEWER DEBT 1	2155	56,908.44	0.00	0.00	0.000000	0.0000	0.0000
B2-SD1-U - B2-SEWER DEBT 1-U	5	82.50	0.00	0.00	0.000000	0.0000	0.0000
B2-U-1-C - B2 U RES C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-U-2-C - B2 U COM C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-U-4-C - B2-U-4-C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-Unmetered Sewer - B2-Unmetered..	5	318.00	0.00	0.00	0.000000	0.0000	0.0000
S Category Totals:	4274	182,755.77	0.00	0.00	52562.000000	0.0000	52,562.0000

Service Category: W - Water

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B2-0-1-C - B2 5/8 RES C	1716	128,817.25	0.00	0.00	26013.000000	0.0000	26,013.0000
B2-0-2-C - B2 5/8 COM C	146	11,488.74	0.00	0.00	2336.000000	0.0000	2,336.0000
B2-0-4-C - B2 5/8 INSTITUTIONAL C	10	890.10	0.00	0.00	184.000000	0.0000	184.0000
B2-0-5-C - B2 5/8 GOV C	1	74.39	0.00	0.00	15.000000	0.0000	15.0000
B2-0-S-C - B2 5/8 SPRINKLER C	129	12,206.41	0.00	0.00	2542.000000	0.0000	2,542.0000
B2-1-1-C - B2 3/4 RES C	53	4,759.67	0.00	0.00	985.000000	0.0000	985.0000
B2-1-2-C - B2 3/4 COM C	75	6,353.25	0.00	0.00	1305.000000	0.0000	1,305.0000
B2-1-4-C - B2 3/4 INSTITUTIONAL C	3	98.47	0.00	0.00	16.000000	0.0000	16.0000
B2-1-S-C - B2 3/4 SPRINKLER C	78	14,024.02	0.00	0.00	3082.000000	0.0000	3,082.0000
B2-2-1-C - B2 1 RES C	3	408.07	0.00	0.00	88.000000	0.0000	88.0000
B2-2-2-C - B2 1 COM C	56	10,516.94	0.00	0.00	2317.000000	0.0000	2,317.0000
B2-2-4-C - B2 1 INSTITUTIONAL C	7	881.93	0.00	0.00	189.000000	0.0000	189.0000
B2-2-5-C - B2 1 GOV C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-2-S-C - B2 1 SPRINKLER C	20	12,074.40	0.00	0.00	2762.000000	0.0000	2,762.0000
B2-4-2-C - B2 1.5 COM C	23	12,564.17	0.00	0.00	2869.000000	0.0000	2,869.0000
B2-4-4-C - B2 1.5 INSTITUTIONAL C	4	723.26	0.00	0.00	159.000000	0.0000	159.0000
B2-4-5-C - B2 1.5 GOV C	1	22.79	0.00	0.00	3.000000	0.0000	3.0000
B2-4-S-C - B2 1.5 SPRINKLER C	12	23,312.88	0.00	0.00	5394.000000	0.0000	5,394.0000
B2-5-2-C - B2 2 COM C	29	34,467.51	0.00	0.00	7949.000000	0.0000	7,949.0000
B2-5-3-C - B2 2 INDUSTRIAL C	1	1,248.29	0.00	0.00	288.000000	0.0000	288.0000
B2-5-4-C - B2 2 INSTITUTIONAL C	6	4,398.04	0.00	0.00	1009.000000	0.0000	1,009.0000
B2-5-S-C - B2 2 SPRINKLER C	4	5,896.16	0.00	0.00	1362.000000	0.0000	1,362.0000
B2-6-2-C - B2 3 COM C	19	27,806.81	0.00	0.00	6423.000000	0.0000	6,423.0000
B2-6-4-C - B2 3 INSTITUTIONAL C	3	885.37	0.00	0.00	199.000000	0.0000	199.0000
B2-6-5-C - B2 3 GOV C	1	2,813.49	0.00	0.00	652.000000	0.0000	652.0000
B2-6-S-C - B2 3 SPRINKLER C	1	3,428.39	0.00	0.00	795.000000	0.0000	795.0000
B2-7-2-C - B2 4 COM C	1	3,836.89	0.00	0.00	890.000000	0.0000	890.0000
B2-7-4-C - B2 4 INSTITUTIONAL C	3	5,486.37	0.00	0.00	1269.000000	0.0000	1,269.0000
B2-8-4-C - B2 6 INSTITUTIONAL C	1	3,866.99	0.00	0.00	897.000000	0.0000	897.0000
W Category Totals:	2406	333,351.05	0.00	0.00	71992.000000	0.0000	71,992.0000
Totals:	6685	516,443.72	0.00	0.00	124561.000000	0.0000	124,561.0000

Revenue Totals

Revenue Code	Total Billed	Taxable
B2-FIRE HYDRANTS - B2-FIRE HYDRANTS	300.00	0.00
B2-ON CALL - B2-ON CALL CHARGE	50.00	0.00
B2-OTH CUTOFF - B2-OTHER CUTOFF	750.00	0.00
B2-SD1 - B2-SEWER DEBT 1	56,990.94	0.00
B2-SW - B2-SEWER	125,801.73	0.00
B2-WA - B2-WATER	333,351.05	0.00
Revenue Totals:	517,243.72	

