



CLEAN WATER STATE REVOLVING FUND LOAN
APPLICATION

PROJECT PLAN



March 2022

Ira Township
7085 Meldrum Road
Fair Haven, MI 48023

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SECTION 1 – THE STUDY AREA

Description of Study Area

Ira Township was created in 1837 and was named after an early settler. It's located in St. Clair County, on the north shoreline of Lake St. Clair and is bordered by the City of New Baltimore to the west, Casco Township to the north, and Cottrellville and Clay Townships to the east. The Township has a total area of 21.6 square miles. 17.0 square miles of that is land, and the remaining lies in water. There are four unincorporated communities within the township: Anchorville, Copeland Corner, Fair Haven, and Perch Point. As of the 2020 census the Township's population is 4,967, with the average households at 2.6 persons.

Most of the Township is zoned agricultural, with residential areas, a few multi-family residential areas, a large mobile home park and small regions zoned business and industrial. Ira's sanitary sewer system follows M-29 at the south end of the township and north into some of the residential streets. It does not travel far into the agricultural areas. The system serves approximately 45% of the total population. Due to aging and outdated infrastructure, climate concerns, and projected population increases, Ira has made it a priority to address municipal utility concerns before foreseen and unforeseen failures occur.

The oldest areas of the sanitary sewer system were constructed in the late 1970s. The system has 9 sanitary pump stations. The Township is outlined in Figure 1-1 below.

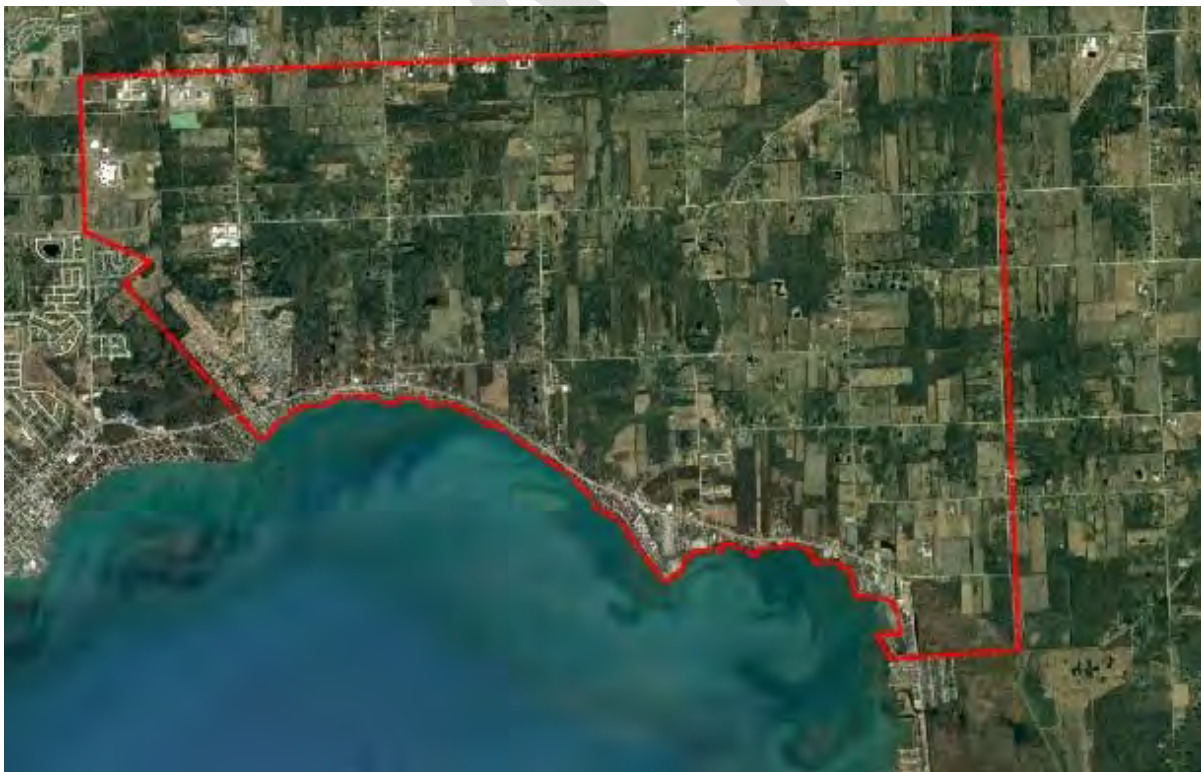


Figure 1-1 – Study Area – Ira Township

Based on the National Register of Historic Place's database there are no historical structures within the study area. A bridge on Venier Rd. over Swan Creek was on the registry but the road has since been reconfigured and the bridge no longer exists.

Air Quality

New Haven, Michigan is the nearest city to Ira Township with air quality monitoring. New Haven is located approximately 9 miles northwest of the Township. Based on the 2018-2020 of air quality reports on Particulate Matter 2.5 micrometers or less (PM_{2.5}) and Ozone (O₃), the area shows normal levels of both pollutants. Sulfur Dioxide (SO₂) is not reported. The following tables show the percentage of days New Haven levels of PM_{2.5} and O₃ fell within each air quality category between the years of 2018 to 2020.

Table 1-1 – Air Quality Report for TM_{2.5} and O₃

AQI Category	Index Values	Percentage of Days
Good	0-50	85%
Moderate	51-100	13%
Unhealthy for Sensitive Groups	101-150	2%
Unhealthy	151-200	0%

The proposed projects funded by this loan will not add to air pollutants. There are no known future developments within the Township’s industrial areas that will affect the air quality in this area.

Wetlands

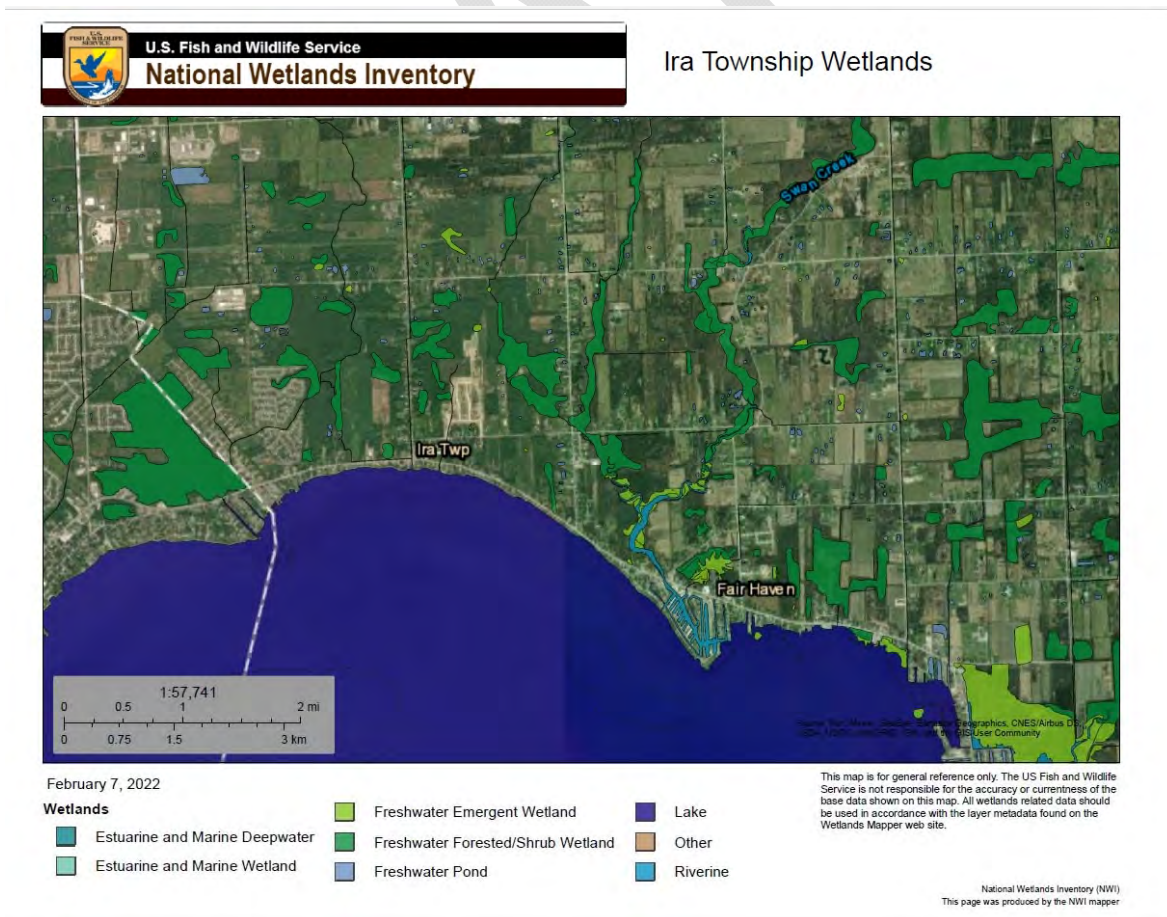


Figure 1-2- Wetland Areas in Ira Township

There are wetland areas scattered around Ira Township, as noted on the National Wetland Inventory (U.S. Fish & Wildlife Service). All the project areas lie adjacent to roadways. And although roadways are not typically wetland areas, some do extend or cross roadways, especially in the marshy areas of the southeast corner of the Township. In general wetlands are not an ideal location for sanitary sewer placement due to the water levels and unsupportive soils. Figure 1-3 shows the locations of the wetlands.

Coastal Zones

Although Ira Township lies on the north coast of Lake St. Clair, and therefore within a coastal zone, it is not an area of concern per EGLE. Properties along the coast mostly consist of single family residents and marinas. Lake St. Clair is part of the Lake Erie basin and is heavily used by people for all sorts of water activities. Millions of people on both the U.S. and Canadian sides rely on this lake for drinking water.

St. Clair County
East China Township, T4N R16E
Cottrellville Township and Marine City, T3N R16E
Algonac, T2N R16E
Clay Township, T3N R15E, T3N R16E, T2N R15E, and T2N R16E
Ira Township, T3N R15E

The heavy red line is the **Coastal Zone Management Boundary**
The red hatched area is the **Coastal Zone Management Area**



Figure 1-3 – Lake St. Clair Coastal Zone in Ira Township

Floodplains

The southern areas of Ira Township along the coast are all within the 100 year floodplain of Lake St. Clair. FEMA recently updated these areas to include wind and wave action, increasing the floodplain elevation, which will take effect in July, 2022. The coastal floodplain elevation varies throughout the waterfront across the Township, as well as the distance it travels inland. The floodplain along the Lake is currently zoned AE and will include zone VE when the new maps take effect, with a 1% annual chance of flooding and a base flood elevation. There is also a federally regulated floodplain along the Swan Creek, which is a county drain under the jurisdiction of St. Clair County. Figure 1-4 shows the overall floodplain for the Township and FEMA floodplain maps can be found in Appendix A.

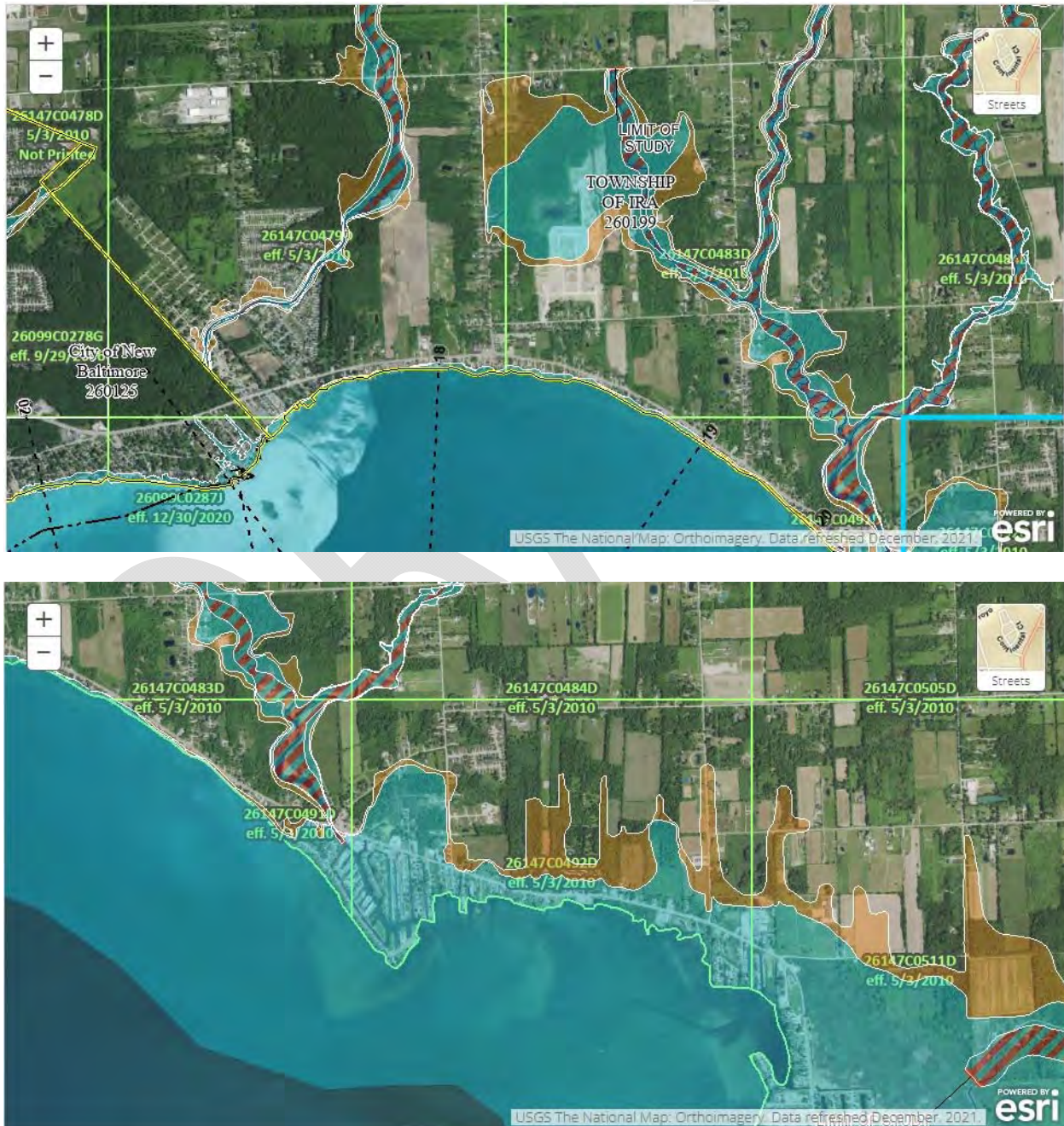


Figure 1-4 – Floodplain Zones

Recreational Facilities

Ira Township has two recreational areas within the Township limits. The Ira Township Park is a 25-acre parcel adjacent to the Township Offices. The recreational facilities include pavilions, playscapes, picnic tables, nature trails, cornhole, a butterfly memorial garden and a 9 hole disc golf course. Water Works Park is on a small parcel at the end of a local road. It has a gazebo, a walking path, and a great view of the Anchor Bay. Figure 1-6 Shows the locations of the parks within the Township.

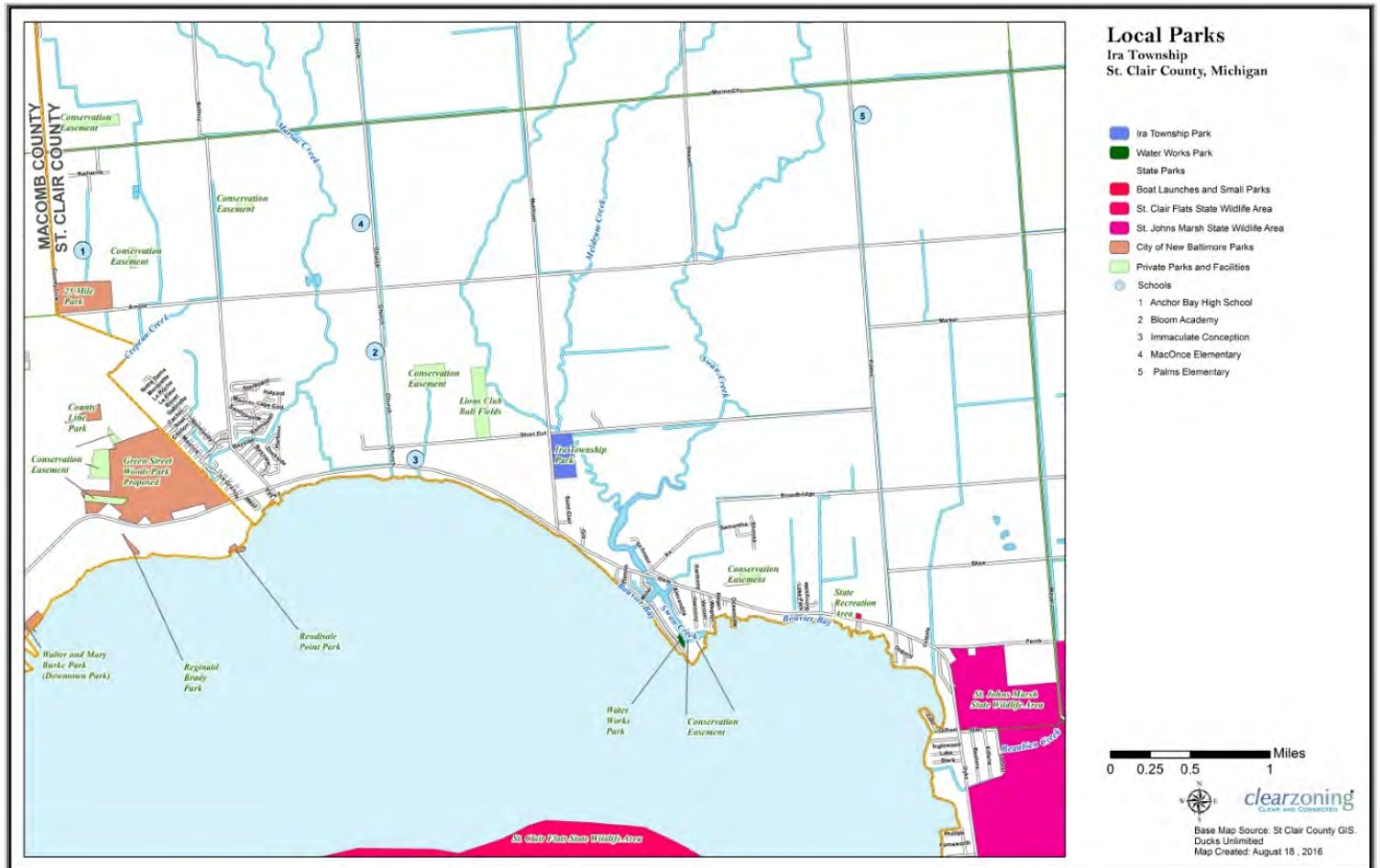


Figure 1-6 – Ira Township Recreational Areas

Topography

The general topography of the Township is a north to south slope towards Anchor Bay. There is approximately 40 feet of fall in about 2.5 miles from north end limits of Marine City Highway to the Lake. From west to east the land is relatively flat, the elevation not changing much more than 13 feet in about 6 to 7 miles. The clip below in Figure 1-7 shows the typical topography sloping towards the lake within the study area.

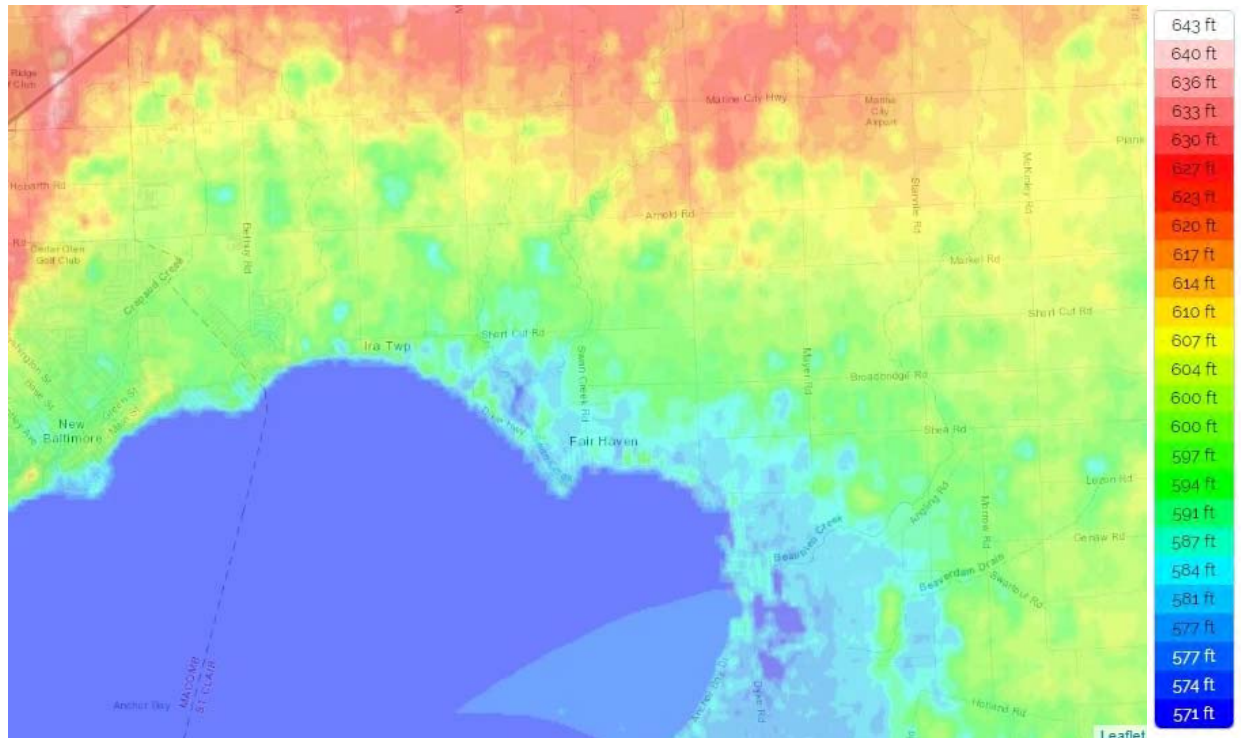


Figure 1.7 Clip of Study Area's Typical Topography

Soils

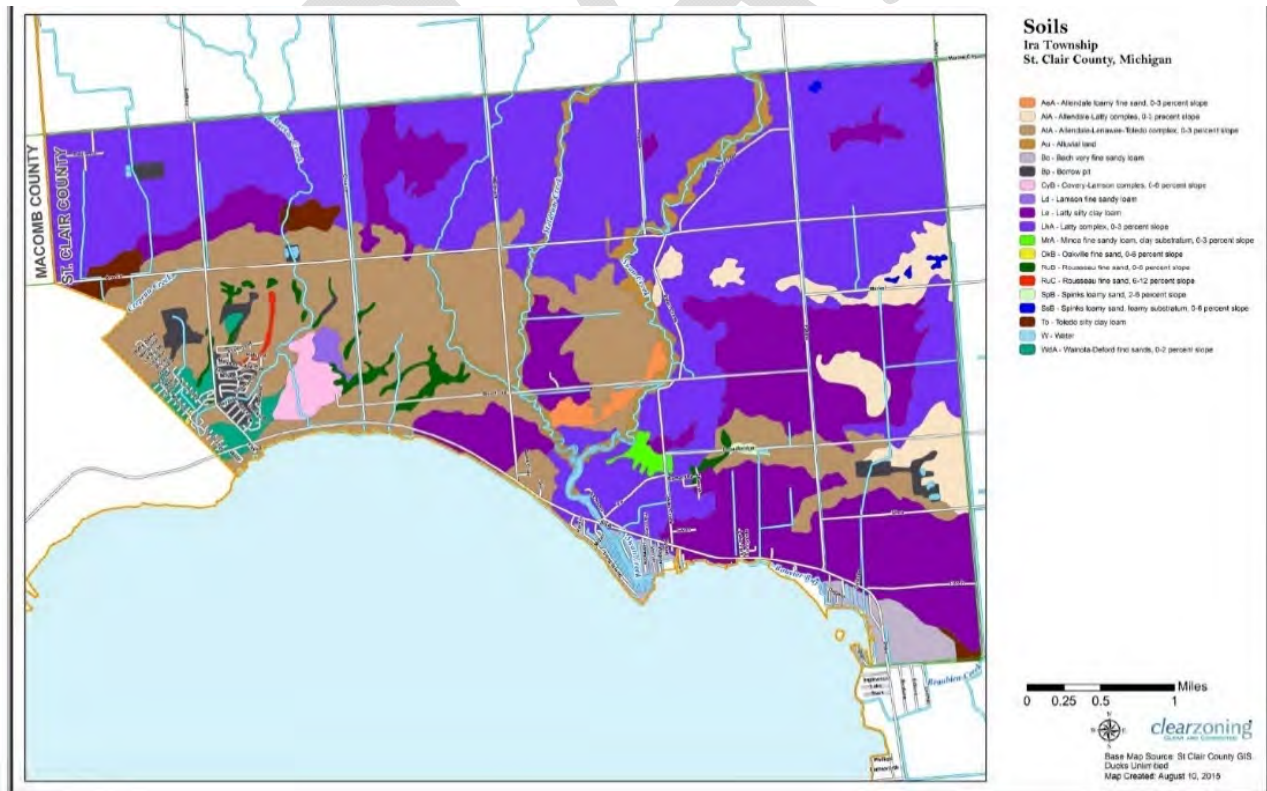


Figure 1-8 Ira Township Soil Map

There are 19 separate soils found in Ira Township as shown in Figure 1-8. Much of the area is composed of sand and loam. The main soils found are the Latty complex (LhA), Latty Silty Clay Loam (Le), the Allendale-Lenawee-Toledo Complex (AtA), and Allendale-Latty complex (AIA). These four soils make up almost 80% of the land. All have a soil group rating of D, which is categorized as slow infiltration rate when thoroughly wet. Group D consists mainly of clays with a high water table and a slow rate of water transmission. Soils like these that are assigned a dual hydrologic group, such as C/D, are assigned the first group, C, for the drained areas, and the second, D, for the undrained areas. The remaining 30% of the land consists of the soils with the same characteristics mostly having a hydrological group rating of C/D. The detailed soil report can be found in Appendix B.

Fauna and Flora – Threatened & Endangered Species

According to the Midwest Region of the U.S. Fish & Wildlife Service, the principal federal agency responsible for conserving, protecting, and enhancing fish, wildlife, and plants and their habitats, the following are threatened (T) or endangered (E) species that may be located within the study area.

Mammals – The Indian Bat (E) and the Northern Long Eared Bat (T) are found in habitats that includes small to medium river and stream corridors and well developed woods within 1 to 3 miles of the river or stream and upland forests during the summer month. The bats hibernate in caves and mines located elsewhere in the colder months.

Birds – Three birds with potential to be found in Ira Township area on the threatened and endangered list. The Piping Plover (E) can be found in beaches along the shorelines of the Great Lakes and the Rufa Red Knot (T) is a bird that habitats in coastal areas and large wetland complexes. The Whooping Crane is not listed as endangered or threatened in Michigan, but it is on the list as a “nonessential experimental population” and has the potential to reside in the open wetlands or the lakeshore within the Township.

Reptiles – The Eastern Massasauga (T), locally known as the Michigan Rattlesnake, are usually found in various wetland habitats and hibernate below the frostline on the edges of wetlands or in areas with a high water table.

Clams – Two endangered clam species have the potential to reside in the waters of Ira Township. The Rayed Bean’s habitat is the larger rivers of the southeastern Michigan. The Snuffbox mussel can be found in small to medium size creeks (and some larger rivers) in areas with a swift current.

Plants – The Eastern Prairie Fringed Orchid plant likes to live in mesic to wet prairies and meadows and has the possibility to live in the wetter areas of the Township.

Habitats - There are no Ira Township locations considered critical habitats, which are habitats that contain features essential to the conservation of an endangered or threatened species.

While there are no threatened or endangered species that definitively live in the Ira Township proposed project locations, the Township will abide by any restrictions necessary to protect the species, such as limiting construction times or construction activities. Michigan State University has a comprehensive inventory for all species on the Threatened and Endangered list that have appeared anywhere in the County. This list can be found in Appendix C.

Land Use

The most prominent land use in the Ira Township is agricultural. The highest densities of residential living are located near waterfront. There are commercial and industrial areas along State Route M-29 which is the major east/west thoroughfare through the Township. The waterfront is mainly zoned single family residential or waterfront residential. Community Facilities include all township owned property, such as the Township Hall, parks, a cemetery, post office, etc. There are significant portions remaining undeveloped. Figure 1-9 shows how Ira Township is currently zoned.

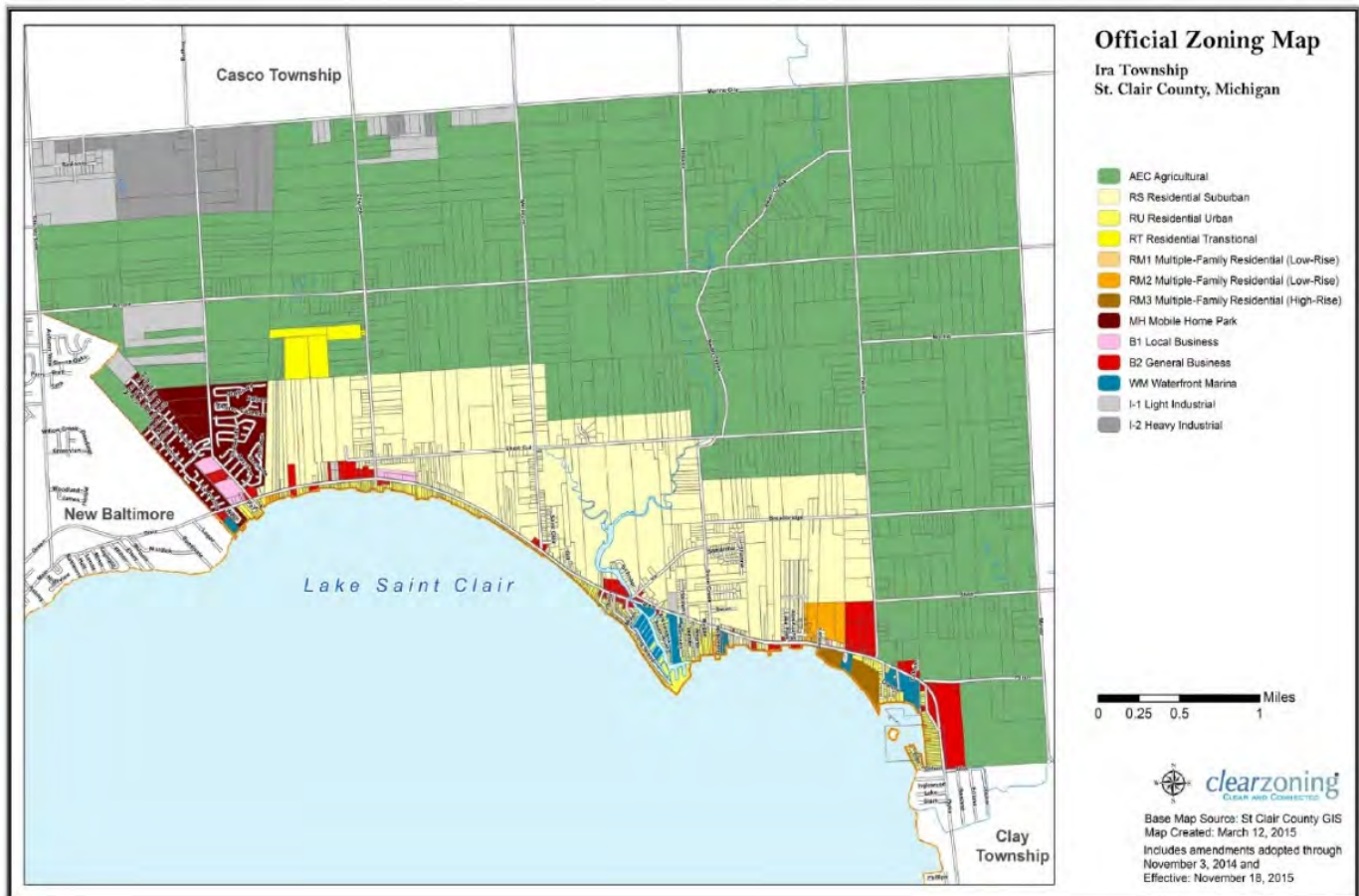


Figure 1-9 –Ira Township Land Use Map

Ira Township specifies future goals for all types of land in their Master Plan. For the residential areas, the Township wishes to support a homeowner-oriented community with a variety of housing types including multi-family, duplexes, condominiums, apartments, and senior housing. The Township encourages the use of open spaces and recreational areas within these residential locations and redevelopment opportunities along the waterfront that will result in more open space and better views of the lake.

Preserving the natural resources of the area is an important goal for the Township. The Master Plan's aims to preserve the environmentally sensitive areas along Swan Creek, preserve the open rural character of the Township, minimize the conversion of existing farmland into urban uses and protect the existing woodland as well as incorporation of woodland into new developments.

Keeping the area's rural feel is important to the Township and will continue to be a consideration when implementing commercial development. The Township will encourage businesses that provide retail and services that are sufficient to the needs of the community and contributes to the image and identity of the Township. Commercial developments will mainly reside in the Fair Haven and Anchor Bay areas and will be appropriately located with access to the Township's main roadways.

The Township plans include creating a clean, high quality industrial base that provide employment to the residents. All industrial developments will lie along Marine City Highway in keeping with the protection of the natural resources along the lake. Light industries and high tech/research facilities that have no adverse environmental effects are encouraged.

Ira's objectives for recreation and open spaces are to preserve the existing land and acquire more land to expand on the existing recreational areas to meet the anticipated needs of future residents. The Township would like to increase opportunities for access to Anchor Bay waterfront for recreational purposes.

Population

Based on the 2020 U.S. Census the population in Ira Township is 4,967 and is also the population of the study area. Few residents in the Township are seasonal residents and therefore there are minimal seasonal fluctuations in the sanitary system. SEMCOG projects the Township's population will decrease over the next 20+ years by 4.1%. Projecting that in 5, 10 and 20 year increments the population is estimated at 4,916, 4,865 and 4,763, respectively. This is lower than the estimated populations increase of St. Clair County, which is -0.1%. However, local interests suggest the area will see slow increases in population as developers and residents are finding more interest in rural areas near recreational waters.

Economic Characteristics

Ira Township is a small township of less than 5,000 people. It has some commercial and industrial zones, proportionate to its size. All the commercial and industrial businesses are considered small enterprises and there are no major employers such as a large wholesaler or utility company.

Economically, Ira Township lies above the average for St. Clair County. The median household income is \$72,625 with 7.8% of persons below the poverty line. (American Community Survey, 2015-2019). 57.4% of the Township's citizens aged 16 years and above are employed, which is slightly higher than the county's rate.

Based on SEMCOG's population estimates for the next 30 years, there is no expected growth. The study estimates the population to decline slightly. The expected business growth within the Township remains the same as it has over the last several decades. New small industrial and commercial business are anticipated to open in those regions zoned as such. Local interests estimate the growth will remain slow and steady over the next decades.

Existing Facilities

The Ira Township's Sanitary System serves the denser area of the Township, with a current year round population of 1,175. The Township's sanitary sewer system has about 100,000 feet of pipe and 9 pump stations around the Township. The collector pipes range from 8 inch to 21 inch diameters with materials of clay, reinforced concrete, and truss pipe. The Township shares a Wastewater Treatment Plant with

neighboring Clay Township and the City of Algonac. Table 1-2 shows a general inventory of the system. A map of the system can be found in Appendix D.

Table 1-2– Sanitary System General Asset Inventory

Asset	Capacity/Quantity	Material
Pump Station 1 (Church Rd.) and appurtenances	680 GPM	Varies
Pump Station 2 (Ira Rd.) and appurtenances	690 GPM	Varies
Pump Station 3 (Swan Creek) and appurtenances	640 GPM	Varies
Pump Station 4 (Palms Rd.) and appurtenances	650 GPM	Varies
Pump Station 5 (Zobl Rd.) and appurtenances	1000 GPM	Varies
Pump Station 6 (Long Island Ct) and appurtenances	325 GPM	Varies
Pump Station 7 (Bethuy Rd.) and appurtenances	560 GPM	Varies
Pump Station 8 (Bethuy Woods) and appurtenances	470 GPM	Varies
Pump Station 9 (Macone/Church Rd.) and appurtenances	60 GPM	Varies
Sewer 8"	9,327 ft	Truss Pipe
Sewer 10"	38,716 ft	Truss Pipe
Sewer 12"	26,549 ft	Truss Pipe
Sewer 15"	1,413 ft	Truss Pipe
Sewer 18"	26,651 ft	Reinforced Concrete
Sewer 21"	102 ft	Reinforced Concrete
Sanitary Structures	467 each	Varies

The wastewater treatment plant serving Ira Township is the Algonac WWTP. The City of Algonac, Ira and Clay Townships all own the plant, operated by the county. Ira’s portion is 33%. The wastewater treatment plant uses trickling filters and has a capacity of 1.8 million gallons per day (MGD). The system currently manages a peak flow of 1 MGD in dry weather and 4 MGD in wet weather. There are no combined sewers remaining within the Township.

Most of the sanitary collection system was videoed, reviewed, and categorized. Many areas showed age and signs of structural defects. From the information uncovered from the study, the Township set priorities for improvements.

The pump station locations can be found on Table 1-3 and shown on Figure 1-10.

Table 1-3 – Pump Station Locations

Pump Station	Location
Bethuy Woods.	42.715671, -82.719707
Bethuy Rd.	42.693840, -82.708392
Macone-Church Rd.	42.709467, -82.689511
Church Rd..	42.691118, -82.685675
Ira Rd.	42.680568, -82.657763
Long Island Ct..	42.677656, -82.657708
Swan Creek.	42.677586, -82.646460
Palms Rd.	42.674555, -82.627275
Zobl Ct.	42.665030, -82.620587



Figure 1-10– Pump Station Locations

Pump Station 1 (Church Road) is located on the north side of M-29 approximately 0.2 miles east of Church Road. The station has two pumps, each with a capacity of 680 GPM, updated in 2022. This is a lift station that sends flow directly to the 18” diameter M-29 sewer.

Pump Station 2 (Ira Rd.) is located next to Swan Creek at the end of Ira Rd. The station has two pumps, both with a capacity of 690 GPM, updated in 2022. It pumps directly into the 18” diameter sewer on M-29.

Pump Station 3 (Swan Creek) is located on M-29, about 550 feet east of Swan Creek Road. The station has two pumps, both with a capacity of 640 GPM, updated in 2022. It pumps directly into the 18” diameter sewer on the north side of M-29.

Pump Station 4 (Palms Rd.) is located along M-29, about 330 feet east of Palms Road. The station has two pumps, both with a capacity of 650 GPM, updated in 2022. It pumps directly into the 18” diameter sewer on the north side of M-29.

Pump Station 5 (Zobl Ct.) is located off Zobl Court, near the M-29 intersection. This station pumps all the Township’s sewage to the wastewater treatment plant and has two 1000 GPM capacity pump that were updated in 2022. The sewage is pumped into an interceptor forcemain that flows to the wastewater treatment plant.

Pump Station 6 (Long Island Ct.) is located on Long Island Court at the Water Works Drive intersection. The station has two pumps, both with a capacity of 325 GPM, updated in 2022. It pumps to a 4” diameter ductile iron forcemain.

Pump Station 7 (Bethuy Rd) is located along Bethuy Road, approximately 0.4 miles north of M-29. The station has two pumps, both with a capacity of 560 GPM, updated in 2022. It pumps to a 4” diameter ductile iron forcemain to transport the sewage under Crapaud Creek, approximately 220 feet.

Pump Station 8 (Bethuy Woods/Andrews) is located near the northwest corner of the Township. It’s in a forested area with at the end of a dirt access road off Bethuy Rd. The station has two pumps, both with a capacity of 470 GPM, updated in 2022. Sewage is pumped to a gravity sewer that flows to Bethuy Road.

Pump Station 9 (Macone/Church Rd.) is approximately 750 feet north of Arnold Road along Church Rd. The station has two pumps, both with a capacity of 60 GPM, updated in 2022. It pumps directly the 12” sewer along Church Road.

Fiscal Sustainability Plan

Ira Township will not be requiring SRF funds to complete an asset management plan of the sewer system. The Township was awarded a SAW grant in 2013 which was used to assess the existing infrastructure and create an asset management plan, completed in 2018. As part of the SAW Grant, areas of the system were estimated for the consequences of their failure. The failure of a portion of the wastewater system can lead to severe consequences for the residents and the environment. A 1-5+ numeral rating system was used to show the level of damage that can be caused by system faults, with a rating of over 5 being considered the most crucial items. The following table was taken from the SAW Grant’s final presentation. Table 1-4 shows the total of the sanitary sewers and their consequence of failure. In determining these quantities, the sewers were videoed and reviewed for damages ranging from cracks to missing pipe sections due to erosion. The National Association of Sewer Service Companies’ (NASSCO) LOF ratings were used during the assessment.

Table 1-4 – Consequence of Failure Ratings for the Sanitary System (2019 Ira Township SAW Grant Report)

Quantity	Size	Material	Consequence of Failure
2	4 in.	Force mains Under Canal	6
9	Various	Pump Stations	6
250.8 ft.	18 in.	Reinforced Concrete Pipe under M-29 Hwy	6
80.7 ft	12 in.	ABS Truss Pipe under M-29 Hwy	6
1,867.7 ft	10 in.	ABS Truss Pipe under M-29 Hwy	6
93.7 ft	8 in.	ABS Truss Pipe under M-29 Hwy	6
467	Various	Sanitary Manhole Structures	5
26,400 ft	18 in.	Reinforced Conc Pipe (interceptor along M-29)	5
14,438 ft	10 in.	ABS Pipe South of M-29 along Lake St. Clair	Various (5 and down)
438.9 ft	8 in.	ABS Pipe South of M-29 along Lake St. Clair	Various (5 and down)
5,166 ft	12 in.	ABS Pipe Streets South of M-29	Various (5 and down)
21,302 ft	12 in.	ABS Pipe Streets North of M-29	Various (5 and down)
1,413 ft	15 in.	ABS Pipe Northside of M-29	Various (4 and down)
6,035 ft	10 in.	ABS Pipe North of M-29	Various (4 and down)
7,270 ft	10 in.	ABS Pipe Streets South of M-29	Various (4 and down)
9,105 ft	10 in.	ABS Pipe Streets North of M-29	Various (4 and down)
4,528 ft	8 in.	ABS Pipe Streets South of M-29	Various (3 and down)
4,266 ft	8 in.	ABS Pipe Streets North of M-29	Various (3 and down)

Need for the Project

Compliance Status

Ira Township shares a wastewater treatment plant with Clay Township and the City of Algonac. The plant is in Algonac and is owned by the three communities, each with a 33% stake in the plant. The plant has the authorization to discharge under the National Pollutant Discharge Elimination System with permit No. MI0020389. The current permit took effect on May 1, 2015. It was set to expire October 1, 2018 but has been extended and is still in effect. The plant discharges to the St. Clair River in accordance with effluent limitations and monitoring requirements. The plant discharge is monitored for total suspended solids, biochemical oxygen demand, mercury, fecal coliform bacteria and phosphorus. The permit and monitoring reports, performed by the St. Clair County Department of Public Works, can be found in Appendix E. The report shows that the plant's discharge follows the permitting limits. The following table shows the treatment plant's effluent amount versus the permitting limits.