Read Groups

Read Group	# of Accounts	Total Bill Amount	Total Meter Consumption	Total Demand Consumption	Total KVAR Consumption
B2001	187	56,837.05	14821.000000	0.000000	0.000000
B2002	199	40,980.36	9992.000000	0.000000	0.000000
B2003	219	29,128.80	6641.000000	0.000000	0.000000
B2004	198	52,376.93	12891.000000	0.000000	0.000000
B2005	153	19,482.11	4407.000000	0.000000	0.000000
B2006	162	22,533.82	5193.000000	0.000000	0.000000
B2007	193	51,052.81	11720.000000	0.000000	0.000000
B2008	179	25,619.40	6060.000000	0.000000	0.000000
B2009	146	22,266.97	5167.000000	0.000000	0.000000
B2010	118	34,421.51	8951.000000	0.000000	0.000000
B2011	178	46,634.91	11721.000000	0.000000	0.000000
B2012	120	20,351.97	4677.000000	0.000000	0.000000
B2013	118	14,659.99	3128.000000	0.000000	0.000000
B2014	154	21,413.17	4861.000000	0.000000	0.000000
B2015	136	59,483.92	14331.000000	0.000000	0.000000
Read Group Totals:	2,460	517,243.72	124561.000000	0.000000	0.000000

Abnormal Consumption

Account Number	Service	Expected Consumption	Current Consumption	Percent Warning
B2001-14219-01	100	44.0000	11.0000	75.00 Abnormal Consumption
B2001-14908-02	100	5.0000	11.0000	120.00 Abnormal Consumption
B2001-14910-01	100	4.0000	8.0000	100.00 Abnormal Consumption
B2001-14919-01	100	6.0000	13.0000	116.67 Abnormal Consumption
B2001-14921-01	100	5.0000	14.0000	180.00 Abnormal Consumption
B2001-14938-00	100	16.0000	3.0000	81.25 Abnormal Consumption
B2001-14949-04	100	8.0000	22.0000	175.00 Abnormal Consumption
B2001-15327-00	100	103.0000	232.0000	125.24 Abnormal Consumption
B2001-16092-03	100	2.0000	5.0000	150.00 Abnormal Consumption
B2001-16192-00	100	8.0000	14.0000	75.00 Abnormal Consumption
B2001-16377-00	100	0.0000	310.0000	30,900.00 Abnormal Consumption
B2001-16496-00	100	32.0000	96.0000	200.00 Abnormal Consumption
B2001-16513-01	100	13.0000	31.0000	138.46 Abnormal Consumption
B2001-16526-01	100	19.0000	1,648.0000	8,573.68 Abnormal Consumption
B2001-16735-00	100	37.0000	69.0000	86.49 Abnormal Consumption
B2001-17088-12	100	8.0000	43.0000	437.50 Abnormal Consumption
B2001-17182-00	100	2.0000	7.0000	250.00 Abnormal Consumption
B2001-18047-01	100	9.0000	18.0000	100.00 Abnormal Consumption
B2001-18057-02	100	12.0000	2.0000	83.33 Abnormal Consumption
B2001-18059-04	100	15.0000	29.0000	93.33 Abnormal Consumption
B2001-18061-01	100	14.0000	43.0000	207.14 Abnormal Consumption
B2001-18062-00	100	11.0000	20.0000	81.82 Abnormal Consumption
B2001-18065-04	100	27.0000	2.0000	92.59 Abnormal Consumption
B2001-18066-01	100	7.0000	17.0000	142.86 Abnormal Consumption
B2001-19500-00	100	1.0000	3.0000	200.00 Abnormal Consumption
B2002-14123-08	100	1.0000	11.0000	1,000.00 Abnormal Consumption
B2002-14149-01	100	4.0000	15.0000	275.00 Abnormal Consumption
B2002-14972-02	100	0.0000	46.0000	4,500.00 Abnormal Consumption
B2002-15019-02	100	5.0000	9.0000	80.00 Abnormal Consumption
B2002-15023-02	100	8.0000	35.0000	337.50 Abnormal Consumption
B2002-15025-08	100	3.0000	18.0000	500.00 Abnormal Consumption
B2002-15028-00	100	4.0000	7.0000	75.00 Abnormal Consumption
B2002-15030-16	100	8.0000	14.0000	75.00 Abnormal Consumption
B2002-15036-00	100	8.0000	15.0000	87.50 Abnormal Consumption
B2002-15056-00	100	5.0000	9.0000	80.00 Abnormal Consumption
B2002-15057-01	100	9.0000	24.0000	166.67 Abnormal Consumption
B2002-15071-02	100	4.0000	11.0000	175.00 Abnormal Consumption
B2002-15075-00	100	5.0000	1.0000	80.00 Abnormal Consumption

Rate Code by Service Category Totals

Service Category: FH - FIRE HYDRANTS

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-FIRE HYDRANT - B1-FIRE HYDRANT	1	100.00	0.00	0.00	0.000000	0.0000	0.0000
FH Category Totals:	1	100.00	0.00	0.00	0.000000	0.0000	0.0000

Service Category: MS - Metered Sewer

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-0-2-C - B1 5/8 COM C	1	47.97	0.00	0.00	26.000000	0.0000	26.0000
B1-Z-5-C - B1 Z GOV C	1	11,B92.87	0.00	0.00	6446.000000	0.0000	6,446.0000
M5 Category Totals:	2	11,940.84	0.00	0.00	6472.000000	0.0000	6,472.0000