Table 1-5 Algonac Wastewater Treatment Plant Effluent Quantities vs. Permitting Limits, March 2021

Parameter	Algonac/Clay/Ira Effluent	Permitting Limits
CBOD ₅	94.8 lbs	560 lbs
TSS	167.6 lbs	680 lbs
Mercury	Undetected	0.00009 lbs/day
Fecal Coliform Bacteria	5 cts/100 ml	200 cts/100 ml
Phosphorus	9.66 lbs	23 lbs
pH	7.0/7.5	6.5/9.0 min/max daily

Orders

Ira Township is not currently under any court orders, federal or state enforcement orders or administrative consent orders.

Water Quality Problems

Although there are many areas of the Township where sanitary sewer service is not available, Ira is unaware of any water quality issues with septic systems in the Township.

Projected Needs for the Next 20 Years

Based on the projected population estimation for the Township's population will slightly decrease over the next 20 years. The minimal decrease will not change the sanitary needs of the Township as a whole. The population reduction will not be limited to one sanitary district and so does not warrant any changes in the sizes of the sanitary sewer pipes, the wastewater treatment plant, or the sewer pumps, but to maintain the current level of service the residents have today, it will require upgrades and repair. The proposed project activities will maintain the system with fewer loss of service/property by repairing structurally deficient pipes and manholes. The pump stations were recently upgraded under a separate project and therefore do not need attention at this time.

Even with the projected decreases in the population, there has still been interest in possible development in industrial and residential zones within the Township. The existing sanitary system runs to or through the areas zoned R-1 Residential Subdivision. The existing system runs north up the locations that are zoned for industrial. The only areas which do not have access to the system are the agricultural areas which will remain as they are.

Future Environment without the Proposed Project

Sanitary sewers in many areas of Ira Township are beyond their life expectancy. The pipes are degrading generating cracks and breaks leading to infiltration problems. Prior to a recent project the pumps were underperforming. The issues with the system are causing the Township to use more energy and more staff hours to maintain. It has caused inconvenience to residents and will become too costly to not address. As the sewer system gets older, deterioration will occur more rapidly. Without repairs and rehabilitation, the Township can expect more infiltration and inflow. Ira can expect to pay more in maintenance and energy and unnecessarily treating storm water. The extreme weather and flooding in the area create more stress on the system and downstream pipes and pump stations.

Deteriorating pipes are seen throughout the system. Although some of areas are newer than others, and some areas a lower lying than others, issues have been seen in various areas. Through the pipe inspections, many cracks and fractures were found to be letting in ground water.

Along with those foreseeable issues there can be issues with neighboring infrastructure. As the pipes degrade and fail, they create erosion issues around the break, which can lead to sinkholes. This puts other utilities in jeopardy such as the adjacent roads.

DRAFT

Section 2 - Analysis of Alternatives

Ira Township and their consultants have considered options to address the existing and future concerns of the system. Many factors have gone into considering all possibilities such as level of priority, likelihood of failure, criticality of failure, safety to citizens, impacts to the area, cost effectiveness, efficiency of choice, feasibility of choice, citizen's concerns, and seasonal concerns.

Alternative #1 - No Action Alternative

Keeping the system as it is with continued maintenance and spot repairs as needed was an option considered. This is how the Township has typically been preserving the collection system for decades and there has been a noted increase in the problems that arise as the system ages. The age and condition of the system in certain areas suggest that it is at or beyond its life expectancy. And with any growth the system will be operating beyond capacity. As the foreseeable problems that may arise, many potentially disastrous to residences and the environment, the Township will have to make emergency repairs at those locations.

Alternative #2 - Optimum Performance of Existing Facilities

The existing facilities were evaluated to determine how they could better function without major construction and cost. Lining the interior of the pipes can be useful in eliminating the cracks and repairing damages which cause infiltration problems. Cured-in-place-pipe-lining (CIPP) is one such process considered a viable option. CIPP starts with placing a flexible liner into the existing sewer. Steam or hot water is forced into the liner pushing the liner tightly against the existing sewer walls. The liner material cures with the heat and creates a new pipe within the existing pipes. After the lining is cured, the existing lateral services are cut out of the lining using a robotic cutter. This can be a desirable option because it is generally less costly and takes less time than a full replacement and causes little disruption to the surrounding areas and traffic when sewers lie within road rights-of-way. However, pipe lining cannot correct issues caused by severely damaged pipes. Joints and taps with showing problems will also be lined and pipes will be lined where there is heavy encrustation. Manholes with severe structural damage will also be lined on the same process of the pipe lining.

The nine pump stations within the Township have been recently upgraded with new pumps, necessary repairs, and control upgrades. Due to the updates, the stations did not need to be considered for this project.

Alternative #3 -System Replacements

A full replacement of 8,414 feet of the most severely damaged sewer would result in the reduction of wastewater, more efficient use of energy, and an increase in the life expectancy of the system.

Pipe rehabilitation includes the removal of the critical pipes and replacing them with High Density Polyurethane (HDPE) pipe in the same size of the previous pipe. This would include excavation of the existing pipe, placement of bedding and new pipe along with new manhole structures as needed. Beyond the replacement of the pipe, it would be necessary to restore pavement, driveways, sidewalks, landscaping, utilities, and trees that are disturbed by the construction.

Water and Energy Efficiency

The No Action Alternative (#1) is the least efficient of the choices. The current sanitary sewer system is both water and energy ineffective. With the high occurrences of fractures and cracks within the pipes

leading to the ground water seeping in, treating extraneous flow from infiltration and inflow (I/I) is ineffective and costly. It is estimated that 40% of wastewater entering the treatment plant consists of I/I. The I/I deprive the pipe system of valuable capacity and overwhelms the pumps.

Optimizing the existing system, Alternative #2, would result in a reduction of I/I and would be an improvement of the water efficiency of the existing system. Lining the pipe could result in an estimated 40% reduction of the wastewater going to the treatment plant.

Alternative #3, Full System Rehabilitation, has the same results as alternative #2 in improving efficiency. It would result in the removal of 40% of inflow and infiltration.

Regional Alternatives

The sanitary collection system has been inspected and although it's been found that deterioration is occurring in all areas of the system, the areas near the lake are causing more problems. This area is the lowest lying in the township and where infiltration through the pipes is the worse. These pipes show more deterioration, with more cracks, breaks and bad connections compared to more recently placed pipes.

Because of its proximity to the lake, this area was settled first. When Ira Township decided to construct a wastewater collection system in the 1970s, this was, and remains, the most densely populated area. It is because of the issues with the old pipes that these areas are high on the priority list for repairs.

Analysis of Principal Alternatives

The Monetary Evaluation

This evaluation compares the alternatives through the 20 year loan period. Table 2-1 summarizes the monetary differences in the alternatives.

Alternative #1 – No Action

- A. Sunk Cost
 - a. Project Plan Preparation Cost
 - i. Ira Township: \$0
 - b. Outstanding Bond Debt
 - i. Ira Township 2022: \$76,488
- B. Present Worth
 - a. Ira Township Sewer System (project area only): \$0
- C. Salvage Value
 - a. Ira Township Sewer System: 20 year monetary evaluation: \$0
- D. Escalation: Energy Cost escalation is the only one, published by the EPA or based on historic data
- E. Interest During Construction: 0
- F. Mitigation Costs:
 - a. Existing Mitigation: N/A
 - b. Post Construction Mitigation: no mitigation is needed.
- G. User Cost: Avg. Quarterly Sewer Costs, Annual Cost Total
 - a. \$59.85 quarterly, \$239.40 annually

- H. Delivery Method.
 - a. There is no project for this Alternative.

Alternative #2 – Optimum Performance of Existing Facilities

- A. Sunk Cost
 - a. Project Plan Preparation Cost
 - i. Ira Township: \$69,000
 - b. Outstanding Bond Debt
 - i. Ira Township: \$76,488
 - c. Existing Facilities Cost (capital existing):
 - i. Ira Township: \$126,964
- B. Present Worth
 - a. Ira Township Sewer System (project area only): \$2,610,000
- C. Salvage Value
 - a. Ira Township Sewer System: 20 year monetary evaluation: \$1,566,000
- D. Escalation: Energy Cost escalation is the only one, published by the EPA or based on historic data
- E. Interest During Construction: Interest rates are exceptionally low now, and alternatives would all use a SRF loan with 20 year term at 1.875% for Ira Twp. Interest incurred during the loan period: \$544,001.24
- F. Mitigation Costs:
 - a. Existing Mitigation: None
 - b. Post Construction Mitigation: no mitigation is needed.
- G. User Cost: Avg. Quarterly Sewer Costs, Annual Cost Total
 - a. \$59.85 quarterly, \$239.40 annually
- H. Delivery Method.
 - a. The traditional Design-Bid-Build project delivery method will be used.

Alternative #3 – System Replacement

- A. Sunk Cost
 - a. Project Plan Preparation Cost
 - i. Ira Township: \$70,000
 - b. Outstanding Bond Debt
 - i. Ira Township: \$76,488
 - c. Existing Facilities Cost (capital existing):
 - i. Ira Township: \$126,964
- B. Present Worth
 - a. Ira Township Sewer System (project area only): \$14,724,500
- C. Salvage Value
 - a. Ira Township Sewer System: 20 year monetary evaluation: \$10,748,885
- D. Escalation: Energy Cost escalation is the only one, published by the EPA or based on historic data
- E. Interest During Construction: Interest rates are exceptionally low now, and alternatives would all use a SRF loan with 20 year term at 1.875% for Ira Township. In incurred during the loan period: \$3,069,021.57
- F. Mitigation Costs:

- a. Existing Mitigation: None
- b. Post Construction Mitigation: no mitigation is needed.
- G. User Cost: Quarterly Sewer Costs, Annual Cost Total
 - a. \$59.85 quarterly, \$239.40 annually
- H. Delivery Method.
 - a. The traditional Design-Bid-Build project delivery method will be used.

Table 2-1 – Alternatives Monetary Evaluation Summary

Alternative #	Sunk Costs	Present Worth	Interest Incurred	Salvage Value	Lifespan of Project (yr)
1	\$203,452	\$0	\$0	\$0	0
2	\$273,452	\$2,610,000	\$544,001	\$1,566,000	50
3	\$273,452	\$14,724,500	\$3,069,022	\$10,748,885	75

The Environmental Evaluation

All the alternatives are expected to result in minimal or no impact. Alternative #3 is the only option using open trench construction and therefore creates the most physical disturbance. The following table summarizes the environmental impacts using a numbered scale, 0-5, where 0 equals no impact and 5 is substantial impact.

Table 2-2 – Environmental Impacts per Alternative

Alternative	Impacts										
	Air Quality	Wetlands	Costal Zones	Floodplains	Rivers	Surface Waters	Recreational Facilities	Topography	Soils	Agricultural Resources	Fauna/Flora
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	1	0	0
3	0	0	2	2	2	1	0	0	2	0	1

Alternative #2 will have very minimal earth disturbance. The project lies within the coastal zone, floodplains, and will cross county drains (surface waters), therefore there is the potential for some impact with Alternative #3. If any threatened or endangered flora and fauna reside in the area, there is a possibility of its disturbance, but there will be no tree removal and no open trench construction through open water.

Implementability and Public Participation

The public will have 30 days to review a draft of this project plan and will have the opportunity to discuss the proposed activities and any concerns during that period. After the 30 days a public hearing will be held where any interested party can address their questions and assert any concerns. A detailed explanation of the hearing will be recorded within this project plan.

Technical and Other Considerations

Infiltration and Inflow (I/I) Removal

An evaluation of I/I in the existing sanitary system was performed from February 2, 2016 to March 1, 2018. Monitors were placed at thirteen locations and their flow reports were monitored and studied to

characterize the flow. The normal flow, or Base Sanitary Flow (BSF) were calculated using the residential equivalent units and a value of 2.56 persons per REU. The typical flow used per person was 100 GPD. Most of the thirteen locations are in a series of each other and track cumulative flow volume. The monitors remained in place since the original study at Zobl Court Pump Station. This station is the last stop before entering Clay Township and ultimately to the treatment plant in Algonac. More recent readings (from September of 2020 to December of 2021) were studied and compared to the estimated BSF. The table below shows the comparison.

Table 2-3– Ira Township Sewage Flow Comparison

Zobl Pump Station				
# of Customers		1175		
2.56 Persons/Households		3055		
Township BSF (GPD)		300,800		
Monthly Cumulative Avg. BSF (GPD)		9,024,000		
Month/Year	Days	Total Monthly Flow	Avg. Daily Flow	Precipitation (rain/snow)
20-Sep	30	16,005,835.90	533,527.86	2.9"
20-Oct	31	11,185,889.05	360,835.13	1.84"
20-Nov	30	11,889,221.20	396,307.37	1.96"
20-Dec	31	12,191,315.31	393,268.24	0.98"
21-Jan	31	11,511,897.55	371,351.53	0.75"
21-Feb	28	9,240,508.40	330,018.16	0.43"
21-Mar	31	13,763,695.25	443,990.17	1.98"
21-Apr	30	10,557,730.44	351,924.35	1.19"
21-May	31	10,075,153.50	325,004.95	0.83"
21-Jun	30	12,898,864.64	429,962.15	5.26"
21-Jul	31	15,250,517.12	491,952.17	5.00"
21-Aug	31	11,789,398.96	380,303.19	5.63"
21-Sep	30	14,878,420.79	495,947.36	0.28"
21-Oct	31	15,132,633.24	488,149.46	5.02"
21-Nov	30	12,275,572.68	409,185.76	1.21"
21-Dec	31	15,923,570.27	513,663.56	2.53"

As seen in the table above, the actual flows through the Zobl pump station are over the estimated base flow. The differences range from 2% over to 43% over base flow. The additional flow is due to the inflow and infiltration into the system. Monthly precipitation amounts (rain and snow) are shown to further illustrate how the weather is affecting the system. Because the Zobl pump station takes in Ira’s entire sewage, I&I is happening throughout the Township. To pinpoint locations where water is entering the system, the sewer pipes were inspected and assessed for deterioration.

Structural Integrity

The structural integrity of Ira Township’s sanitary sewer systems varies. Some sections of the system have been replaced, repaired, or updated as recently as last year. However, there are many areas of the

system where the pipes and manholes are aging and deteriorating. Most of these areas coincided with the earliest developed locations of the Township. The aging segments of the system are mainly near the water. The most critical areas have been prioritized and can be seen on the project map in Appendix G.

The sewer collection system was videoed, reviewed, and rated based on National Association of Sewer Service Companies (NASSCO) pipeline assessment certification program. A clip of the critical list from the study is shown in Table 2-4. These pipe segments have been found to have multiple cracks, deposit encrustation, and tree root damage.

NASSCO Rating Definitions

- 5: Pipe has failed or will likely fail within 5 years.
- 4: Pipe will probably fail in 5-10 years.
- 3: Pipe may fail in 10-20 years.
- 2: Pipe unlikely to fail for at least 20 years.
- 1: Failure unlikely in foreseeable future.

Table 2-4 – A Clip of the Critical Pipe List

U/S MH	# OF FLAIL	# OF LATS	# OF T/L	Line Pipe	Tot LF	# OF JPR	PIPE DIA (in)	OTHER REMARKS	LOF
175	0	11	11	372	372	0	10	HINGED FRACT./MASS INFL PIPE COLAPSE IMINENT	>5
233	0	0	0	300	56	0	10	PIPE INTRUSION, CROSS BORE H2O PIPE	>5
142R	0	2	1	216	216	0	10	INVESTIGATE	5
177	0	0	0	7	7	0	8	6.6' INTRUSION WATER LINE LINK TO 142	5
116	0	4	4	358	358	0	10	EXCAVATE 8' OF PIPE DAMAGED	5
281	0	5	5	254	254	0	10	2 BROKE LOCATIONS PATCH THEM, TAP @ 234' T-LINE, TAP @225 ILLEGAL?	5
156	0	1	1	193	193	0	10	75' CEILING FRACTURE, HSV @21'	5
18	0	2	2	376	376	0	18		5
150	0	3	3	250	250	0	18		5
42	0	6	2	283	283	0	18		5

Table Legend:

FLAIL = areas of DAE to be removed
 LATS = Laterals
 T/L = Tee liners needed for damaged laterals
 JPR = Joint Point Repairs

DAE = Deposit Attached Encrustation
 MSA = Survey Abandoned due to obstruction
 ID = Infiltration dripper

There is currently approximately 8,414 linear feet of pipe surpassing the critical rating based on NASSCO rating system. The full inventory of Ira Township's critical pipes and their ratings can be found in Appendix F. From this information the Township prioritizes projects to repair or replace pipe segments in the system.

Growth Capacity

There is no population growth estimated for Ira Township based on SEMCOG assessments. SEMCOG projects a decrease in population by 4.1% bringing the total to 4,763 persons in 20 years. However, local projections estimate slight increases due to available land for development and the Township's proximity to Lake St. Clair which makes the areas desirable for those looking to leave near recreational opportunities. This estimate does not warrant increases in the wastewater treatment plant or the collection system. However, maintaining the existing system will be important to keep areas working at their optimum capability through any new changes.

Alternative #1, the no action alternative, will not maintain the system. Alternative #2 will provide a solution though at least the next 50 years and can help prepare for future city growth. Alternative #3 will provide a longer term solution and will also help prepare for potential future developments.

Reliability

The reliability of the system depends on the maintaining the system so that it continues to service the residents of the Township at or above its current level of service. Preventing the failures of the collection system is important for this utility's constant service and to prevent backups causing the release of raw sewage into home and environment. Alternative #1 will not extend or establish more reliability within the system. Alternative #2 will extend the life of the existing sewers. The life expectancy of lining the pipe is approximately 50 years. The HDPE pipe proposed in Alternative #3 is often estimated to a 50 year life span, but many studies show they can last up to 100 years under good conditions.

Alternative Sites and Routings

The Township's priority is to repair the existing issues plaguing the sanitary sewer system. Because no new facilities or residential developments are being considered, there are no alternative sites or re-routing considered.

Green Project Reserve (GPR)

Clean water is consuming capacity in the Township's sanitary sewer system, causing sewer backups which release raw sewage into homes and the environment. This, in turn, creates health and safety issues that can be costly to resolve. Additionally, clear water that reaches the wastewater treatment plant is treated unnecessarily. This increases the cost and energy of treatment, reduces the life of the equipment, and may unnecessarily necessitate a plant expansion. Through estimating the sanitary base flow, and determining an illicit connection flow using flow reading, drawdowns, and pump cycles it was determined that Alternatives 2 & 3 will reduce the amount of I/I into the system by 40%. With a 40% decrease in sewage that needs to be treated, the reduction of I/I into the system will, in turn, reduce energy usage by the same amount. Replacements of pumps and controls have shown an energy reduction of 30% at the pump stations.

SECTION 3 - SELECTED ALTERNATIVE

Relevant Design Parameters

Alternative #2 has been determined to be the most productive and efficient solution to the existing concerns of the Township's sanitary sewer system. A list of the proposed projects activities and locations are below and can be seen on the project map.

Lining Existing Sewer

The lining of the existing sewer will consist of several different activities.

- Lining 8,414 linear feet of existing sewer with a non-woven felt fabric using the CIPP method.
- Joint repair of 285 linear feet (5 feet/joint) using the same material and method of the pipe lining.
- Tap lining of 134 taps using the same material and method of the pipe lining.
- Placement of 134 lateral clean outs for residents without them in the lining areas.
- Incidental to the above items is pipe cleaning and TV-ing the pipes pre and post lining.

Project Map

A detailed map of the locations of the pipe lining and pump rehabilitation is shown on the project map in Appendix G.

Controlling Factors

Ira Township's main priority for their sanitary sewer system is to address problems caused by the existing system in the most productive and cost efficient ways possible. Ira Township uses budgeting software specific to municipal utilities. Loan amounts were evaluated throughout the 20 year loan period along with facility costs and revenue to determine the amount that Township can manage.

Sensitive Features

There are wetlands, floodplains, and potential threatened or endangered species within our study area. The projects proposed have little to no earth distance that would impact any of these features. No new facilities are proposed, and the proposed projects do not require excavation.

Schedule for Design and Construction

The following is a tentative schedule for the milestones of the projects.

- Project Design: July 2023 – November 2023
- Bid Advertisement: November 2023
- Bid Opening: January 2024
- Project Construction Start: April 2024
- Substantial Completion: April 2026
- Project Final Completion: July 2026

Cost Summary

The following is a summary of the estimated costs for construction and associated work for the proposed project.

Lining Sanitary Pipe

- Engineering/Design: \$164,844
- Contract Administration: \$109,896

- Pipe Lining: \$140/linear foot = \$1,177,960
- Joint Repair: \$4,500/each = \$256,500
- Tap Lining: \$4,500/each = \$603,000
- Lateral clean outs: \$700/clean out = \$93,800
- Inspection: \$204,000

Total estimate for all work and associated costs: \$2,610,00

Prices were determined through quotes from suppliers and inquiries to contractors and review of similar projects. In some cases, the prices were updated due to inflation or changing market prices. The price references can be found in Appendix H.

AUTHORITY TO IMPLEMENT THE SELECTED ALTERNATIVE

Ira Township owns and operates the entire sanitary sewer system within the Township. The Department of Public Services operates the system, and the Wastewater Treatment Plant, located in Algonac, is operated by the County. The sewer system was built and maintained by the Township since the 1970s. The DPS operates under meticulous budgets that are regularly reviewed and updated. Inventories and assessments are periodically updated to maintain the Township’s plans for the facilities.

USER COSTS

The total residential equivalent users (REUs) for the entire sanitary sewer system is 2,741. The term “residential equivalent user” or REU is used for calculating fees. One REU is equal to one single-family dwelling. A single family dwelling has 2.6 people (American Community Survey, 2020), on average and the typical person creates 100 gallons/day of sewage. Therefore, in Ira Township, one REU uses 260 gallons/day.

The current costs and revenue breakdown of the Department of the Public Service (2022) are as follows:

- Operating Expenses (staff wages, health insurance facility maintenance, etc.): \$570,241
- Capital Improvements (new equipment, meter replacement, etc.): \$126,964
- Current Debt: \$76,488
- Total Costs: \$773,693

- Sale of Sewer Service: \$484,909
- Operating (tap charges, service fees, etc.): \$206,097
- Non-Operating Revenue (incurred interest, equipment rental, etc.): \$3,169
- Developer Contribution: \$0
- Total Revenue: \$694,175

The CWSRF loan amount for the proposed project is \$2,610,000 over a 20 year period. The loan will be partially paid back through increases in the current rate structure. The rate structure Ira Township is considering is an annual increase of 8% for 3 years (starting 2023) and then 5% for the following 8 years (2026-2033), 2.5% for 5 years (2034-2038) and then 5.0% until 2047. A single family unit (1 REU) pays about \$239/year in sewer charges.

The cost of the loan with interest = \$2,610,000 + \$544,001(1.87% interest)/20 years = \$157,700/year

1 REU will increase to \$258 next year. In 20 years, 1 REU will pay about \$642 annually. This cost multiplied across the Township sewer customers will bring in an additional \$473,897 of revenue over the next 20 years. Payments on the existing debt will conclude in 2023. That money and the rate increases will cover the loan payments.

USEFUL LIFE

Tests have shown that the life expectancy of the CIPP lining for the sewer is 50 years in pipes that were cured in place as far back as the 1970s. With the advancement of materials, CIPP lining can be expected to last over 50 years.

The lifespans were determined by researching case studies, supplier's and manufacturer's documentation and industry standards. Some of these references can be found in Appendix I.

SECTION 4 – EVALUATION OF ENVIRONMENTAL IMPACTS

Analysis of the Impacts

Direct Impacts

There will be minimal impacts due to construction.

Lining of the sewer will create noise from the machines. There is also a potential odor from the chemical use in the liner resin that may smell like plastic or glue. It is suggested that residents fill any floor drains or sinks with a small amount of water to prevent odors and cover floor drains and open windows if the odor is already in the residence. Residents will be asked to refrain from using any fixtures and appliances that use large amounts of water, such as showers, baths, washing machines and dishwasher while the pipe is being relined. This is because the services will be blocked until the lateral connections are opened to the new lining. Residents will still be able to flush toilets and wash hands. Traffic will be minimally impacted where the lining contractor needs to set up within the road rights of way. If this is necessary on streets with steady traffic, a traffic regulator will be onsite to direct vehicles. Because there will be no earth disturbance with sewer lining sensitive features such as floodplains, wetlands, stream crossings, and shorelines will not be impacted. Potential habitats of threatened or endangered species will also not be impacted.

Indirect Impacts

The proposed project does not change the sanitary sewer system, nor will it bring on changes in land use, air or water quality, aesthetics, or increase in resource consumption.

Cumulative Impacts

The only impacts brought on by this project are direct impacts that will only occur during construction. These projects will not create further impacts over time.

SECTION 5 - MITIGATION

Mitigation was not considered because the project's impacts are minimal and temporary.

SECTION 6 – PUBLIC PARTICIPATION

[TO BE WRITTEN AFTER PUBLIC HEARING]

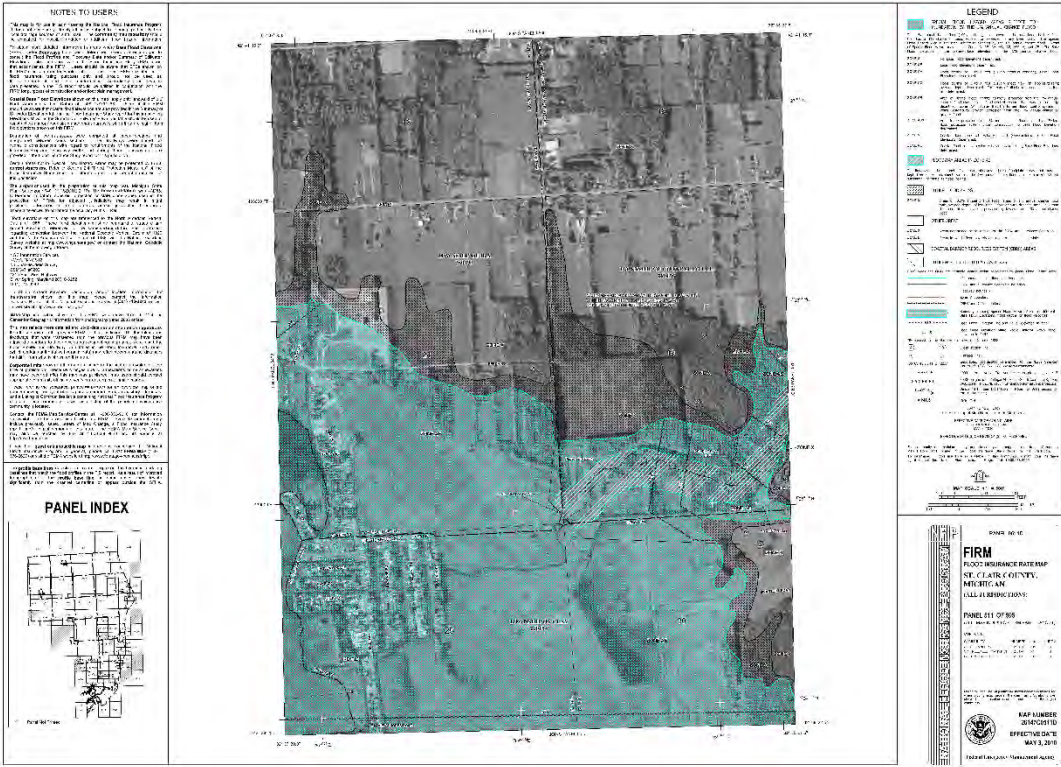
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IRA TOWNSHIP
CLEAN WATER STATE REVOLVING FUND LOAN APPLICATION

PROJECT PLAN
APPENDICES

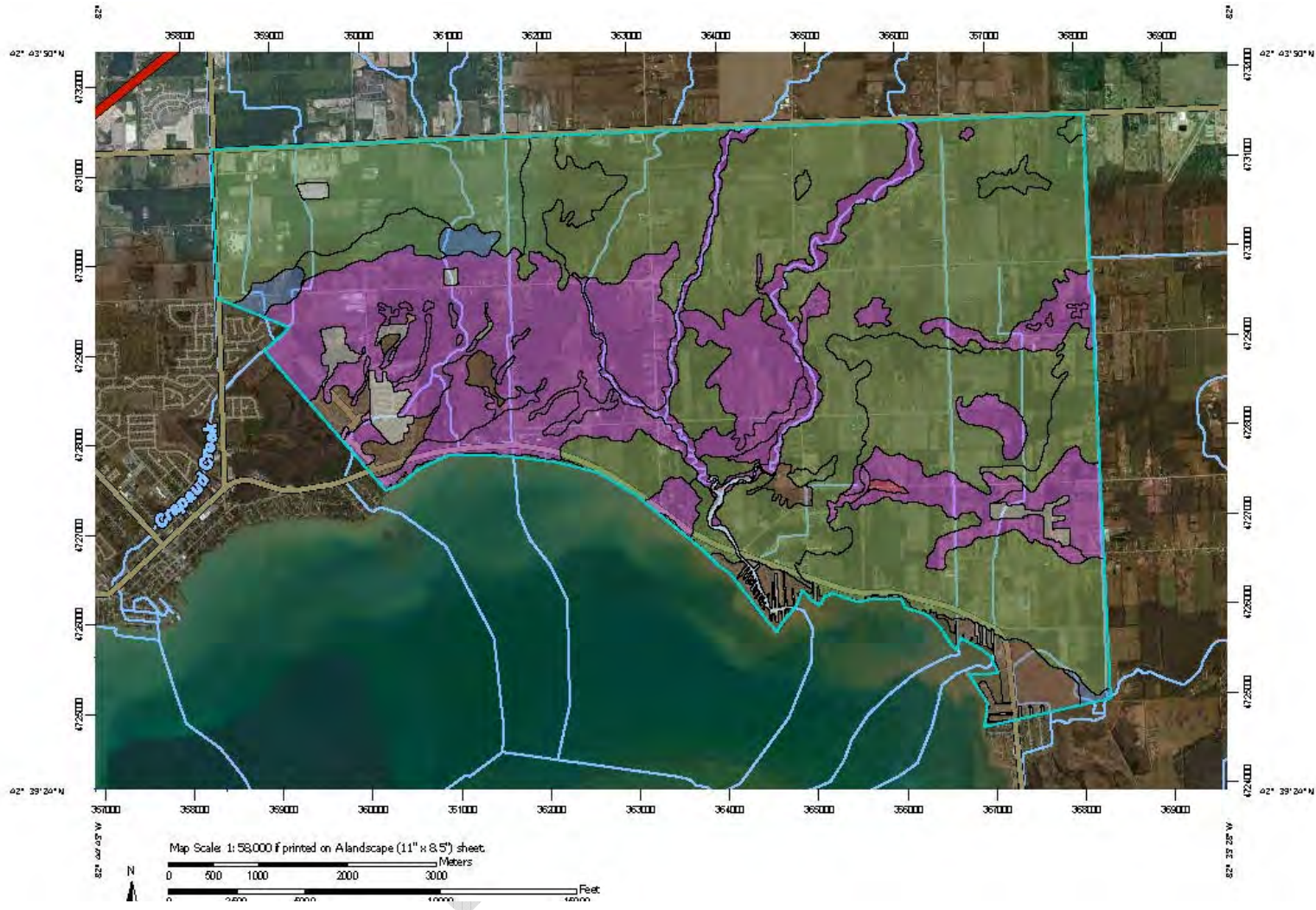
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Appendix A (cont.) - FEMA Floodplain Maps

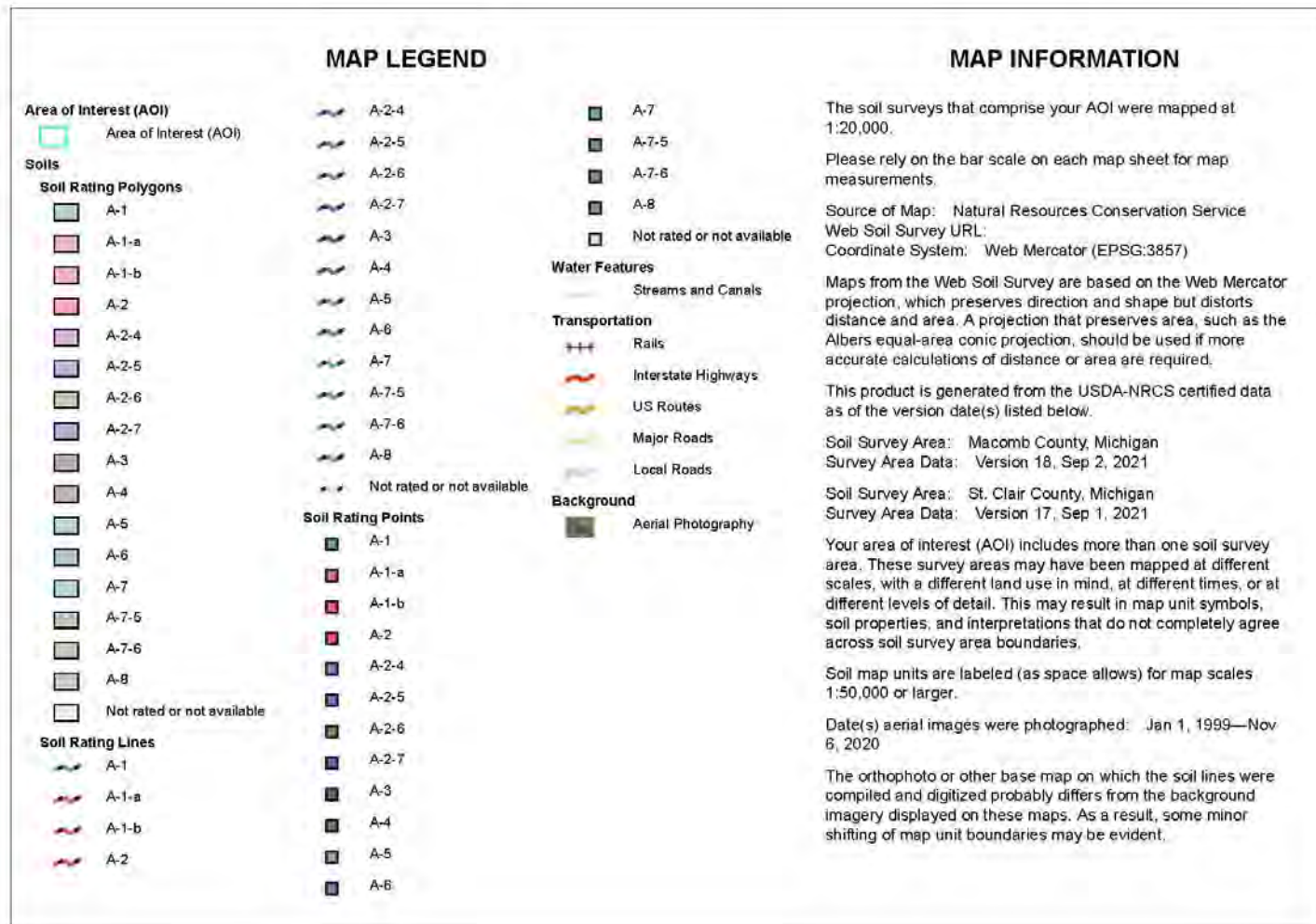


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Appendix B - Ira Township Soils



Appendix B (cont.) - Ira Township Soils



Appendix B (cont.) – Ira Township Soils

AASHTO Group Classification (Surface)—Macomb County, Michigan, and St. Clair County, Michigan

Ira Township Soil Map

AASHTO Group Classification (Surface)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
LbA	Latty complex, 0 to 3 percent slopes	A-7-6	6.0	0.1%
MeA	Metamora fine sandy loam, 0 to 2 percent slopes	A-2-4	0.0	0.0%
Subtotals for Soil Survey Area			6.0	0.1%
Totals for Area of Interest			10,956.0	100.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AeA	Allendale loamy fine sand, 0 to 3 percent slopes	A-2-4	71.2	0.7%
AIA	Allendale-Latty complex, 0 to 3 percent slopes	A-2-4	422.2	3.9%
AtA	Allendale-Lenawee-Toledo complex, 0 to 3 percent slopes	A-2-4	2,283.0	20.8%
Au	Alluvial land	A-2-4	321.2	2.9%
Bc	Bach very fine sandy loam	A-4	248.1	2.3%
Bp	Borrow pits		180.7	1.6%
CyB	Covert-Lamson complex, 0 to 6 percent slopes	A-2-4	101.1	0.9%
Ld	Lamson fine sandy loam	A-4	29.2	0.3%
Le	Latty silty clay loam	A-7-6	2,279.2	20.8%
LhA	Latty complex, 0 to 3 percent slopes	A-7-6	4,466.4	40.8%
MrA	Minoa fine sandy loam, clay substratum, 0 to 3 percent slopes	A-4	35.7	0.3%
OkB	Oakville fine sand, 0 to 6 percent slopes	A-2-4	1.9	0.0%
RuB	Rousseau fine sand, 0 to 6 percent slopes	A-2-4	118.0	1.1%
RuC	Rousseau fine sand, 6 to 12 percent slopes	A-2-4	12.4	0.1%
SpB	Spinks loamy sand, 2 to 6 percent slopes	A-1-b	10.7	0.1%
SsB	Spinks loamy sand, loamy substratum, 0 to 6 percent slopes	A-2-4	12.5	0.1%

Appendix B (cont.) - Ira Township Soils

AASHTO Group Classification (Surface)—Macomb County, Michigan, and St. Clair County, Michigan

Ira Township Soil Map

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
To	Toledo silty clay loam	A-6	112.2	1.0%
W	Water		59.4	0.5%
WdA	Wainola-Deford fine sands, 0 to 2 percent slopes	A-4	119.4	1.1%
Subtotals for Soil Survey Area			10,884.3	99.3%
Totals for Area of Interest			10,956.0	100.0%

Description

AASHTO group classification is a system that classifies soils specifically for geotechnical engineering purposes that are related to highway and airfield construction. It is based on particle-size distribution and Atterberg limits, such as liquid limit and plasticity index. This classification system is covered in AASHTO Standard No. M 145-82. The classification is based on that portion of the soil that is smaller than 3 inches in diameter.

The AASHTO classification system has two general classifications: (i) granular materials having 35 percent or less, by weight, particles smaller than 0.074 mm in diameter and (ii) silt-clay materials having more than 35 percent, by weight, particles smaller than 0.074 mm in diameter. These two divisions are further subdivided into seven main group classifications, plus eight subgroups, for a total of fifteen for mineral soils. Another class for organic soils is used.

For each soil horizon in the database one or more AASHTO Group Classifications may be listed. One is marked as the representative or most commonly occurring. The representative classification is shown here for the surface layer of the soil.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

Appendix C - MSU Threatened and Endangered County Species List

3/7/22, 11:48 AM

County Element Data - Michigan Natural Features Inventory

Michigan Natural Features Inventory MSU Extension

County Element Data

The lists include all elements (species and natural communities) for which locations have been recorded in MNFI's database for each county. Information from the database cannot provide a definitive statement on the presence, absence, or condition of the natural features in any given locality, since much of the state has not been specifically or thoroughly surveyed for their occurrence and the conditions at previously surveyed sites are constantly changing. The County Element Lists should be used as a reference of which natural features currently or historically were recorded in the county and should be considered when developing land use plans. Included in the list is scientific name, common name, element type, federal status, and state status for each element.

Choose a county: St. Clair ▼

St. Clair County

[Code Definitions](#)

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank	Occurrences in County	Last Observed in County
<i>Acipenser fulvescens</i>	Lake sturgeon		I	G3G4	S2	3	2016
<i>Acris blanchardi</i>	Blanchard's cricket frog		I	G5	S2S3	1	2021
<i>Agalinis gattingeri</i>	Gattinger's gerardia		E	G4	S1	1	1999
<i>Agalinis skinneriana</i>	Skinner's gerardia		E	G3G4	S1	1	1994
<i>Alasmidonta marginata</i>	Elktoe		SC	G4	S3?	11	2019
<i>Alasmidonta viridis</i>	Slippershell		I	G4G5	S2S3	11	2020
<i>Ammocrypta pellucida</i>	Eastern sand darter		I	G4	S1S2	4	2010
<i>Ammodramus henslowii</i>	Henslow's sparrow		E	G4	S3	1	2006
<i>Ammodramus sevensonum</i>	Grasshopper sparrow		SC	G5	S4	1	2011
<i>Aristida longespica</i>	Three-awned grass		I	G5	S2	3	2002
<i>Asclepias purpurascens</i>	Purple milkweed		I	G5?	S2	3	2006
<i>Asclepias sullivantii</i>	Sullivant's milkweed		I	G5	S2	10	2016
<i>Astragalus canadensis</i>	Canadian milk vetch		I	G5	S1S2	1	2011
<i>Baptisia lactea</i>	White or prairie false indigo		SC	G4Q	S3	1	1912
<i>Beckmannia syzigachne</i>	Slough grass		I	G5	S2	5	1996
<i>Bombus borealis</i>	Northern amber bumble bee		SC	G4G5	S3	2	1966
<i>Bombus terricola</i>	Yellow banded bumble bee		SC	G3G4	S2S3	1	1990
<i>Botaurus lentiginosus</i>	American bittern		SC	G5	S3	2	2017
<i>Buteo lineatus</i>	Red-shouldered hawk		I	G5	S4	1	2004
<i>Callitriche heterophylla</i>	Large water starwort		I	G5	S1	1	1896
<i>Cardamine maxima</i>	Large toothwort		I	G5	S1S2	2	2003

Appendix C (cont.) - MSU Threatened and Endangered County Species List

3/7/22, 11:48 AM

County Element Data - Michigan Natural Features Inventory

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank	Occurrences in County	Last Observed in County
<i>Carex festucacea</i>	Fescue sedge		SC	G5	S1	1	1920
<i>Carex platyphylla</i>	Broad-leaved sedge		F	G5	S1	1	1988
<i>Carex squarrosa</i>	Sedge		SC	G4G5	S1	1	2016
<i>Castanea dentata</i>	American chestnut		F	G3	S1S2	1	1900
<i>Cerastium velutinum</i>	Field Chickweed		X	G5T4?	SX	1	1832
<i>Chlidonias niger</i>	Black tern		SC	G4G5	S2	1	2009
<i>Cincinnatiensis</i>	Cameloma spire snail		SC	G5	S3	1	
<i>Cirsium hillii</i>	Hill's thistle		SC	G3	S3	1	1904
<i>Cistothorus palustris</i>	Marsh wren		SC	G5	S3	2	2017
<i>Clemmys guttata</i>	Spotted turtle		I	G5	S2	3	2009
<i>Cuscuta indecora</i>	Dodder		SC	G5	S1	1	1904
<i>Cyclonaias tuberculata</i>	Purple wartyback		I	G5	S2	1	2011
<i>Cypripedium candidum</i>	White lady slipper		I	G4	S2	1	1991
<i>Dalea purpurea</i>	Purple prairie clover		X	G5	SX	1	1915
<i>Diarrhena obovata</i>	Beak grass		I	G4G5	S2	1	2011
<i>Dichanthelium leibergii</i>	Leiberg's panic grass		I	G4	S2	1	1981
<i>Dorydiella kansana</i>	Leafhopper		SC	GNR	S3	1	1994
<i>Draba reptans</i>	Creeping whitlow grass		I	G5	S1	1	1913
<i>Emydoidea blandingii</i>	Blanding's turtle		SC	G4	S2S3	8	2021
<i>Epioblasma triquetra</i>	Snuffbox	LE	F	G3	S1S2	12	2020
<i>Euonymus atropurpureus</i>	Wahoo		SC	G5	S3	1	2011
<i>Falco columbarius</i>	Merlin		I	G5	S3	1	2015
<i>Falco peregrinus</i>	Peregrine falcon		F	G4	S3	2	2020
<i>Faxonius immunis</i>	Calico crayfish		SC	G5	S4	1	2015
<i>Fimbristylis puberula</i>	Chestnut sedge		X	G5	SX	1	1904
<i>Flexamia reflexa</i>	Leafhopper		SC	GNR	S1	3	2017
<i>Galearis spectabilis</i>	Showy orchis		I	G5	S2	2	1952
<i>Gallinula galeata</i>	Common gallinule		I	G5	S3	2	2017
<i>Gentiana alba</i>	White gentian		F	G4	S1	1	1900
<i>Gentianella quinquefolia</i>	Stiff gentian		I	G5	S2	1	1895
<i>Gymnocarpium robertianum</i>	Limestone oak fern		I	G5	S2	1	1888
<i>Haliaeetus leucocephalus</i>	Bald eagle		SC	G5	S4	6	2017
<i>Helianthus mollis</i>	Downy sunflower		I	G4G5	S2	1	2011