Service Category: S - Sewer/WasteWater

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-0-1-C - B1 5/B RE5 C	1930	79,347.32	0.00	0.00	29B04.000000	0.0000	29,B04.0000
B1-0-2-C - B1 5/B COM C	19	1,453.BB	0.00	0.00	646.000000	0.0000	646.0000
B1-0-4-C - B1 5/B INSTITUTIONAL C	1	36.90	0.00	0.00	3.000000	0.0000	3.0000
B1-0-5-C - B1 5/8 GOV C	1	36.90	0.00	0.00	10.000000	0.0000	10.0000
B1-1.5-5-C - B1 1.5 GOV C	2	73.80	0.00	0.00	26.000000	0.0000	26.0000
B1-1-1-C - B1 3/4 RE5 C	93	4,129.1B	0.00	0.00	1703.000000	0.0000	1,703.0000
B1-1-2-C - B1 3/4 COM C	2	BB.56	0.00	0.00	33.000000	0.0000	33.0000
B1-1-4-C - B1 3/4 INSTITUTIONAL C	1	169.74	0.00	0.00	92.000000	0.0000	92.0000
B1-1-5-C - B1 3/4 GOV C	2	73.B0	0.00	0.00	12.000000	0.0000	12.0000
B1-2-1-C - B1 1 RE5 C	7	282.30	0.00	0.00	12B.000000	0.0000	12B.0000
B1-2-2-C - B1 1 COM C	2	127.31	0.00	0.00	61.000000	0.0000	61.0000
B1-2-4-C - B1 1 INSTITUTIONAL C	2	129.15	0.00	0.00	51.000000	0.0000	51.0000
B1-4-2-C - B1 1.5 COM C	2	49B.16	0.00	0.00	270.000000	0.0000	270.0000
B1-4-4-C - B1 1.5 INSTITUTIONAL C	2	199.27	0.00	0.00	43.000000	0.0000	43.0000
B1-4-5-C - B1 1.5 GOV C	3	260.15	0.00	0.00	125.000000	0.0000	125.0000
B1-5-1-C - B1 2 RE5 C	1	55.35	0.00	0.00	30.000000	0.0000	30.0000
B1-6-2-C - B1 3 COM C	2	6,761.93	0.00	0.00	3665.000000	0.0000	3,665.0000
B1-6-5-C - B1 3 GOV C	1	1,094.09	0.00	0.00	593.000000	0.0000	593.0000
B1-7-2-C - B1 4 COM C	1	3,247.20	0.00	0.00	1760.000000	0.0000	1,760.0000
B1-7-5-C - B1 4 GOV C	1	1,512.90	0.00	0.00	B20.000000	0.0000	820.0000
B1-B-2-C - B1 6 COM C	1	B,516.52	0.00	0.00	4616.000000	0.0000	4,616.0000
B1-5D1 - B1-5EWER DEBT 1	2114	51,377.42	0.00	0.00	0.000000	0.0000	0.0000
B1-5D1-U - B1-5EWER DEBT 1-U	2	33.00	0.00	0.00	0.000000	0.0000	0.0000
B1-U-1-C - B1-U RE5 C	1	63.60	0.00	0.00	0.000000	0.0000	0.0000
B1-U-2-C - B1-U COM C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B1-U-4-C - B1-U INSTITUTIONAL C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B1-Unmetered Sewer - B1-Unmetered..	1	63.60	0.00	0.00	0.000000	0.0000	0.0000
B2-1-2-C - B2 3/4 COM C	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
B2-5D1 - B2-5EWER DEBT 1	0	0.00	0.00	0.00	0.000000	0.0000	0.0000
5 Category Totals:	4194	159,632.03	0.00	0.00	44491.000000	0.0000	44,491.0000