Appendix C (cont.) - MSU Threatened and Endangered County Species List

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County Element Data - Michigan Natural Features Inventory

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank	Occurrences in County	Last Observed in County
<i>Hiodon tergisus</i>	Mooneye		I	G5	S1	2	2007
<i>Hydrastis canadensis</i>	Goldenseal		I	G3G4	S2	1	2011
<i>Hypericum gentianoides</i>	Gentian-leaved St. John's-wort		SC	G5	S3	2	2002
<i>Ixobrychus exilis</i>	Least bittern		I	G4G5	S3	1	2017
<i>Jeffersonia diphylla</i>	Twinleaf		SC	G5	S3	1	1904
<i>Juncus brachycarpus</i>	Short-fruited rush		I	G4G5	S1S2	1	1999
<i>Juncus scirpoides</i>	Scirpus-like rush		I	G5	S2	2	2008
<i>Lampsilis fasciola</i>	Wavyrayed lampmussel		I	G5	S2	8	2011
<i>Lasmigona compressa</i>	Creek heelsplitter		SC	G5	S3	9	2020
<i>Lasmigona costata</i>	Flutedshell		SC	G5	SNR	10	2020
<i>Ligumia nasuta</i>	Eastern pondmussel		F	G4	S2	7	2016
<i>Ligumia recta</i>	Black sandshell		F	G4G5	S1?	4	2020
<i>Lipocarpus micrantha</i>	Dwarf-bulrush		SC	G5	S3	1	1988
<i>Lithobates palustris</i>	Pickering frog		SC	G5	S3S4	3	2018
<i>Lithospermum incisum</i>	Narrow-leaved puccoon		X	G5	SX	1	1915
<i>Lithospermum latifolium</i>	Broad-leaved puccoon		SC	G4	S2	3	2011
<i>Lycopodiella margueritae</i>	Northern prostrate clubmoss		I	G1G2	S1S2	1	2002
<i>Lycopodiella subappressa</i>	Northern appressed clubmoss		SC	G2	S2	1	1999
<i>Macrhybopsis storeriana</i>	Silver chub		SC	G5	S1	2	1985
<i>Moxostoma carinatum</i>	River redhorse		I	G4	S2	1	1984
<i>Notropis anogenus</i>	Pugnose shiner		F	G3	S1S2	4	2018
<i>Noturus miurus</i>	Brindled madtom		SC	G5	S2	3	2020
<i>Noturus stigmosus</i>	Northern madtom		F	G3	S1	3	2017
<i>Obliquaria reflexa</i>	Threehorn wartyback		F	G5	S1	1	2011
<i>Obovata subrotunda</i>	Round hickorynut		F	G4	S1	9	2019
<i>Panax quinquefolius</i>	Ginseng		I	G3G4	S2S3	1	1900
<i>Pandion haliaetus</i>	Osprey		SC	G5	S4	3	2017
<i>Pantherophis gloydi</i>	Eastern fox snake		I	G3	S2	5	2019
<i>Papaiperna boeriana</i>	Blazing star borer		SC	G2G3	S2	5	2017
<i>Papaiperna sciata</i>	Culvers root borer		SC	G3	S3	4	2017
<i>Papaiperna speciosissima</i>	Regal fern borer		SC	G4	S2S3	1	2015
<i>Parkesia motacilla</i>	Louisiana waterthrush		I	G5	S2	1	2011

Appendix C (cont.) - MSU Threatened and Endangered County Species List

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County Element Data - Michigan Natural Features Inventory

Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank	Occurrences in County	Last Observed in County
<i>Penstemon calycosus</i>	Beard tongue		I	G5	S2	2	2005
<i>Percina copelandi</i>	Channel darter		E	G4	S1	3	1996
<i>Persicaria careyi</i>	Carey's smartweed		I	G4	S1S2	1	1900
<i>Pisidium idahoense</i>	Giant northern pea clam		SC	G5	SNR	1	
<i>Plantago cordata</i>	Heart-leaved plantain		E	G4	S1	3	2011
<i>Platanthera ciliaris</i>	Orange- or yellow-fringed orchid		E	G5	S1S2	1	1903
<i>Platanthera leucophaea</i>	Prairie white-fringed orchid	L.T.	E	G2G3	S1	2	2006
<i>Pleuroberma sintoxia</i>	Round pigtoe		SC	G4G5	S3	9	2020
<i>Poa paludigena</i>	Bog bluegrass		I	G3G4	S2	1	1904
<i>Polygala cruciata</i>	Cross-leaved milkwort		SC	G5	S3	1	1914
<i>Polygala incarnata</i>	Pink milkwort		X	G5	SX	3	1900
<i>Potamilus alatus</i>	Pink heelsplitter		SC	G5	SNR	5	2019
<i>Potamilus ohioensis</i>	Pink papershell		I	G5	SNR	1	2009
<i>Pterospora andromedea</i>	Pine-drops		I	G5	S2	2	1893
<i>Ptychobranthus fasciolaris</i>	Kidney shell		SC	G4G5	S2	5	2020
<i>Rallus elegans</i>	King rail		E	G4	S2	5	2014
<i>Ranunculus ambigenus</i>	Spearwort		I	G4	SX	1	1904
<i>Ranunculus rhomboideus</i>	Prairie buttercup		I	G5	S2	2	1915
<i>Sander canadensis</i>	Sauger		I	G5	S1	3	1983
<i>Scleria pauciflora</i>	Few-flowered nut rush		E	G5	S1	1	1903
<i>Scleria triglomerata</i>	Tall nut rush		SC	G5	S3	2	1999
<i>Setophaga cerulea</i>	Cerulean warbler		I	G4	S3	2	2011
<i>Setophaga citrina</i>	Hooded warbler		SC	G5	S3	2	2011
<i>Simpsonia ambigua</i>	Salamander mussel		E	G3	S1	4	2003
<i>Solidago bicolor</i>	White goldenrod		E	G5	S1	1	1896
<i>Sterna forsteri</i>	Forster's tern		I	G5	S2	2	2007
<i>Sterna hirundo</i>	Common tern		I	G5	S2	2	2002
<i>Trichophorum clintonii</i>	Clinton's bulrush		SC	G4	S3	1	1999
<i>Trillium undulatum</i>	Painted trillium		E	G5	S1S2	9	2011
<i>Triplasis purpurea</i>	Sand grass		SC	G4G5	S2	1	1954
<i>Truncilla truncata</i>	Deertoe		SC	G5	S2S3	4	2011

Appendix C (cont.) - MSU Threatened and Endangered County Species List

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County Element Data - Michigan Natural Features Inventory

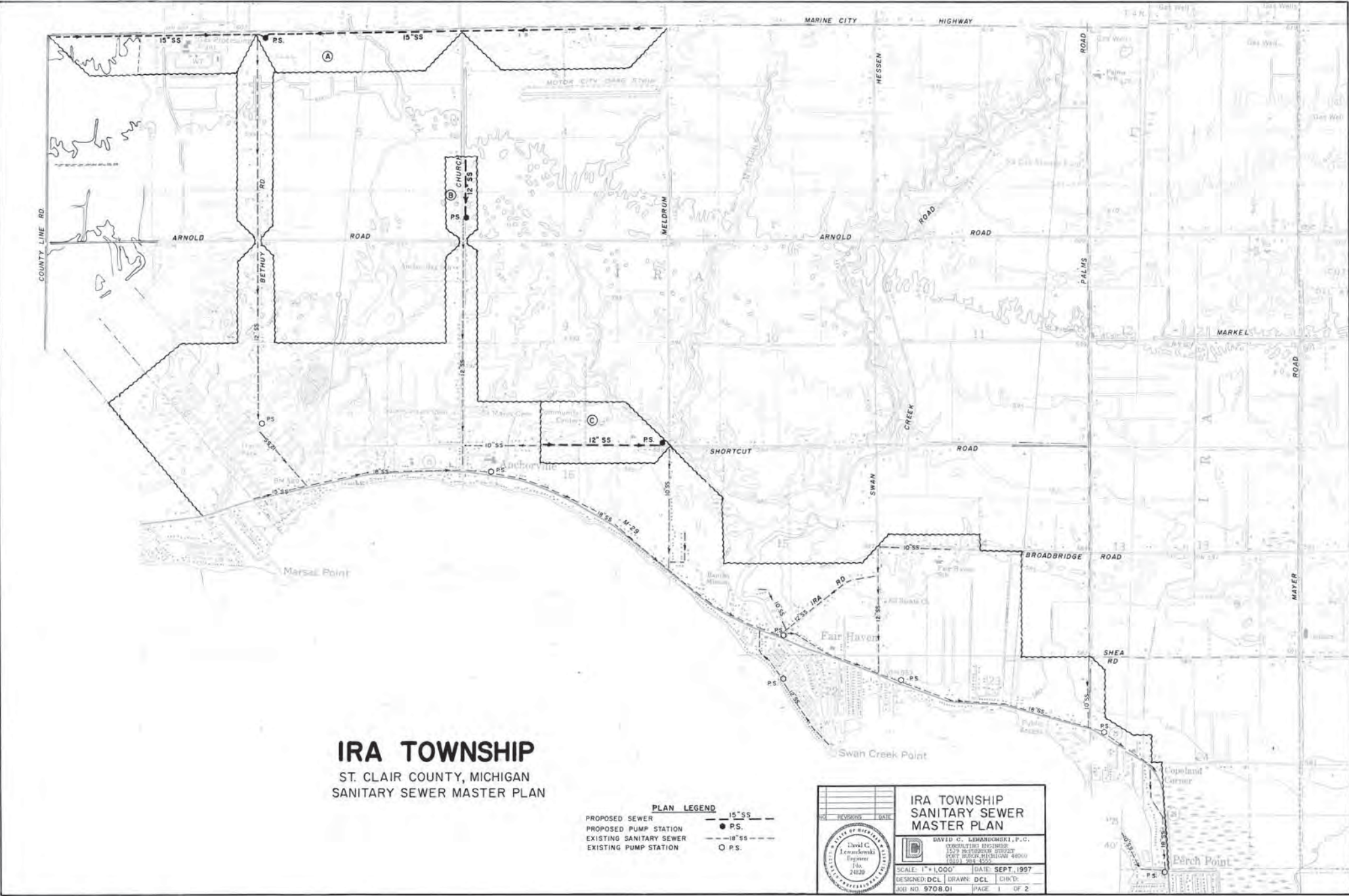
Scientific Name	Common Name	Federal Status	State Status	Global Rank	State Rank	Occurrences in County	Last Observed in County
Vilosa fabalis	Rayed bean	LE	E	G2	S1S2	13	2019
Vilosa iris	Rainbow		SC	G5	S3	22	2020
Vitis vulpina	Frost grape		I	G5	S1S2	1	1899
Zizania aquatica	Wild rice		I	G5	S2S3	2	2005

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APPENDIX D - MAP OF THE SANITARY SEWER SYSTEM



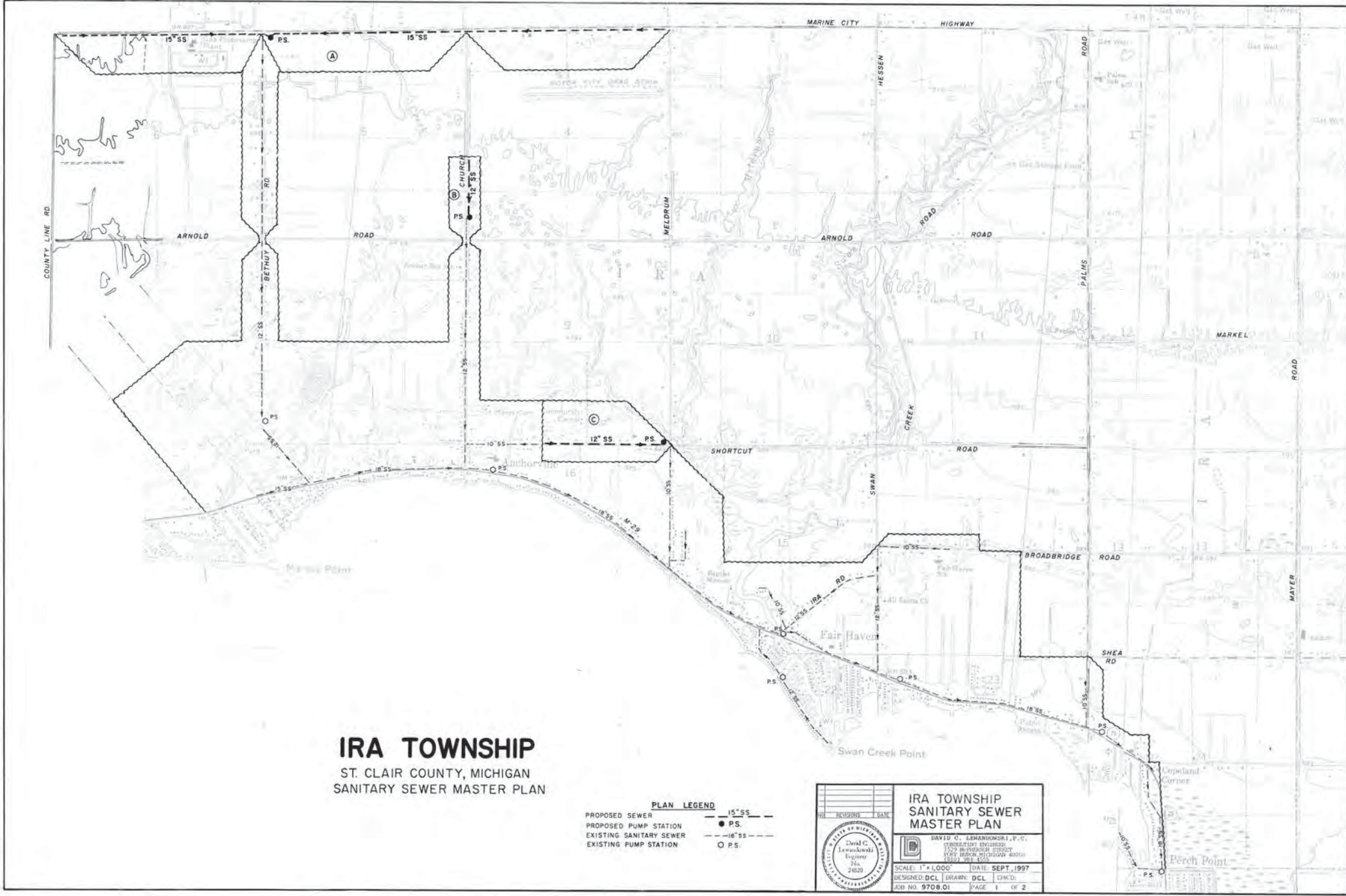
IRA TOWNSHIP
 ST. CLAIR COUNTY, MICHIGAN
 SANITARY SEWER MASTER PLAN

PLAN LEGEND

PROPOSED SEWER	— 15" SS —
PROPOSED PUMP STATION	● P.S.
EXISTING SANITARY SEWER	- - - 18" SS - - -
EXISTING PUMP STATION	○ P.S.

		<p>IRA TOWNSHIP SANITARY SEWER MASTER PLAN</p> <p>DAVID C. LEBANDOWSKI, P.E. CONSULTING ENGINEER 1579 WASHINGTON STREET PORT HURON, MICHIGAN 48060 (810) 984-3500</p> <p>SCALE: 1" = 1,000' DATE: SEPT. 1997 DESIGNED: DCL DRAWN: DCL CHECKED: JOB NO. 9708.01 PAGE: 1 OF 2</p>
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APPENDIX D - MAP OF THE SANITARY SEWER SYSTEM



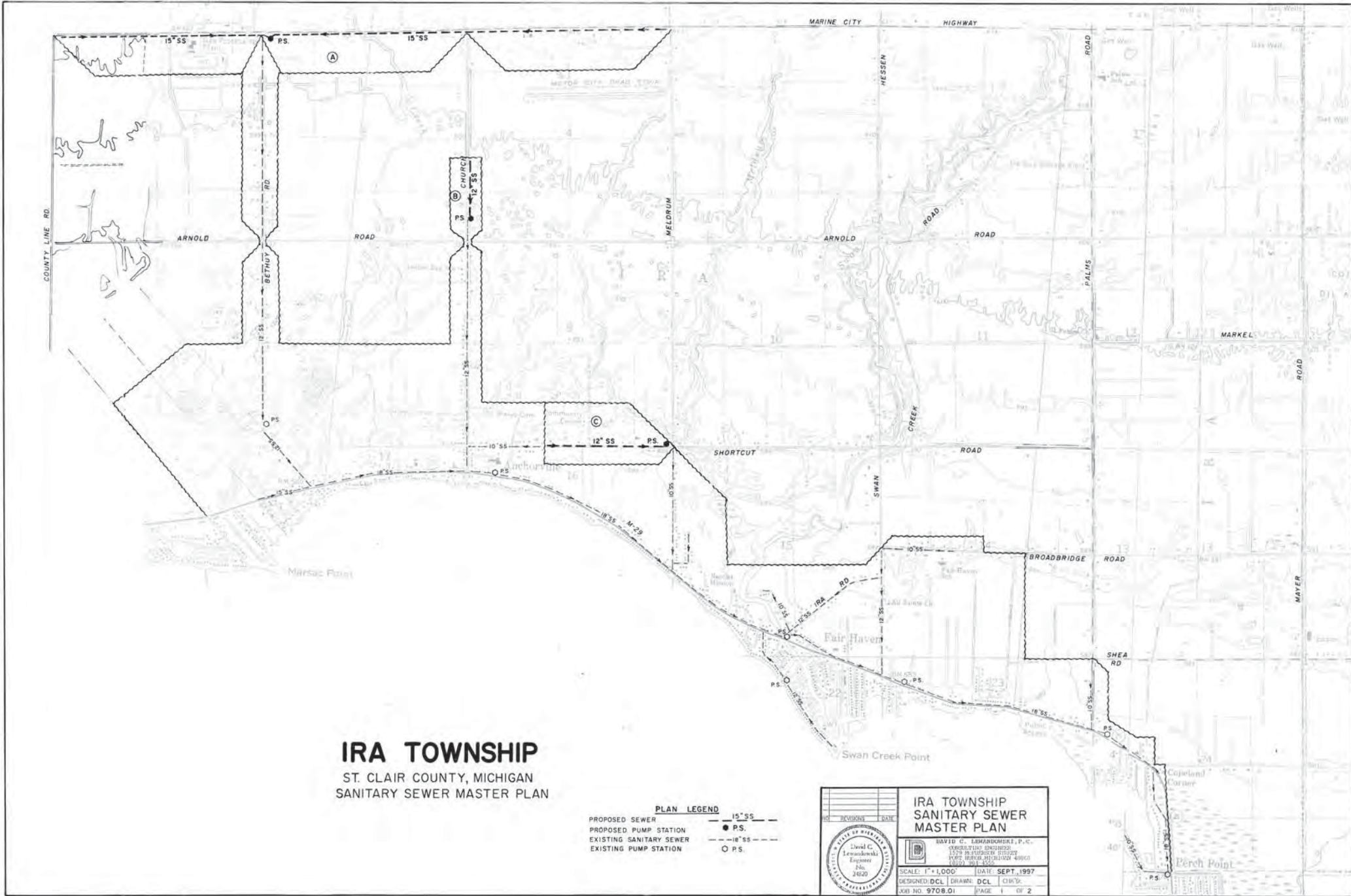
IRA TOWNSHIP ST. CLAIR COUNTY, MICHIGAN SANITARY SEWER MASTER PLAN

PLAN LEGEND

PROPOSED SEWER	15" SS
PROPOSED PUMP STATION	● P.S.
EXISTING SANITARY SEWER	- - - 18" SS - - -
EXISTING PUMP STATION	○ P.S.

	IRA TOWNSHIP SANITARY SEWER MASTER PLAN	
	DAVID C. LEVANSOWSKI, P.E. REGISTERED ENGINEER 1079 W. BONDUR STREET FAYE BEACH, MICHIGAN 49606 (517) 981-1550	
SCALE: 1" = 1,000' DESIGNED: DCL JOB NO. 9708.01	DATE: SEPT. 1997 DRAWN: DCL PAGE 1 OF 2	CHKD:

APPENDIX D - MAP OF THE SANITARY SEWER SYSTEM



Appendix E - NPDES Permit and SCC DPW's Water Treatment Plant Report

PERMIT NO. MI0020389



STATE OF MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act (33 U.S.C. 1251 *et seq.*, as amended; the "Federal Act"); Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); Part 41, Sewerage Systems, of the NREPA; and Michigan Executive Order 2011-1,

St. Clair County, Department of Public Works

21 Airport Drive
Saint Clair, Michigan 48079

is authorized to discharge from the **St. Clair County, Algonac Wastewater Treatment Plant** located at

451 State Street
Algonac, Michigan 48001

designated as **St Clair County-Algonac WWTP**

to the receiving water named the St. Clair River in accordance with effluent limitations, monitoring requirements, and other conditions set forth in this permit.

This permit is based on a complete application submitted on March 4, 2014.

This permit takes effect on May 1, 2015. The provisions of this permit are severable. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term in accordance with applicable laws and rules. On its effective date this permit shall supersede NPDES Permit No. MI0020389, expiring October 1, 2013.

This permit and the authorization to discharge shall expire at midnight, **October 1, 2018**. In order to receive authorization to discharge beyond the date of expiration, the permittee shall submit an application which contains such information, forms, and fees as are required by the Department of Environmental Quality (Department) by **April 4, 2018**.

Issued: March 27, 2015

Original Permit Signed by Philip Argiroff
Philip Argiroff, Chief
Permits Section
Water Resources Division

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

PERMIT NO. MI0020389

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PERMIT FEE REQUIREMENTS

In accordance with Section 324.3120 of the NREPA, the permittee shall make payment of an annual permit fee to the Department for each October 1 the permit is in effect regardless of occurrence of discharge. The permittee shall submit the fee in response to the Department's annual notice. The fee shall be postmarked by January 15 for notices mailed by December 1. The fee is due no later than 45 days after receiving the notice for notices mailed after December 1.

Annual Permit Fee Classification: Municipal Major, less than 10 MGD (Individual Permit)

In accordance with Section 324.3132 of the NREPA, the permittee shall make payment of an annual biosolids land application fee to the Department if the permittee land applies biosolids. In response to the Department's annual notice, the permittee shall submit the fee, which shall be postmarked no later than January 31 of each year.

CONTACT INFORMATION

Unless specified otherwise, all contact with the Department required by this permit shall be made to the Southeast Michigan District Supervisor of the Water Resources Division. The Southeast Michigan District Office is located at 27700 Donald Court, Warren, Michigan 48092-2793, Telephone: 586-753-3700, Fax: 586-751-3751.

CONTESTED CASE INFORMATION

Any person who is aggrieved by this permit may file a sworn petition with the Michigan Administrative Hearing System within the Michigan Department of Licensing and Regulatory Affairs, c/o the Michigan Department of Environmental Quality, setting forth the conditions of the permit which are being challenged and specifying the grounds for the challenge. The Department of Licensing and Regulatory Affairs may reject any petition filed more than 60 days after issuance as being untimely.

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

PERMIT NO. MI0020389

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PART I

Section A. Limitations and Monitoring Requirements

1. Final Effluent Limitations, Monitoring Point 001A

During the period beginning on the effective date of this permit and lasting until the expiration date of this permit, the permittee is authorized to discharge treated municipal wastewater from **Monitoring Point 001A through Outfall 001**. Outfall 001 discharges to the St. Clair River. Such discharge shall be limited and monitored by the permittee as specified below.

Parameter	Maximum Limits for Quantity or Loading				Maximum Limits for Quality or Concentration				Monitoring Frequency	Sample Type
	Monthly	7-Day	Daily	Units	Monthly	7-Day	Daily	Units		
Flow	(report)	---	(report)	MGD	---	---	---	---	Daily	Report Total Daily Flow
Carbonaceous Biochemical Oxygen Demand (CBOD ₅)	560	900	---	lbs/day	25	40	---	mg/l	5x Weekly	24-Hr Composite
Total Suspended Solids	680	1010	---	lbs/day	30	45	---	mg/l	5x Weekly	24-Hr Composite
Ammonia Nitrogen (as N)	---	---	---	---	(report)	---	(report)	mg/l	5x Weekly	24-Hr Composite
Total Phosphorus (as P)	23	---	---	lbs/day	1.0	---	---	mg/l	Weekly	24-Hr Composite
Fecal Coliform Bacteria	---	---	---	---	200	400	---	cts/100 ml	5x Weekly	Grab
Total Residual Chlorine	---	---	---	---	---	---	0.038	mg/l	5x Weekly	Grab
Available Cyanide	---	---	(report)	lbs/day	---	---	(report)	µg/l	Quarterly	Grab
Total Copper	---	---	(report)	lbs/day	---	---	(report)	µg/l	2x Annually	24-Hr Composite
Total Mercury										
– Corrected	(report)	---	---	lbs/day	(report)	---	---	ng/l	Quarterly	Calculation
– Uncorrected	(report)	---	---	lbs/day	(report)	---	---	ng/l	Quarterly	Grab
– Field Duplicate	---	---	---	---	(report)	---	---	ng/l	Quarterly	Grab
– Field Blank	---	---	---	---	(report)	---	---	ng/l	Quarterly	Preparation
– Laboratory Method Blank	---	---	---	---	(report)	---	---	ng/l	Quarterly	Preparation
	12-Month Rolling Average				12-Month Rolling Average					
Total Mercury	0.00009	---	---	lbs/day	4	---	---	ng/l	Quarterly	Calculation
					Minimum Monthly					
CBOD ₅ Minimum % Removal	---	---	---	---	85	---	---	%	Monthly	Calculation
Total Suspended Solids Minimum % Removal	---	---	---	---	85	---	---	%	Monthly	Calculation
					Minimum Daily					
pH	---	---	---	---	6.5	---	9.0	S.U.	Daily	Grab
Dissolved Oxygen	---	---	---	---	4.0	---	---	mg/l	Daily	Grab

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

PERMIT NO. MI0020389

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PART I

Section A. Limitations and Monitoring Requirements

The following design flow was used in determining the above limitations, but is not to be considered a limitation or actual capacity: 2.7 MGD.

- a. **Narrative Standard**
The receiving water shall contain no turbidity, color, oil films, floating solids, foams, settleable solids, or deposits as a result of this discharge in unnatural quantities which are or may become injurious to any designated use.
- b. **Sampling Locations**
Samples for CBOD₅, Total Suspended Solids, Ammonia Nitrogen, Total Copper, and Total Phosphorus shall be taken prior to disinfection. Samples for Dissolved Oxygen, Fecal Coliform Bacteria, Total Residual Chlorine, Available Cyanide, Total Mercury, and pH shall be taken after disinfection. The Department may approve alternate sampling locations which are demonstrated by the permittee to be representative of the effluent.
- c. **Quarterly and 2x Annually Monitoring**
Quarterly samples shall be taken during the months of January, April, July, and October. If the facility does not discharge during these months, the permittee shall sample the next discharge occurring during that quarter. If the facility does not discharge during a quarter, a sample is not required for that quarter. 2x annually samples shall be taken during the months of April and October. For any month in which a sample is not taken, the permittee shall enter "*G" on the Discharge Monitoring Report.
- d. **Total Residual Chlorine**
Compliance with the Total Residual Chlorine limit shall be determined on the basis of one or more grab samples. If more than one (1) sample per day is taken, the additional samples shall be collected in near equal intervals over at least eight (8) hours. The samples shall be analyzed immediately upon collection and the average reported as the daily concentration. Samples shall be analyzed in accordance with Part II.B.2. of this permit.
- e. **Percent Removal Requirements**
These requirements shall be calculated based on the monthly (30-day) effluent CBOD₅ and Total Suspended Solids concentrations and the monthly influent concentrations for approximately the same period.
- f. **Analytical Method and Quantification Level for Available Cyanide and Total Copper**
The sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for Available Cyanide shall be in accordance with EPA Method OIA-1677. The sampling procedures, preservation and handling, and analytical protocol for compliance monitoring for Total Copper shall be in accordance with EPA approved methods. The quantification level for Available Cyanide shall be 2.0 µg/l unless a higher level is appropriate because of sample matrix interference. The quantification level for Total Copper shall be 1.0 µg/l unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination. Upon approval from the Department, the permittee may use alternate analytical methods (for parameters with methods specified in 40 CFR 136, the alternate methods are restricted to those listed in 40 CFR 136).

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

PERMIT NO. MI0020389

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PART I

Section A. Limitations and Monitoring Requirements

- g. Final Effluent Limitation for Total Mercury
The final limit for Total Mercury is the Discharge Specific Level Currently Achievable (LCA) based on a multiple discharger variance from the water quality-based effluent limit of 1.3 ng/l, pursuant to Rule 323.1103(9) of the Water Quality Standards. Compliance with the LCA shall be determined as a 12-month rolling average, the calculation of which may be done using blank-corrected sample results. The 12-month rolling average shall be determined by adding the present monthly average result to the preceding 11 monthly average results then dividing the sum by 12. For facilities with quarterly monitoring requirements for Total Mercury, quarterly monitoring shall be equivalent to 3 months of monitoring in calculating the 12-month rolling average. Facilities that monitor more frequently than monthly for Total Mercury must determine the monthly average result, which is the sum of the results of all data obtained in a given month divided by the total number of samples taken, in order to calculate the 12-month rolling average. If the 12-month rolling average for any quarter is less than or equal to the LCA, the permittee will be considered to be in compliance for Total Mercury for that quarter, provided the permittee is also in full compliance with the Pollutant Minimization Program for Total Mercury, set forth in Part I.A.3.
- h. Total Mercury Testing and Additional Reporting Requirements
The analytical protocol for Total Mercury shall be in accordance with EPA Method 1631, Revision E, "Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry," EPA-821-R-02-019, August 2002. The quantification level for Total Mercury shall be 0.5 ng/l, unless a higher level is appropriate because of sample matrix interference. Justification for higher quantification levels shall be submitted to the Department within 30 days of such determination.

The use of clean technique sampling procedures is required unless the permittee can demonstrate to the Department that an alternative sampling procedure is representative of the discharge. Guidance for clean technique sampling is contained in EPA Method 1669, "Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels," EPA-821-R96-001, July 1996. Information and data documenting the permittee's sampling and analytical protocols and data acceptability shall be submitted to the Department upon request.

In order to demonstrate compliance with EPA Method 1631E and EPA Method 1669, the permittee shall report, on the daily sheet, the analytical results of all field blanks and field duplicates collected in conjunction with each sampling event, as well as laboratory method blanks when used for blank correction. The permittee shall collect at least one (1) field blank and at least one (1) field duplicate per sampling event. If more than ten (10) samples are collected during a sampling event, the permittee shall collect at least one (1) additional field blank AND field duplicate for every ten (10) samples collected. Only field blanks or laboratory method blanks may be used to calculate a concentration lower than the actual sample analytical results (i.e. a blank correction). Only one (1) blank (field OR laboratory method) may be used for blank correction of a given sample result, and only if the blank meets the quality control acceptance criteria. If blank correction is not performed on a given sample analytical result, the permittee shall report under 'Total Mercury - Corrected' the same value reported under 'Total Mercury - Uncorrected.' The field duplicate is for quality control purposes only; its analytical result shall not be averaged with the sample result.

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Section A. Limitations and Monitoring Requirements

2. Additional Monitoring Requirements

As a condition of this permit, the permittee shall monitor the discharge from **Monitoring Point 001A** for the constituents listed below. This monitoring is an application requirement of 40 CFR 122.21(j), effective December 2, 1999. Testing shall be conducted in **August 2015, May 2016, March 2017, and October 2017**. **Grab samples shall be collected for total phenols and the Volatile Organic Compounds identified below. For all other parameters, 24-hour composite samples shall be collected.**

Test species for whole effluent toxicity monitoring shall include fathead minnow **and** either *Daphnia magna*, *Daphnia pulex* or *Ceriodaphnia dubia*. If the permittee has received Department approval to conduct acute toxicity testing using the more sensitive species identified in the toxicity database, the first three (3) tests required above may be performed using the more sensitive species. The last (4th) test shall be conducted using two (2) test species. Testing and reporting procedures shall follow procedures contained in EPA/600/4-90/027/F, "Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms (Fifth Edition)." When the effluent ammonia nitrogen (as N) concentration is greater than 5 mg/l, the pH of the toxicity test shall be maintained at the pH of the effluent at the time of sample collection. Toxicity test data acceptability is contingent upon the validation of the test method by the testing laboratory. Such validation shall be submitted to the Department upon request.

The results of such additional monitoring shall be submitted with the application for reissuance (see the cover page of this permit for the application due date). The permittee shall notify the Department within 14 days of completing the monitoring for each month specified above in accordance with Part II.C.5. Additional reporting requirements are specified in Part II.C.11. The permittee shall report to the Department any whole effluent toxicity test results greater than 1.0 TU_A or 1.0 TU_C within five (5) days of becoming aware of the result. If, upon review of the analysis, it is determined that additional requirements are needed to protect the receiving waters in accordance with applicable water quality standards, the permit may then be modified by the Department in accordance with applicable laws and rules.

Whole Effluent Toxicity

acute toxicity

Hardness

calcium carbonate

Metals (Total Recoverable), Cyanide and Total Phenols

antimony (1 µg/l)	arsenic (1 µg/l)	barium (5 µg/l)	beryllium (1 µg/l)
boron (20 µg/l)	cadmium (0.2 µg/l)	chromium (10 µg/l)	lead (1 µg/l)
nickel (5 µg/l)	selenium (1 µg/l)	silver (0.5 µg/l)	thallium (1 µg/l)
zinc (10 µg/l)	total phenolic compounds		

Volatile Organic Compounds

acrolein	acrylonitrile	benzene	bromoform
carbon tetrachloride	chlorobenzene	chlorodibromomethane	chloroethane
2-chloroethylvinyl ether	chloroform	dichlorobromomethane	1,1-dichloroethane
1,2-dichloroethane	trans-1,2-dichloroethylene	1,1-dichloroethylene	1,2-dichloropropane
1,3-dichloropropylene	ethylbenzene	methyl bromide	methyl chloride
methylene chloride	1,1,2,2,-tetrachloroethane	tetrachloroethylene	toluene
1,1,1-trichloroethane	1,1,2-trichloroethane	trichloroethylene	vinyl chloride

Acid-Extractable Compounds

p-chloro-m-cresol	2-chlorophenol	2,4-dichlorophenol	2,4-dimethylphenol
4,6-dinitro-o-cresol	2,4-dinitrophenol	2-nitrophenol	4-nitrophenol
Pentachlorophenol	phenol	2,4,6-trichlorophenol	

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Section A. Limitations and Monitoring Requirements

Base/Neutral Compounds

acenaphthene	acenaphthylene	anthracene	benzidine
benzo(a)anthracene	benzo(a)pyrene	3,4-benzofluoranthene	benzo(ghi)perylene
benzo(k)fluoranthene	bis(2-chloroethoxy)methane	bis(2-chloroethyl)ether	bis(2-chloroisopropyl)ether
bis(2-ethylhexyl)phthalate	4-bromophenyl phenyl ether	butyl benzyl phthalate	2-chloronaphthalene
4-chlorophenyl phenyl ether	chrysene	di-n-butyl phthalate	di-n-octyl phthalate
dibenzo(a,h)anthracene	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene
3,3'-dichlorobenzidine	diethyl phthalate	dimethyl phthalate	2,4-dinitrotoluene
2,6-dinitrotoluene	1,2-diphenylhydrazine	fluoranthene	fluorene
Hexachlorobenzene	hexachlorobutadiene	hexachlorocyclo-pentadiene	hexachloroethane
indeno(1,2,3-cd)pyrene	isophorone	naphthalene	nitrobenzene
n-nitrosodi-n-propylamine	n-nitrosodimethylamine	n-nitrosodiphenylamine	phenanthrene
pyrene	1,2,4-trichlorobenzene		

3. Pollutant Minimization Program for Total Mercury

The goal of the Pollutant Minimization Program is to maintain the effluent concentration of Total Mercury at or below 1.3 ng/l. The permittee shall continue to implement the Pollutant Minimization Program approved on August 22, 2005, and modifications thereto, to proceed toward the goal. The Pollutant Minimization Program includes the following:

- an annual review and semi-annual monitoring of potential sources of mercury entering the wastewater collection system;
- a program for quarterly monitoring of influent and periodic monitoring of sludge for mercury; and
- implementation of reasonable cost-effective control measures when sources of mercury are discovered. Factors to be considered include significance of sources, economic considerations, and technical and treatability considerations.

On or before March 31 of each year, the permittee shall submit a status report for the previous calendar year to the Department that includes 1) the monitoring results for the previous year, 2) an updated list of potential mercury sources, and 3) a summary of all actions taken to reduce or eliminate identified sources of mercury.

Any information generated as a result of the Pollutant Minimization Program set forth in this permit may be used to support a request to modify the approved program or to demonstrate that the Pollutant Minimization Program requirement has been completed satisfactorily.

A request for modification of the approved program and supporting documentation shall be submitted in writing to the Department for review and approval. The Department may approve modifications to the approved program (approval of a program modification does not require a permit modification), including a reduction in the frequency of the requirements under items a. and b.

This permit may be modified in accordance with applicable laws and rules to include additional mercury conditions and/or limitations as necessary.

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4. Untreated or Partially Treated Sewage Discharge Reporting and Testing Requirements

In accordance with Section 324.3112a of the NREPA, if untreated sewage, including sanitary sewer overflows (SSO) and combined sewer overflows (CSO), or partially treated sewage is directly or indirectly discharged from a sewer system onto land or into the waters of the state, the entity responsible for the sewer system shall immediately, but not more than 24 hours after the discharge begins, notify, by telephone, the Department, local health departments, a daily newspaper of general circulation in the county in which the permittee is located, and a daily newspaper of general circulation in the county or counties in which the municipalities whose waters may be affected by the discharge are located that the discharge is occurring.

The permittee shall also annually contact municipalities, including the superintendent of a public drinking water supply with potentially affected intakes, whose waters may be affected by the permittee's discharge of combined sewage, and if those municipalities wish to be notified in the same manner as specified above, the permittee shall provide such notification. Such notification shall also include a daily newspaper in the county of the affected municipality.

At the conclusion of the discharge, written notification shall be submitted in accordance with and on the "Report of Discharge Form" available via the internet at: <http://www.deq.state.mi.us/csosso/>, or, alternatively for combined sewer overflow discharges, in accordance with notification procedures approved by the Department.

In addition, in accordance with Section 324.3112a of the NREPA, each time a discharge of untreated sewage or partially treated sewage occurs, the permittee shall test the affected waters for *Escherichia coli* to assess the risk to the public health as a result of the discharge and shall provide the test results to the affected local county health departments and to the Department. The testing shall be done at locations specified by each affected local county health department but shall not exceed 10 tests for each separate discharge event. The affected local county health department may waive this testing requirement, if it determines that such testing is not needed to assess the risk to the public health as a result of the discharge event. The results of this testing shall be submitted with the written notification required above, or, if the results are not yet available, submit them as soon as they become available. This testing is not required, if the testing has been waived by the local health department, or if the discharge(s) did not affect surface waters.

Permittees accepting sanitary or municipal sewage from other sewage collection systems are encouraged to notify the owners of those systems of the above reporting and testing requirements.

5. Facility Contact

The "Facility Contact" was specified in the application. The permittee may replace the facility contact at any time, and shall notify the Department in writing within 10 days after replacement (including the name, address and telephone number of the new facility contact).

- a. The facility contact shall be (or a duly authorized representative of this person):
 - for a corporation, a principal executive officer of at least the level of vice president; or a designated representative if the representative is responsible for the overall operation of the facility from which the discharge originates, as described in the permit application or other NPDES form,
 - for a partnership, a general partner,
 - for a sole proprietorship, the proprietor, or
 - for a municipal, state, or other public facility, either a principal executive officer, the mayor, village president, city or village manager or other duly authorized employee.

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Section A. Limitations and Monitoring Requirements

- b. A person is a duly authorized representative only if:
- the authorization is made in writing to the Department by a person described in paragraph a. of this section; and
 - the authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the facility (a duly authorized representative may thus be either a named individual or any individual occupying a named position).

Nothing in this section obviates the permittee from properly submitting reports and forms as required by law.

6. Monthly Operating Reports

Part 41 of Act 451 of 1994 as amended, specifically Section 324.4106 and associated R 299.2953, requires that the permittee file with the Department, on forms prescribed by the Department, reports showing the effectiveness of the treatment facility operation and the quantity and quality of liquid wastes discharged into waters of the state.

Since this permit includes modifications to the monitoring requirements in the previously-issued permit, the previously approved treatment facility monitoring program shall be revised. Within thirty (30) days of the effective date of this permit, the permittee shall submit to the Department a revised treatment facility monitoring program to meet this requirement. Upon approval by the Department the permittee shall implement the revised treatment facility monitoring program. The reporting forms and guidance are available on the DEQ web site at http://www.michigan.gov/deq/0,1607,7-135-3313_44117---,00.html. The permittee may use alternative operating forms if they are consistent with the approved monitoring program. These forms shall be maintained on site and shall be provided to the Department for review upon request. These treatment facility monitoring records shall be maintained for a minimum of three years.

7. Asset Management

The permittee shall at all times properly operate and maintain all facilities (i.e., the sewer system and treatment works as defined in Part 41 of the NREPA), and control systems installed or used by the permittee to operate the sewer system and treatment works and achieve and maintain compliance with the conditions of this permit (also see Part II.D.3 of this permit). The requirements of an Asset Management Program function to achieve the goals of effective performance, adequate funding, and adequate operator staffing and training. Asset management is a planning process for ensuring that optimum value is gained for each asset and that financial resources are available to rehabilitate and replace those assets when necessary. Asset management is centered on a framework of five (5) core elements: the current state of the assets; the required sustainable level of service; the assets critical to sustained performance; the minimum life-cycle costs; and the best long-term funding strategy.

- a. Asset Management Program Requirements
On or before December 1, 2015, the permittee shall submit to the Department an Asset Management Plan for review and approval. An approvable Asset Management Plan shall contain a schedule for the development and implementation of an Asset Management Program that meets the requirements outlined below in 1) – 4). A copy of any Asset Management Program requirements already completed by the permittee should be submitted as part of the Asset Management Plan. Upon approval by the Department the permittee shall implement the Asset Management Plan. (The permittee may choose to include the Operation and Maintenance Manual required under Part II.C.14. of this permit as part of their Asset Management Program).