Service Category: W - Water

Rate Code	Number	Total Net	Total Tax	Taxable	Billed Consumption	Unbilled Consumption	Total Consumption
B1-0-1-C - B1 5/B RE5 C	2250	172,135.45	0.00	0.00	34B6B.000000	2.0000	34,B70.0000
B1-0-2-C - B1 5/B COM C	21	3,131.69	0.00	0.00	6B0.000000	0.0000	6B0.0000
B1-0-4-C - B1 5/B INSTITUTIONAL C	2	32.6B	0.00	0.00	3.000000	0.0000	3.0000
B1-0-5-C - B1 5/B GOV C	2	71.3B	0.00	0.00	12.000000	0.0000	12.0000
B1-0-5-C - B1 5/B SPRINKLER C	161	25,500.29	0.00	0.00	5560.000000	0.0000	5,560.0000
B1-1-1-C - B1 3/4 RE5 C	123	12,104.07	0.00	0.00	2532.000000	0.0000	2,532.0000
B1-1-2-C - B1 3/4 COM C	3	49B.37	0.00	0.00	109.000000	0.0000	109.0000
B1-1-4-C - B1 3/4 INSTITUTIONAL C	2	415.3B	0.00	0.00	92.000000	0.0000	92.0000
B1-1-5-C - B1 3/4 GOV C	2	71.3B	0.00	0.00	12.000000	0.0000	12.0000
B1-1-5-C - B1 3/4 SPRINKLER C	95	30,B63.25	0.00	0.00	6959.000000	0.0000	6,959.0000
B1-2-1-C - B1 1 RE5 C	12	1,163.5B	0.00	0.00	243.000000	0.0000	243.0000
B1-2-2-C - B1 1 COM C	5	32B.95	0.00	0.00	65.000000	0.0000	65.0000
B1-2-4-C - B1 1 INSTITUTIONAL C	2	239.0B	0.00	0.00	51.000000	0.0000	51.0000
B1-2-5-C - B1 1 SPRINKLER C	B	B57.42	0.00	0.00	1B1.000000	0.0000	1B1.0000
B1-4-2-C - B1 1.5 COM C	3	6,208.77	0.00	0.00	1437.000000	0.0000	1,437.0000
B1-4-4-C - B1 1.5 INSTITUTIONAL C	2	204.6B	0.00	0.00	43.000000	0.0000	43.0000
B1-4-5-C - B1 1.5 GOV C	6	2,050.24	0.00	0.00	463.000000	0.0000	463.0000
B1-4-5-C - B1 1.5 SPRINKLER C	1	B05.39	0.00	0.00	1B5.000000	0.0000	1B5.0000
B1-5-1-C - B1 2 RE5 C	1	13B.B9	0.00	0.00	30.000000	0.0000	30.0000
B1-5-5-C - B1 2 GOV C	1	57.19	0.00	0.00	11.000000	0.0000	11.0000
B1-6-2-C - B1 3 COM C	1	10,751.29	0.00	0.00	249B.000000	0.0000	2,49B.0000
B1-6-5-C - B1 3 GOV C	1	2,559.79	0.00	0.00	593.000000	0.0000	593.0000
B1-7-2-C - B1 4 COM C	1	7,577.B9	0.00	0.00	1760.000000	0.0000	1,760.0000

Rate Code by Service Category Totals

B1-7-5-C - B1 4 GOV C	1	3,535.89	0.00	0.00	820.000000	0.0000	820.0000
B1-8-2-C - B1 6 COM C	1	19,858.69	0.00	0.00	4616.000000	0.0000	4,616.0000
B1-U-1-C - B1 U RES C	1	9.89	0.00	0.00	0.000000	0.0000	0.0000
W Category Totals:	2708	301,171.57	0.00	0.00	63823.000000	2.0000	63,825.0000
Totals:	6905	472,844.44	0.00	0.00	114786.000000	2.0000	114,788.0000

Revenue Totals

Revenue Code	Total Billed	Taxable
B1-FIRE HYDRANTS - B1-FIRE HYDRANTS	100.00	0.00
B1-MXU CHARGE - B1-MXU CHARGE	130.00	0.00
B1-ON CALL - B1-ON CALL CHARGE	100.00	0.00
B1-OTH CUTOFF - B1-OTHER CUTOFF	950.00	0.00
B1-SD1 - B1-SEWER DEBT 1	51,410.42	0.00
B1-SW - B1-SEWER	120,162.45	0.00
B1-WA - B1-WATER	301,171.57	0.00
Revenue Totals:	474,024.44	

Read Groups

Read Group	# of Accounts	Total Bill Amount	Total Meter Consumption	Total Demand Consumption	Total KVAR Consumption
B1001	163	50,545.40	13125.000000	0.000000	0.000000
B1002	165	31,913.42	7895.000000	0.000000	0.000000
B1003	120	16,360.31	3663.000000	0.000000	0.000000
B1004	168	19,362.43	4134.000000	0.000000	0.000000
B1005	255	32,678.85	7226.000000	0.000000	0.000000
B1006	166	22,023.96	4872.000000	0.000000	0.000000
B1007	187	37,243.25	9010.000000	0.000000	0.000000
B1008	158	29,452.82	7197.000000	0.000000	0.000000
B1009	111	16,253.11	3769.000000	0.000000	0.000000
B1010	162	24,491.55	5892.000000	0.000000	0.000000
B1011	153	53,881.87	15816.000000	0.000000	0.000000
B1012	121	19,830.34	4617.000000	0.000000	0.000000
B1013	214	27,295.06	5899.000000	0.000000	0.000000
B1014	162	21,336.57	4876.000000	0.000000	0.000000
B1015	131	15,429.51	3484.000000	0.000000	0.000000
B1016	177	21,816.63	4763.000000	0.000000	0.000000
B1017	149	34,109.36	8548.000000	0.000000	0.000000
Read Group Totals:	2,762	474,024.44	114786.000000	0.000000	0.000000