- 1) *Maintenance Staff.* The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit. The level of staffing needed shall be determined by taking into account the work involved in operating the sewer system and treatment works, planning for and conducting maintenance, and complying with this permit.

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2) *Collection System Map.* The permittee shall complete a map of the sewer collection system it owns and operates. The map shall be of sufficient detail and at a scale to allow easy interpretation. The collection system information shown on the map shall be based on current conditions and shall be kept up-to-date and available for review by the Department. **Note: Items below referencing combined sewer systems are not applicable to separate sewer systems.** Such map(s) shall include but not be limited to the following:

- a) all sanitary sewer lines and related manholes;
- b) all combined sewer lines, related manholes, catch basins and CSO regulators;
- c) all known or suspected connections between the sanitary sewer or combined sewer and storm drain systems;
- d) all outfalls, including the treatment plant outfall(s), combined sewer treatment facility outfalls, untreated CSOs, and any known SSOs;
- e) all pump stations and force mains;
- f) the wastewater treatment facility(ies), including all treatment processes;
- g) all surface waters (labeled);
- h) other major appurtenances such as inverted siphons and air release valves;
- i) a numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;
- j) the scale and a north arrow;
- k) the pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow; and
- l) the manhole interior material, rim elevation (optional), and invert elevations.

3) *Inventory and assessment of fixed assets.* The permittee shall complete an inventory and assessment of operations-related fixed assets. Fixed assets are assets that are normally stationary (e.g., pumps, blowers, and buildings). The inventory and assessment shall be based on current conditions and shall be kept up-to-date and available for review by the Department.

- a) The fixed asset inventory shall include the following:
 - (1) a brief description of the fixed asset, its design capacity (e.g., pump: 120 gallons per minute), its level of redundancy, and its tag number if applicable;
 - (2) the location of the fixed asset;
 - (3) the year the fixed asset was installed;
 - (4) the present condition of the fixed asset (e.g., excellent, good, fair, poor);
 - (5) the depreciated value of the fixed asset in dollars for year specified in accordance with approved schedules; and
 - (6) the current fixed asset (replacement) cost in dollars for year specified in accordance with approved schedules;

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- b) The fixed asset assessment shall include a "Business Risk Evaluation" that combines the probability of failure of the fixed asset and the criticality of the fixed asset, as follows:
- (1) Rate the probability of failure of the fixed asset on a scale of 1-5 (low to high) using criteria such as maintenance history, failure history, and remaining percentage of useful life (or years remaining);
 - (2) Rate the criticality of the fixed asset on a scale of 1-5 (low to high) based on the consequence of failure versus the desired level of service for the facility; and
 - (3) Compute the Business Risk Factor of the fixed asset by multiplying the failure rating from (1) by the criticality rating from (2).
- 4) *Operation, Maintenance & Replacement (OM&R) Budget and Rate Sufficiency for the Sewer System and Treatment Works.* The permittee shall complete an assessment of its user rates and replacement fund, including the following:
- a) beginning and end dates of fiscal year;
 - b) name of the department, committee, board, or other organization that sets rates for the operation of the sewer system and treatment works;
 - c) amount in the permittee's replacement fund in dollars for year specified in accordance with approved schedules;
 - d) replacement fund of all assets with a useful life of 20 years or less;
 - e) expenditures for maintenance, corrective action and capital improvement taken during the fiscal year;
 - f) OM&R budget for the fiscal year; and
 - g) rate calculation demonstrating sufficient revenues to cover OM&R expenses. If the rate calculation shows there are insufficient revenues to cover OM&R expenses, the permittee shall document, within three (3) fiscal years after submittal of the Asset Management Plan, that there is at least one rate adjustment that reduces the revenue gap by at least 10 percent. The ultimate goal of the Asset Management Program is to ensure sufficient revenues to cover OM&R expenses.
- b) Reporting
The permittee shall develop a written report that summarizes asset management activities completed during the previous year and planned for the upcoming year. The written report shall be submitted to the Department on or before February 1 of each year. The written report shall include:
- 1) a description of the staffing levels maintained during the year;
 - 2) a description of inspections and maintenance activities conducted and corrective actions taken during the previous year;
 - 3) expenditures for collection system maintenance activities, treatment works maintenance activities, corrective actions, and capital improvement during the previous year;
 - 4) a summary of assets/areas identified for inspection/action (including capital improvement) in the upcoming year based on the five (5) core elements and the Business Risk Factors;

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- 5) a maintenance budget and capital improvement budget for the upcoming year that take into account implementation of an effective Asset Management Program that meets the five (5) core elements;
- 6) an updated asset inventory based on the original submission; and
- 7) an updated OM&R budget with an updated rate schedule that includes the amount of insufficient revenues, if any.

Section B. Storm Water Pollution Prevention

This section (Section B. Storm Water Pollution Prevention) is not needed for this permit.

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Section C. Industrial Waste Pretreatment Program

1. Industrial Waste Pretreatment Program

It is understood that the permittee does not receive the discharge of any type or quantity of substance which may cause interference with the operation of the treatment works; and, therefore, the permittee is not required to immediately develop an industrial pretreatment program in accordance with Section 307 of the Federal Act. The permittee is required to comply with Section 307 of the Federal Act upon accepting any such discharge for treatment. The permittee is required to notify the Department within thirty (30) days if any user discharges or proposes to discharge such wastes to the permittee for treatment.

Under no circumstances shall the permittee allow introduction of the following wastes into the waste treatment system:

- a. pollutants which cause pass-through or interference;
- b. pollutants which create a fire hazard or explosion hazard in the sewerage system, including, but not limited to wastestreams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21;
- c. pollutants which will cause corrosive structural damage to the sewerage system; but in no case, discharges with pH less than 5.0, unless the works is specifically designed to accommodate such discharges;
- d. solid or viscous pollutants in amounts which will cause obstruction to the flow in the sewerage system resulting in interference;
- e. any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a discharge at a flow rate and/or pollutant concentration which will cause interference with the treatment plant;
- f. heat in amounts which will inhibit biological activity in the treatment plant resulting in interference; but in no case, heat in such quantities that the temperature at the treatment plant exceeds 40 degrees Centigrade (104 degrees Fahrenheit) unless the Department, upon request of the permittee, approves alternate temperature limits;
- g. pollutants which result in the presence of toxic gases, vapors or fumes within the sewerage system in a quantity that may cause acute worker health and safety problems; and
- h. any trucked or hauled pollutants, except at discharge points designated by the permittee.

If information is gained by the Department that the permittee receives or is about to receive industrial wastes, then this permit may be modified in accordance with applicable laws and rules to incorporate the requirements of Section 307 of the Federal Act.

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Section D. Residuals Management Program

1. Residuals Management Program for Land Application of Biosolids

The permittee is authorized to land-apply bulk biosolids or prepare bulk biosolids for land application in accordance with the permittee's approved Residuals Management Program (RMP) approved on August 6, 2002 and approved modifications thereto in accordance with the requirements established in R 323.2401 through R 323.2418 of the Michigan Administrative Code (Part 24 Rules). The approved RMP, and any approved modifications thereto, are enforceable requirements of this permit. Incineration, landfilling and other residual disposal activities shall be conducted in accordance with Part II.D.7. of this permit. The Part 24 Rules can be obtained via the internet (<http://www.michigan.gov/deq/> and on the left side of the screen click on Water, Biosolids & Industrial Pretreatment, Biosolids then click on Biosolids laws and Rules Information which is under the Laws & Rules banner in the center of the screen).

- a. Annual Report
On or before October 30 of each year, the permittee shall submit to the Biosolids Program, Water Resources Division, Department of Environmental Quality, P.O. Box 30458, Lansing, MI 48909-7958 for the previous fiscal year of October 1 through September 30. At a minimum, the report shall contain:
 - 1) a certification that current residuals management practices are in accordance with the approved RMP, or a proposal for modification to the approved RMP; and
 - 2) a completed Biosolids Annual Report Form which can be obtained via the internet (<http://www.michigan.gov/deq/> and on the left side of the screen click on Water, Biosolids & Industrial Pretreatment, Biosolids then click on Biosolids Annual Report Form which is under the Downloads banner in the center of the screen) or from the Department.
- b. Modifications to the Approved RMP
Prior to implementation of modifications to the RMP, the permittee shall submit proposed modifications to the Department for approval. The approved modification shall become effective upon the date of approval. Upon written notification, the Department may impose additional requirements and/or limitations to the approved RMP as necessary to protect public health and the environment from any adverse effect of a pollutant in the biosolids.
- c. Record Keeping
Records required by the Part 24 Rules shall be kept for a minimum of five years. However, the records documenting cumulative loading for sites subject to cumulative pollutant loading rates shall be kept as long as the site receives biosolids.
- d. Contact Information
RMP related submittals to the Department shall be to the Southeast Michigan District Supervisor of the Water Resources Division. The Southeast Michigan District Office is located at 27700 Donald Court, Warren Michigan, 48092-2793 Telephone: 586-753-3700, Fax: 586-751-3751.

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

DISCHARGE MONITORING REPORT (DMR) - DAILY

Facility Name: St Clair County-Algonac WWTP
 Permittee Name: St. Clair County, Department of Public Works

Permit Number: MI0020389 v5.0
 DMR Period: 3/1/2021 - 3/31/2021
 DMR Version: 1

I Limit Set Name: 001A -
 Set: 1 of 5

Parameter	Flow	Total Suspended Solids	Total Suspended Solids	Total Suspended Solids	Total Suspended Solids	Carbonaceous Biochemical Oxygen Demand (CBOD5)	Carbonaceous Biochemical Oxygen Demand (CBOD5)
Mon. Loc.	Final Effluent (1)	Prior to Disinfection (B)	Prior to Disinfection (B)	Conventional Daily	Conventional Daily	Prior to Disinfection (B)	Prior to Disinfection (B)
Limit	(report) MGD	45 mg/L	1010 lbs/day	(report) mg/L	(report) lbs/day	40 mg/L	900 lbs/day
Stat. Base	Maximum Daily	Maximum 7-Day Average	Maximum 7-Day Average	Maximum Daily	Maximum Daily	Maximum 7-Day Average	Maximum 7-Day Average
3/1/2021	2.5840			10	215.5		
3/2/2021	2.1352			12	213.7		
3/3/2021	2.1294			10	177.6		
3/4/2021	2.0493			10	170.9		
3/5/2021	2.0031						
3/6/2021	2.0012						
3/7/2021	2.1118	10.4	190.8	10	176.1	5.6	102.3
3/8/2021	1.8723	10.4	178.9	10	156.1	6.0	102.6
3/9/2021	1.9138	9.6	161.7	8	127.7	6.0	100.7
3/10/2021	1.9218	9.2	151.8	8	128.2	6.0	99.0
3/11/2021	1.9258	9.0	146.5	9	144.6	5.8	94.6
3/12/2021	1.8481	9.0	146.5			5.8	94.6
3/13/2021	1.8762	9.0	146.5			5.8	94.6
3/14/2021	1.9084	8.4	133.6	7	111.4	5.6	89.0
3/15/2021	1.7863	8.0	126.2	8	119.2	5.2	82.0
3/16/2021	1.8295	8.0	125.1	8	122.1	5.4	84.4
3/17/2021	1.7070	8.2	125.1	9	128.1	5.4	82.6
3/18/2021	1.8813	7.8	118.1	7	109.8	5.4	82.2
3/19/2021	1.6374	7.8	118.1			5.4	82.2
3/20/2021	1.7777	7.8	118.1			5.4	82.2
3/21/2021	1.7876	8.8	131.6	12	178.9	5.6	84.0

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I Certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE		
		810-335-5402		YEAR	MO	DAY
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

DISCHARGE MONITORING REPORT (DMR) - DAILY

Facility Name: St Clair County-Algonac WWTP
 Permittee Name: St. Clair County, Department of Public Works

Permit Number: MI0020389 v5.0
 DMR Period: 3/1/2021 - 3/31/2021
 DMR Version: 1

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3/4/2021							
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Set: 4 of 5

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NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	Brian Roy	TELEPHONE		DATE		
TYPED OR PRINTED		810-325-5402					
		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

DISCHARGE MONITORING REPORT (DMR) - DAILY

Facility Name: St Clair County-Algonac WWTP **Permit Number:** MI0020389 v5.0
Permittee Name: St. Clair County, Department of Public Works **DMR Period:** 3/1/2021 - 3/31/2021
Works: **DMR Version:** 1

Parameter	Total Mercury - field blank	Total Mercury - laboratory method blank	Fecal Coliform	Fecal Coliform	CBOD5 Minimum % Removal	Total Suspended Solids Minimum % Removal	pH
Mon. Loc.	Mercury QA-Effluent	Mercury QA-Effluent	Final Effluent (1)	Fecal Daily	Percent Removal (K)	Percent Removal (K)	Final Effluent (1)
Limit	(report) ng/L	(report) ng/L	400 #/100mL	(report) #/100mL	(report) %	(report) %	6.5 SU
Stat. Base	Maximum Daily	Maximum Daily	Max 7-Day Geometric Mean	Maximum Daily	Minimum Daily % Removal	Minimum Daily % Removal	Minimum Daily
3/1/2021	+G	+G		240	94.9	90.6	7.4
3/2/2021				14	94.9	89.5	7.5
3/3/2021				3	94.8	91.8	7.4
3/4/2021				2	95.9	91.5	7.3
3/5/2021				1			7.5
3/6/2021							7.4
3/7/2021			7		95.1	92.3	7.5
3/8/2021			3	4	95.1	92.8	7.3
3/9/2021			3	9	96.7	94.0	7.4
3/10/2021			3	3	96.6	94.1	7.3
3/11/2021			3	1	96.6	94.2	7.2
3/12/2021			3	4			7.2
3/13/2021			3				7.3
3/14/2021			3		95.8	94.7	7.3
3/15/2021			3	3	96.9	94.8	7.3
3/16/2021			2	1	95.5	94.1	7.3
3/17/2021			3	41	96.7	94.2	7.1
3/18/2021			5	5	96.7	94.4	7.2
3/19/2021			4	2			7.4
3/20/2021			4				7.2
3/21/2021			4		95.1	92.6	7.3
3/22/2021			4	4	95.6	93.5	7.1
3/23/2021			5	3	96.4	94.0	7.1
3/24/2021			3	1	97.6	93.2	7.0
3/25/2021			2	3	97.2	93.6	7.1

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	Brian Roy		TELEPHONE		DATE		
				810-335-5402				
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY		

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

DISCHARGE MONITORING REPORT (DMR) - DAILY

Facility Name: St Clair County-Algonac WWTP **Permit Number:** MI0020389 v5.0
Permittee Name: St. Clair County, Department of Public Works **DMR Period:** 3/1/2021 - 3/31/2021
DMR Version: 1

3/20/2021	7.2	9.70					
3/21/2021	7.3	9.50					
3/22/2021	7.1	9.20					
3/23/2021	7.1	9.40					
3/24/2021	7.0	8.80					
3/25/2021	7.1	8.60					
3/26/2021	7.0	9.00					
3/27/2021	7.2	10.20					
3/28/2021	7.1	9.00					
3/29/2021	7.5	9.70					
3/30/2021	7.4	9.40					
3/31/2021	7.2	9.30					

DMR Instructions: (X): 12-month rolling average
DMR Comments: (none)

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER TYPED OR PRINTED	I Certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	Brian Roy	TELEPHONE 510-335-5402	DATE
		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE NUMBER	YEAR MO DAY

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

DISCHARGE MONITORING REPORT (DMR)

Facility Name: St Clair County-Algonac WWTP
 Permittee Name: St. Clair County, Department of Public Works

Permit Number: MI0020389 v5.0
 DMR Period: 3/1/2021 - 3/31/2021
 DMR Version: 1

Limit Set: 001A

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
Flow (50050) Final Effluent (1) Lab ID:	SAMPLE MEASUREMENT	2.0710	3.5440	MGD	*****	*****	*****			Daily	Report Total Daily Flow
	PERMIT REQUIREMENT	***** Maximum Monthly Average	***** Maximum Daily		*****	*****	*****			Daily	Report Total Daily Flow
Total Suspended Solids (00530) Prior to Disinfection (B) Lab ID:	SAMPLE MEASUREMENT	167.6	237.2	lbs/day	*****	9.7	11.2	mg/L		5X Weekly	24-Hr Composite
	PERMIT REQUIREMENT	680 Maximum Monthly Average	1010 Maximum 7-Day Average		*****	30 Maximum Monthly Average	45 Maximum 7-Day Average			5X Weekly	24-Hr Composite
Carbonaceous Biochemical Oxygen Demand (CBOD5) (80082) Prior to Disinfection (B) Lab ID:	SAMPLE MEASUREMENT	94.8	122.0	lbs/day	*****	5.5	6.0	mg/L		5X Weekly	24-Hr Composite
	PERMIT REQUIREMENT	560 Maximum Monthly Average	900 Maximum 7-Day Average		*****	25 Maximum Monthly Average	40 Maximum 7-Day Average			5X Weekly	24-Hr Composite
Ammonia Nitrogen (as N) (00610) Prior to Disinfection (B) Lab ID:	SAMPLE MEASUREMENT	*****	*****		*****	0.944	1.570	mg/L		5X Weekly	24-Hr Composite
	PERMIT REQUIREMENT	*****	*****		*****	***** Maximum Monthly Average	***** Maximum Daily			5X Weekly	24-Hr Composite

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I Certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE		
TYPED OR PRINTED	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO	DAY

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

DISCHARGE MONITORING REPORT (DMR)

Facility Name: St Clair County-Algonac WWTP **Permit Number:** MI0020389 v5.0
Permittee Name: St. Clair County, Department of Public Works **DMR Period:** 3/1/2021 - 3/31/2021
DMR Version: 1

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
Total Phosphorus (as P) (00665) Prior to Disinfection (B) Lab ID:	SAMPLE MEASUREMENT	9.66	16.03	lbs/day	*****	0.508	0.614	mg/L		Weekly	24-Hr Composite
	PERMIT REQUIREMENT	23 Maximum Monthly Average	***** Maximum Daily		*****	1.0 Maximum Monthly Average	***** Maximum Daily			Weekly	24-Hr Composite
Total Residual Chlorine (50060) Final Effluent (1) Lab ID:	SAMPLE MEASUREMENT	*****	*****		*****	*****	0.038	mg/L		5X Weekly	Grab
	PERMIT REQUIREMENT	*****	*****		*****	*****	0.038 Maximum Daily			5X Weekly	Grab
Available Cyanide (01257) Final Effluent (1) Lab ID:	SAMPLE MEASUREMENT	*****	*G	lbs/day	*****	*****	*G	ug/L		Quarterly	Grab
	PERMIT REQUIREMENT	*****	***** Maximum Daily		*****	*****	***** Maximum Daily			Quarterly	Grab
Total Copper (01042) Prior to Disinfection (B) Lab ID:	SAMPLE MEASUREMENT	*****	*G	lbs/day	*****	*****	*G	ug/L		2X Annually	24-Hr Composite
	PERMIT REQUIREMENT	*****	***** Maximum Daily		*****	*****	***** Maximum Daily			2X Annually	24-Hr Composite
Total Mercury (71900) Final Effluent (1) Lab ID:	SAMPLE MEASUREMENT	*G	*G	lbs/day	*****	*G	*G	ng/L		Quarterly	Calculation
	PERMIT REQUIREMENT	***** Maximum Monthly Average	***** Maximum Daily		*****	***** Maximum Monthly Average	***** Maximum Daily			Quarterly	Calculation

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE		
		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		AREA CODE	NUMBER	YEAR
TYPED OR PRINTED						

Appendix E (cont.) - NPDES Permit and SCC DPW's Water Treatment Plant Report

DISCHARGE MONITORING REPORT (DMR)

Facility Name: St Clair County-Algonac WWTP **Permit Number:** MI0020389 v5.0
Permittee Name: St. Clair County, Department of Public Works **DMR Period:** 3/1/2021 - 3/31/2021
DMR Version: 1

PARAMETER		QUANTITY OR LOADING			QUALITY OR CONCENTRATION				NO. EX.	FREQUENCY OF ANALYSIS	SAMPLE TYPE
		AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS			
Total Mercury (71900) Hg Calculation (X)	SAMPLE MEASUREMENT	*G	*****	lbs/day	*****	*G	*****	ng/L		Quarterly	Calculation
Lab ID:	PERMIT REQUIREMENT	0.00009 12-Month Rolling Average	*****		*****	4 12-Month Rolling Average	*****			Quarterly	Calculation
Fecal Coliform (74055) Final Effluent (1)	SAMPLE MEASUREMENT	*****	*****		*****	5	15	#/100mL		5X Weekly	Grab
Lab ID:	PERMIT REQUIREMENT	*****	*****		*****	200 Max Monthly Geometric Mean	400 Max 7-Day Geometric Mean			5X Weekly	Grab
CBOD5 Minimum % Removal (80091) Percent Removal (K)	SAMPLE MEASUREMENT	*****	*****		95.8	*****	92.4	%		Monthly	Calculation
Lab ID:	PERMIT REQUIREMENT	*****	*****		85 Minimum Monthly % Removal	*****	***** Minimum Daily % Removal			Monthly	Calculation
Total Suspended Solids Minimum % Removal (81011) Percent Removal (K)	SAMPLE MEASUREMENT	*****	*****		92.6	*****	87.3	%		Monthly	Calculation
Lab ID:	PERMIT REQUIREMENT	*****	*****		85 Minimum Monthly % Removal	*****	***** Minimum Daily % Removal			Monthly	Calculation
pH (00400) Final Effluent (1)	SAMPLE MEASUREMENT	*****	*****		7.0	*****	7.5	SU		Daily	Grab
Lab ID:	PERMIT REQUIREMENT	*****	*****		6.5 Minimum Daily	*****	9.0 Maximum Daily			Daily	Grab
Dissolved Oxygen (00300)	SAMPLE MEASUREMENT	*****	*****		8.0	*****	*****	mg/L		Daily	Grab