Abnormal Consumption

Account Number	Service	Expected Consumption	Current Consumption	Percent Warning
B1001-14002-00	100	2.0000	6.0000	200.00 Abnormal Consumption
B1001-14015-03	100	7.0000	25.0000	257.14 Abnormal Consumption
B1001-14020-02	100	3.0000	24.0000	700.00 Abnormal Consumption
B1001-16011-00	100	14.0000	51.0000	264.29 Abnormal Consumption
B1001-16012-00	100	8.0000	17.0000	112.50 Abnormal Consumption
B1001-16013-00	200	10.0000	26.0000	160.00 Abnormal Consumption
B1001-16322-01	100	7.0000	13.0000	85.71 Abnormal Consumption
B1001-16325-00	100	5.0000	17.0000	240.00 Abnormal Consumption
B1001-16327-00	100	1.0000	2.0000	100.00 Abnormal Consumption
B1001-16329-00	100	19.0000	43.0000	126.32 Abnormal Consumption
B1001-16331-14	100	9.0000	19.0000	111.11 Abnormal Consumption
B1001-16361-01	100	1.0000	2.0000	100.00 Abnormal Consumption
B1001-16369-07	100	4.0000	18.0000	350.00 Abnormal Consumption
B1001-16386-00	100	17.0000	34.0000	100.00 Abnormal Consumption
B1001-16390-03	100	16.0000	30.0000	87.50 Abnormal Consumption
B1001-16399-00	100	2.0000	9.0000	350.00 Abnormal Consumption
B1001-16670-01	100	2.0000	5.0000	150.00 Abnormal Consumption
B1001-16688-02	100	1.0000	16.0000	1,500.00 Abnormal Consumption
B1001-16731-00	100	15.0000	34.0000	126.67 Abnormal Consumption
B1001-16790-02	100	1.0000	2.0000	100.00 Abnormal Consumption
B1001-16859-06	100	13.0000	23.0000	76.92 Abnormal Consumption
B1001-16888-00	100	13.0000	23.0000	76.92 Abnormal Consumption
B1001-16945-01	100	3.0000	21.0000	600.00 Abnormal Consumption
B1001-16992-00	100	1.0000	9.0000	800.00 Abnormal Consumption
B1001-17086-00	100	2.0000	24.0000	1,100.00 Abnormal Consumption
B1001-17304-00	100	8.0000	58.0000	625.00 Abnormal Consumption
B1001-18201-00	100	26.0000	185.0000	611.54 Abnormal Consumption
B1001-18415-08	100	7.0000	1.0000	85.71 Abnormal Consumption

Water Rates 201

Int.	District	Type	Unit	Minimum Use	Unit Charge	Service Charge	Debt 1 Charge	Debt 2 Charge	Minimum Consumption Charge	Minimum Water Charge	Minimum Bill Charge
AT	AKRON TOWNSHIP	*	C	N/A	5.0000	9.89	9.00	0.00	N/A	9.89	18.89
BR	BEAVER RD WATER	*	C	N/A	4.1100	9.89	0.00	0.00	N/A	9.89	9.89
BR	BEAVER RD WATER	*	T	N/A	5.5000	9.89	0.00	0.00	N/A	9.89	9.89
BT	BEAVER TOWNSHIP	*	C	N/A	4.1500	9.89	0.00	0.00	N/A	9.89	9.89
BT	BEAVER TOWNSHIP	B	T	N/A	5.5500	9.89	0.00	0.00	N/A	9.89	9.89
BV	BAY VALLEY	*	T	10.0	3.8600	9.89	0.00	0.00	38.60	48.49	48.49
BV	BAY VALLEY	S	T	N/A	3.8600	9.89	0.00	0.00	N/A	9.89	9.89
B1	BANGOR 1	*	C	N/A	4.0300	9.89	0.00	0.00	N/A	9.89	9.89
B1	BANGOR 1	S	C	N/A	4.0300	9.89	0.00	0.00	N/A	9.89	9.89
B2	BANGOR 2	*	C	N/A	4.0300	9.89	0.00	0.00	N/A	9.89	9.89
B2	BANGOR 2	S	C	N/A	4.0300	9.89	0.00	0.00	N/A	9.89	9.89
FT	FRASER TOWNSHIP	*	C	N/A	4.5200	9.89	35.00	0.00	N/A	9.89	44.89
FT	FRASER TOWNSHIP	*	T	N/A	6.0400	9.89	35.00	0.00	N/A	9.89	44.89
FT	FRASER TOWNSHIP	S	C	N/A	4.5200	9.89	0.00	0.00	N/A	9.89	9.89
F1	FRANKENLUST 1	*	C	N/A	4.1400	9.89	0.00	0.00	N/A	9.89	9.89
F1	FRANKENLUST 1	S	C	N/A	4.1400	9.89	0.00	0.00	N/A	9.89	9.89
F3	FRANKENLUST 3	*	T	10.0	3.8600	9.89	0.00	0.00	38.60	9.89	48.49
F3	FRANKENLUST 3	S	T	N/A	3.8600	9.89	0.00	0.00	N/A	9.89	9.89
F4	FRANKENLUST 4	*	T	10.0	3.8600	9.89	0.00	0.00	38.60	9.89	48.49
F4	FRANKENLUST 4	S	T	N/A	3.8600	9.89	0.00	0.00	N/A	9.89	9.89
F5	FRANKENLUST 5	*	T	10.0	3.8600	9.89	0.00	0.00	38.60	9.89	48.49
F5	FRANKENLUST 5	S	T	N/A	3.8600	9.89	0.00	0.00	N/A	9.89	9.89
K1	KAWKAWLIN 1	*	C	N/A	4.3800	9.89	25.00	0.00	N/A	9.89	34.89
K1	KAWKAWLIN 1	*	T	N/A	5.8600	9.89	25.00	0.00	N/A	9.89	34.89
K1	KAWKAWLIN 1	K	C	N/A	4.3800	9.89	8.00	0.00	N/A	9.89	17.89
K1	FRANKENLUST 1	S	C	N/A	4.3800	9.89	0.00	0.00	N/A	9.89	9.89
MT	MERRITT TOWNSHIP	*	C	N/A	4.3800	9.89	20.00	0.00	N/A	9.89	29.89
MT	MERRITT TOWNSHIP	S	C	N/A	4.3800	9.89	0.00	0.00	N/A	9.89	9.89
M1	MONITOR 1	*	C	N/A	4.1400	9.89	0.00	0.00	N/A	9.89	9.89

M1	MONITOR 1	*	T	N/A	5.5400	9.89	0.00	0.00	N/A	9.89	9.89
M1	MONITOR 1	S	C	N/A	4.1400	9.89	0.00	0.00	N/A	9.89	9.89
M1	MONITOR 1	S	T	N/A	5.5400	9.89	0.00	0.00	N/A	9.89	9.89
M2	MONITOR 2	*	C	N/A	4.1900	9.89	7.00	0.00	N/A	9.89	16.89
M2	MONITOR 2	S	C	N/A	4.1900	9.89	0.00	0.00	N/A	9.89	9.89
PN	PINCONNING	*	T	3.0	5.3100	9.89	20.00	0.00	15.93	25.82	45.82
PN	PINCONNING	S	T	N/A	5.3100	9.89	0.00	0.00	N/A	9.89	9.89
P1	PORTSMOUTH 1	*	C	N/A	4.1400	9.89	0.00	0.00	N/A	9.89	9.89
P1	PORTSMOUTH 1	P	C	N/A	4.1400	9.89	0.00	0.00	N/A	9.89	9.89
P1	PORTSMOUTH 1	S	C	N/A	4.1400	9.89	0.00	0.00	N/A	9.89	9.89
P2	PORTSMOUTH 2	*	C	N/A	4.3800	9.89	35.00	0.00	N/A	9.89	44.89
P2	FRANKENLUST 2	S	C	N/A	4.3800	9.89	0.00	0.00	N/A	9.89	9.89
WS	WILLIAMS	*	C	N/A	4.0000	9.89	9.00	0.00	N/A	9.89	9.89
WS	WILLIAMS	S	C	N/A	4.0000	9.89	0.00	0.00	N/A	9.89	9.89
WT	WISNER TOWNSHIP	*	C	N/A	4.6600	9.89	25.00	0.00	N/A	9.89	34.89

CHARTER TOWNSHIP OF BANGOR
WATER FEE/RATE SCHEDULE

Effective 1st Quarter Billings of 2018

Section 34-52 CONNECTION FEE AND TAP FEE PROCEDURE

Connection Fee (per new connection, per meter size)

5/8 inch	800
3/4 inch	880
1 inch	1,120
1 1/2 inch	1,440
2 inch	2,320
3 inch	8,801
4 inch	11,202
6 inch	16,803

Tap Fee

Line size	Meter size	Tap Fee*	Meter Fee	Inspection	Total
3/4"	5/8"	1,040	125	40	1,205
3/4"	3/4"	1,040	150	40	1,230
1"	5/8"	1,075	125	40	1,240
1"	3/4"	1,075	150	40	1,265
1 1/2"	5/8" to 1 1/2"	Time and Material & any Sub-contracted work			
2"	5/8" to 2"	Time and Material & any Sub-contracted work			

* Subject to higher winter connection and/or highway connection fees.

Section 34-54 WATER RATES

No capital charge set at this time.

plus 9.89 per meter
plus 4.30 per 100 cubic feet of metered consumption

Section 34-62 CHARGES AND LATE FEES

Turn on fee is 25.00 and non-refundable.
Turn off fee is 25.00 and non-refundable.

CHARTER TOWNSHIP OF BANGOR
WATER FEE/RATE SCHEDULE

Section 34-65 Water Connection

Same rate schedule as Section 34-52 listed above.

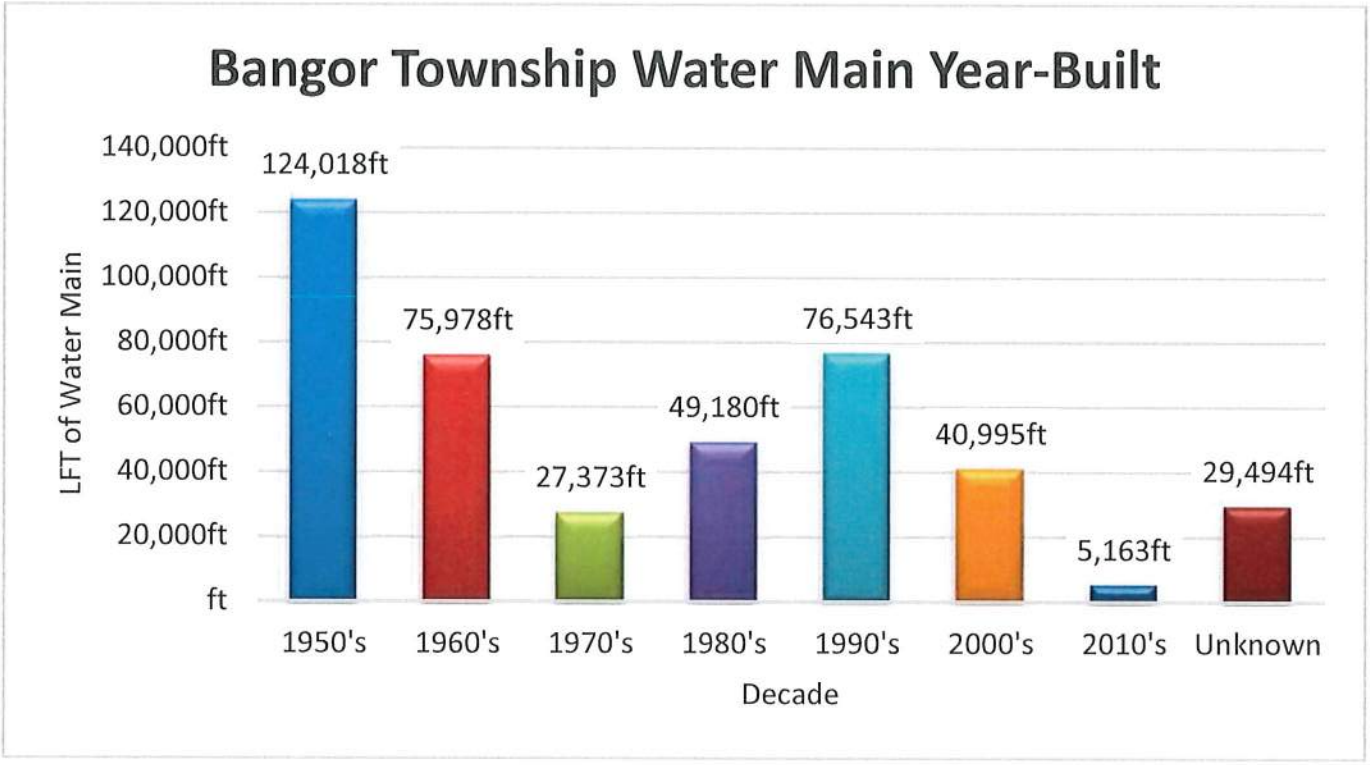
Section 34-66 Water Extension

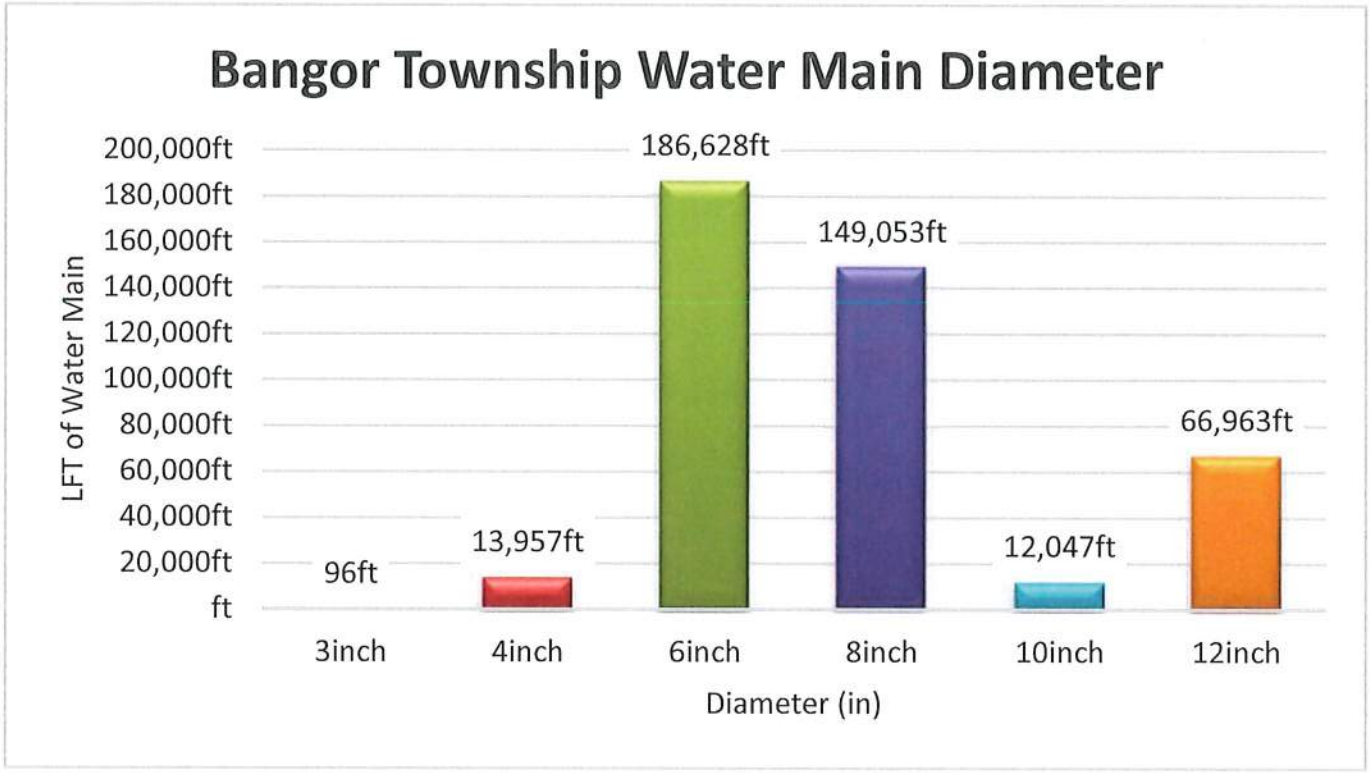
No rate set at this time.

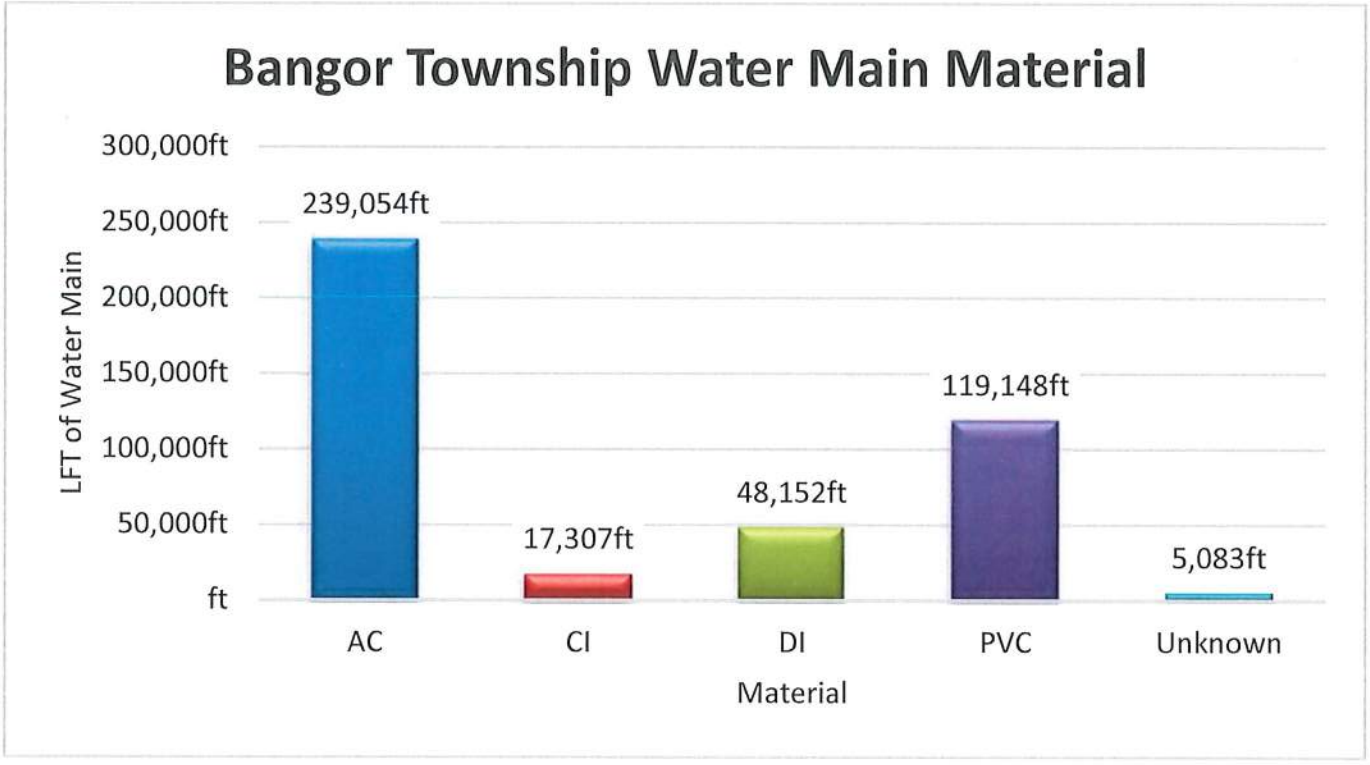
ADOPTED: June 8, 2004 via Resolution #04-024
REVISED: December 14, 2004 via Resolution #04-045
REVISED: December 13, 2005 via Resolution #05-029
REVISED: February 13, 2007 via Resolution #07-011
REVISED: July 10, 2007 via Resolution #07-017
REVISED: February 12, 2008 via Resolution #08-006
REVISED: June 9, 2009 via Resolution #09-008
REVISED: September 14, 2010 via Resolution #10-015
REVISED: August 13, 2013 via Resolution #13-015
REVISED: February 11, 2014 via Resolution #14-004
REVISED: October 14, 2014 via Resolution #14-016
REVISED: September 8, 2015 via Resolution #15-012
REVISED: December 12, 2017 via Resolution #17-041

APPENDIX B

PIPE AGE GRAPH
PIPE DIAMETER GRAPH
PIPE MATERIAL GRAPH


Bangor Township Water Main Year-Built
140,000ft
120,000ft
100,000ft
80,000ft
60,000ft
40,000ft
20,000ft
ft
LFT of Water Main
124,018ft
75,978ft
27,373ft
49,180ft
76,543ft
40,995ft
5,163ft
29,494ft
1950's
1960's
1970's
1980's
1990's
2000's
2010's
Unknown
Decade


Bangor Township Water Main Diameter
LFT of Water Main
200,000ft
180,000ft
160,000ft
140,000ft
120,000ft
100,000ft
80,000ft
60,000ft
40,000ft
20,000ft
ft
96ft
13,957ft
186,628ft
149,053ft
12,047ft
66,963ft
3inch
4inch
6inch
8inch
10inch
12inch
Diameter (in)


Bangor Township Water Main Material
300,000ft
250,000ft
200,000ft
150,000ft
100,000ft
50,000ft
ft
LFT of Water Main
239,054ft
17,307ft
48,152ft
119,148ft
5,083ft
AC
CI
DI
PVC
Unknown
Material