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	TELEPHONE		DATE		
TYPED OR PRINTED		SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	AREA CODE	NUMBER	YEAR	MO

Appendix F - Pipe Inspection Data - Full Critical List

SHEET NO.	U/S MH	# OF FLAIL	# OF LATS	# OF T/L	Line Pipe	Tot LF	# OF JPR	PIPE DIA	OTHER REMARKS	QR	LOF
112	IRA 175		11	11	372	372		10	HINGED FRACTURE/MASS INFIL PIPE COLAPSE IMINENT	5649	6
171	233				300	56	0	10	PIPE INTRUSION, CROSS BORE H2O PIPE	5500	6
16	142R		2	1	216	216	0	10	142 100% BLOCKED-	5342	5
141	177			0	7	7	0	8	6.6" PIPE INTRUSION WATER LINE LINK TO 142	5341	5
66	116		4	4	358	358	0	10	EXCAVATE-8' OF PIPE DAMAGED, review	5241	5
94	281		5	5	254	254	0	10	2 BROKE LOCATIONS PATCH THEM, TAP @ 234' T-LINE, TAP @ 225 ILLEGAL?	5233	5
168	156		1	1	193	193		10	75' CEILING FRACTURE, HSV @21'	5219	5
16	IRA 18	0	2	2	376	376		18		5143	5
9	IRA 150		3	3	250	250		18		5141	5
44	IRA 42		6	2	283	283		18		5141	5
52	IRA 47	2	2	0		402	2	18		5141	5
103	IRA 80	2	4	2	307	307		18		5141	5
132	205	8	7	7	415	415	0	10	CL=13' LINE IT,2 TLINERS, CLEAN LINE	5141	5
196	341	3		2		392	2	10	TAPS @ 96', 197', 255' T-LINE	5141	5
207	290		4	4	206	206		10	TAP @ 69' PROTRUDING PVC, CEMENT DEPOSIT FROM 172' TO MH 268 HEAVY CLEANING NEEDED	5141	5
10	148	0	7	7	387	387	0	10	357' PATCH IT, slip line	5131	5
100	276		2	2	124	124	0	10	35' CL 12:00/ TAP @	5129	5
25	IRA22	0	7	7	268	268		18		5121	5
68	IRA 57	0	0			320	2	18	CAR WASH NEEDS FLAILING	5121	5
6	153	0				210	2	10	PIPE INTRUSION 156'	5121	5

Appendix F (cont.) - Pipe Inspection Data - Full Critical List

106	222A			1		119	0	10	REVERSE OF 103	5121	5
151	190	1		1		406		10	DAE AT TAP CLEAN AND T-LINE	5121	5
127	210		1	1		0		8	MSA TFI	5100	5
142	178Y		1	1	266	266		8	REVERSE OF 141 JOINTS IN BAD	5100	5
138	IRA 350	0	8	0	399	399	0	12	CONDITION, A LOT OF	4936	5
22	IRA 19	0	1			265	2	18	LINK TO SHEET 17/ MSA	4622	5
50	IRA 46		0		219	219		18	SURFACE CORROSION METAL PIPE-REVIEW	4539	5
25	131	0			348	348	0	10		4429	4
28	IRA 26	0	8	3		400		18		4334	4
2	IRA 3		8	4		399	1	18		4332	4
36	IRA 33A	0	2	2		261		18		4331	4
104	IRA 79		4	3		361		18		4331	4
178	302	0		1		???	1	10	PIPE INTRU. REMOVED 2 HOLES VISIBLE CLEAN AND PATCH, T-LINE TAP AFTER RECAMERA NO COUNTER FOOTAGE	4300	4
24	IRA 23	0	1	1		135	1	18		4234	4
34	IRA 31	0	2	2		383	1	18	MSA-LINK TO SHEET	4234	4
105	IRA 78	0	3	2		360		18		4234	4
145	184	0		2		135	3	8	3 LINE PATCHES 2 TAP T-LINERSLINK TO 146	4234	4
49	IRA 288	0	1	1	280	280		18		4231	4
100	IRA 276	0	2	2	124	124		18	LINK TO SHEET 93	4231	4
99	277	0				396	5	10		4231	4
88	IRA 352		4	1		400	1	12		4223	4
83	IRA 88		8	2		400		15		4222	4
143	IRA 338		7			373	2	12		4221	4
130	206	0			90	90	0	10	CI=16' LINE IT	4200	4
109	IRA 72	0	3			397	1	18		4134	4
11	IRA 11		0			195	4	18		4133	4
112	213A	7				329	6	10		4133	4
11	148R	0				309	4	10	T 139' COMPLETELY BLOCKED MUST CLEAN	4132	4
133	IRA 210		1			32	1	8	FROM NEW CONSTRUCTION,	4125	4

Appendix F (cont.) - Pipe Inspection Data - Full Critical List

224	103				344	344		10	TAP @ 178' T-LINE IT, DAE 30% @ 328', CL 12:00 IS 45' LONG	4125	4
90	310			1		235	4	10	TAP @ 31' T-LINE SHORT	4124	4
121	230	0				229	2	10		4124	4
41	IRA 38	0	1	1		167		18		4123	4
96	279			1		276	3	10	TAP @ 142' T-LINE IT	4123	4
103	221Y	0		1	267	267	0	10	TAP @ 267' T-LINE	4123	4
203	294	0				309	2	10		4122	4
84	IRA 87		1			220	1	15		4111	4
35	161				203	203		8	LONGITUDINAL CRACKS- 2 DIFF. COMBINED 21'	3500	4
41	198				351	351		8	DEFECTS	3729	4
42	199				368	368		8	DEFECTS	3729	4
82	109	6		1	440	440	0	10	CL=6' LINE IT, 324' TFA POSSIBLE SUMP PUMP	3900	4
113	213	3		1	297	297	4	10	CL=7' LINE IT, TAP @ 186' T-LINE IT	3625	4
1	IRA 2		0		102	102		21	Line all, then t-line reinstatements	3900	4



APPENDIX G - PROJECT MAP



DEVELOPER / OWNER
IRA TOWNSHIP

PCE
 Project Control Engineering, Inc.
 Engineers Surveyors Consultants
 P.O. Box 307
 2420 Pte. Tremble Road
 Alpena, MI 49701
 Phone 810.794.1931
 Fax 810.794.3331
 www.pce-eng.com

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DRAWING STATUS:
 PRELIMINARY CONSTRUCTION
 FINAL CONSTRUCTION
 RECORD DOCUMENTS

SEAL:
 DATE:

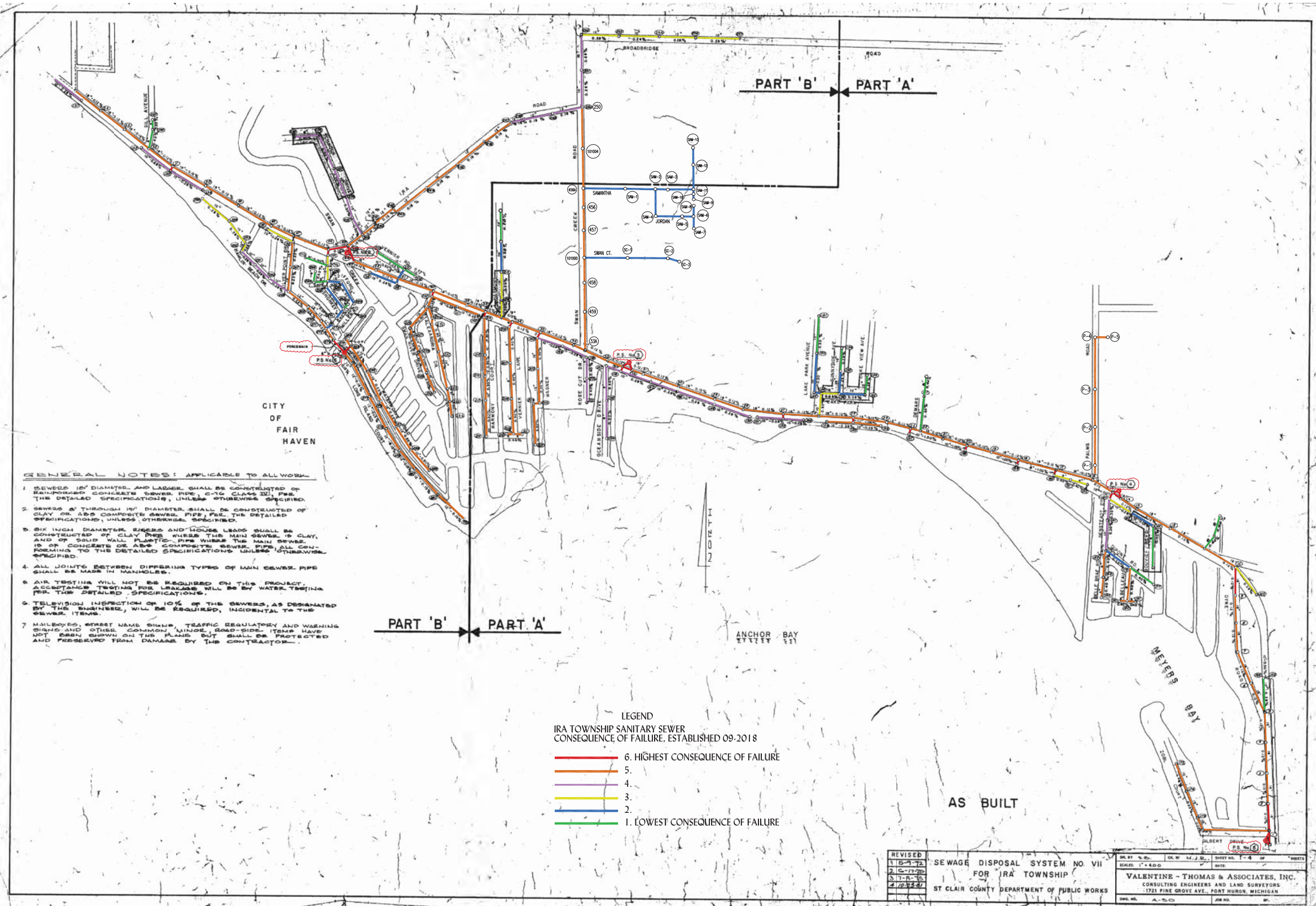
**SANITARY SEWER
 CONSEQUENCE OF FAILURE MAP**
**WEST AREA
 IRA TOWNSHIP**

811 Know what's
 below
 Call
 before you dig.

JOB NUMBER:
IRA TWP.
 DRAWN BY:
MAS
 CHECK BY:
BM
 DRAWING ID:
CONSEQUENCE OF FAILURE
 SCALE:
NO SCALE
2 of 2



APPENDIX G - PROJECT MAP



GENERAL NOTES: APPLICABLE TO ALL WORK

1. SEWERS 18" DIAMETER AND LARGER SHALL BE CONSTRUCTED OF REINFORCED CONCRETE SEWER PIPE, C-16 CLASS III, PER THE DETAILED SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED.
2. SEWERS 8" THROUGH 18" DIAMETER SHALL BE CONSTRUCTED OF CLAY OR ABS COMPOSITE SEWER PIPE, PER THE DETAILED SPECIFICATIONS, UNLESS OTHERWISE SPECIFIED.
3. SIX INCH DIAMETER SEWERS AND HOUSE LEADS SHALL BE CONSTRUCTED OF CLAY PIPE WHERE THE MAIN SEWER IS CLAY, AND OF SOLID WALL PLASTIC PIPE WHERE THE MAIN SEWER IS OF CONCRETE OR ABS COMPOSITE SEWER PIPE, ALL CONFORMING TO THE DETAILED SPECIFICATIONS UNLESS OTHERWISE SPECIFIED.
4. ALL JOINTS BETWEEN DIFFERING TYPES OF MAIN SEWER PIPE SHALL BE MADE IN MANHOLES.
5. AIR TESTING WILL NOT BE REQUIRED ON THIS PROJECT. ACCEPTANCE TESTING FOR LEAKAGE WILL BE BY WATER TESTING PER THE DETAILED SPECIFICATIONS.
6. TELEVISION INSPECTION OF 10% OF THE SEWERS, AS DESIGNATED BY THE ENGINEER, WILL BE REQUIRED, INCIDENTAL TO THE SEWER ITEMS.
7. MANHOLES, STREET NAME SIGNS, TRAFFIC REGULATORY AND WARNING SIGNS AND OTHER COMMON URBAN ROAD-SIDE ITEMS HAVE NOT BEEN SHOWN ON THIS PLAN, BUT SHALL BE PROTECTED AND PRESERVED FROM DAMAGE BY THE CONTRACTOR.

LEGEND
IRA TOWNSHIP SANITARY SEWER
CONSEQUENCE OF FAILURE, ESTABLISHED 09-2018

6. HIGHEST CONSEQUENCE OF FAILURE
5.
4.
3.
2.
1. LOWEST CONSEQUENCE OF FAILURE

REVISED	DATE	BY	DESCRIPTION
1	05-17-18	J.J.S.	ISSUED FOR PERMITS
2	05-17-18	J.J.S.	ISSUED FOR PERMITS
3	05-17-18	J.J.S.	ISSUED FOR PERMITS
4	05-17-18	J.J.S.	ISSUED FOR PERMITS

SEWAGE DISPOSAL SYSTEM NO VII
FOR IRA TOWNSHIP
ST CLAIR COUNTY DEPARTMENT OF PUBLIC WORKS

VALENTINE - THOMAS & ASSOCIATES, INC.
CONSULTING ENGINEERS AND LAND SURVEYORS
1721 PINE GROVE AVE., PORT HURON, MICHIGAN

DEVELOPER / OWNER
IRA TOWNSHIP

PCE
Project Control Engineering, Inc.
Engineers Surveyors Consultants
P.O. Box 307
2420 Pte. Tremble Road
Algonic, MI 48001
Phone 810.794.1931
Fax 810.794.3331
www.pce-eng.com

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**PROJECT CONTROL
ENGINEERING, INC.**

- DRAWING STATUS:
- PRELIMINARY CONSTRUCTION
 - FINAL CONSTRUCTION
 - RECORD DOCUMENTS

SEAL:

DATE:

**SANITARY SEWER
CONSEQUENCE OF FAILURE MAP**

**EAST AREA
IRA TOWNSHIP**

SHEET TITLE: PROJECT:

811 Know what's
below
Call
before you dig.

JOB NUMBER:
IRA TWP.

DRAWN BY:
MAS

CHECK BY:
BM

DRAWING ID:
CONSEQUENCE OF FAILURE

SCALE:
NO SCALE

1 of 2

Appendix H – Price References



6045 Sims Dr., Suite 2,
Sterling Heights, MI 48313
Direct: 248-930-8524
Ph: 586-979-0402
Fax: 586-979-8295
Email: kbates@dvmutilities.com

PROPOSAL

To: William Meldrum
Project Control Engineering

Project: Fitzgerald High School Storm Sewer Repairs

ITEM	QTY	DESCRIPTION	UNIT PRICE	UNIT MEASURE	LINE TOTAL
1	1	12" CIPP Point Liner Installation	\$3,975.00	EACH	\$3,975.00
2	1	15" CIPP Point Liner Installation	\$3,975.00	EACH	\$3,975.00
3	76	12" CIPP	\$150.00	LF	\$11,400.00
4	298	15" CIPP	\$90.00	LF	\$26,820.00
SUBTOTAL					\$46,170.00
SALES TAX					Included
TOTAL					\$46,170.00

LEGEND: LS= Lump Sum, LF=Linear Feet, EA=Each,

General Notes & Conditions

- Cost includes MOB/DEMOB.
- Permits and Bonds are NOT included.
- Price represents fully structural CIPP liner design and installation.
- Price includes cleaning of host pipe (light debris only).
- Cleaning of host pipe requiring more than 10 hours will be extra from contract.
- Price assumes general contractor/owner will supply water for cleaning and lining operations.
- Erosion and sediment control is NOT included.
- Site restoration is NOT included, but typically not required.
- PE stamped design is NOT included.
- Material sampling and testing is included.
- Price Does NOT Include Bypass and will be completed during dry weather only.
 - o At time of site visit no flow was witnessed.
- Price Does NOT Include Traffic Control.
- Disposal of contaminated material is NOT included.

Submitted by: KARL J BATES III

NOTE: Prices were determined through quotes and inquiries to contractors, review of similar projects that were completed and from the manufacturers. In some cases, the prices were updated due to inflation or changing market prices.

Appendix H (cont.) – Price References



Waste Recovery Systems
INDUSTRIAL CONTRACTORS

4750 Clyde Park Ave SW • Wyoming, MI 49509

P. (616) 719-5595
F. (616) 719-5599
info@IndustrialWasteRecovery.com
www.IndustrialWasteRecovery.com

Project Control Engineering
2420 Pointe Tremble Road
Algonac, MI 48001
Attn: Bill
Ph: 810-531-2349
E-mail: wmeldrum@pce-eng.com

Quote #5183-R East China Township CIPP "Y" liner 10" main X 4" X 5'FT Total of 6 installs

1. Adhere to the O.S.H.A. general construction safety requirements and site safety requirements
2. Mobilize CIPP 6 man-install crew & 4 trucks with equipment with 2-UTV to job site located with in East China Township.
3. Perform CCTV camera inspection to verify pipelines conditions and cleanliness prior to liner installation process.
4. Preform lateral hydro jetting to remove roots, excess debris with in lateral pipeline preparing for liner install.
5. Install CIPP lateral "Y" liner with 8" main pipe & 4" lateral pipe 5'FT long heading towards clean out.
6. Record findings via USB and provide to owner.

Total: \$6,210.00 per install

- Includes mobilization, Per-diem, Equipment, fuel on site, Hotel rooms.
- **WRS Recommends the 10" Sanitary main to be rehabilitated using CIPP before connection T liners are installed, due to Heavy infiltration.**

* Vac-A-Tee install = In the event a 4" clean out on the up-stream side of the lateral is not present, WRS will install a Vac-A-Tee LMK clean out at each install site. This process will cost \$ 1,130.00 above the quoted price per location.

Notes:

- Work quoted to be preformed 8AM to 5PM Monday thru Friday with no over time rates included.
- Estimated time on site 1-12hr-work day per install Monday thru Friday.

NOTE: Prices were determined through quotes and inquiries to contractors, review of similar projects that were completed and from the manufacturers. In some cases, the prices were updated due to inflation or changing market prices.

Appendix H (cont.) – Price References



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- Price includes (1) mobilization & (1) De-mobilization.
- All material is guaranteed to be as specified. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from above specifications involving extra costs, will be executed only upon written orders, and will become an extra charge over and above the estimate. All agreements contingent upon strikes, accident or delays beyond our control. This proposal subject to acceptance within 30 days and is void thereafter at the option of the undersigned.

Thank you for the opportunity to quote your work.

Sincerely,



Rick Plummer

Signature: _____

PO# _____

Date: _____

NOTE: Prices were determined through quotes and inquiries to contractors, review of similar projects that were completed and from the manufacturers. In some cases, the prices were updated due to inflation or changing market prices.

Appendix I– Product Life Expectancy Documentation

The following are excerpts from industry references....

Excerpt from *A Retrospective of Cured-in-Place Pipe (CIPP) Used in Municipal Gravity Sewers*, Executive Summary, P.v, EPA, January 2012

EXECUTIVE SUMMARY

Pipe rehabilitation and trenchless pipe replacement technologies have seen a steadily increasing use over the past 30 to 40 years and represent an increasing proportion of the approximately \$25 billion annual expenditure on operations and maintenance of the nation's water and wastewater infrastructure (EPA, 2002). Despite the massive public investment represented by the use of these technologies, there has been little formal and quantitative evaluation of whether they are performing as expected and whether rehabilitation is indeed cost-effective compared to replacement.

The major reasons for an interest in a retrospective evaluation of pipe rehabilitation systems are:

- The biggest data gap in asset management for pipeline systems involving rehabilitation is prediction of the remaining asset life for the existing pipe and how long rehabilitation techniques can extend that life. Municipalities have expressed a strong desire for some hard data on the current condition of previously installed systems to validate or correct the assumptions made at the time of rehabilitation.
- Since several of the major pipe lining techniques have now been in use for at least 15 years (some nearly 30 years in the U.S. and 40 years internationally), it is a good time to undertake such an investigation to assess whether the originally planned lifetime (typically assumed to be 50 years) is reasonable based on the current condition of the liner.

While the long-term goal of the retrospective evaluation effort is to provide significant and credible feedback on performance to the system owners and the engineers who specify rehabilitation and replacement technologies, a few isolated evaluations of projects with a variety of existing and service conditions cannot provide statistically significant data. Thus, the goals for the effort within this project are to draw attention to the need for this type of evaluation and to develop evaluation protocols that are technically and financially feasible for carrying out evaluations of the main rehabilitation and trenchless replacement technologies. The protocols should produce useful results at a cost that municipalities will be willing to pay to participate in the data collection. The subsequent drive will be to encourage municipalities and other system owners to conduct their own evaluations and then to contribute their data to a common database where the results can be aggregated on a national basis. The initial project described in this report focuses on cured-in-place pipe (CIPP) liners because they were the first trenchless liners (other than conventional slipliners) to be used in pipe rehabilitation and because they hold the largest market share within relining technologies. The pilot testing used CIPP samples from both large and small diameter sewers in two cities: Denver, CO and Columbus, OH. For the small diameter (8 in.) sewers in each city, a 6 ft section of pipe and liner was exhumed from a convenient site. For the larger diameter sewers (36 to 48 in. diameter), CIPP liner samples were cut from the interior of the pipe and the liner patched in situ.

Testing on the liners included thickness, annular gap, ovality, density, specific gravity, porosity, flexural strength, flexural modulus, tensile strength, tensile modulus, surface hardness, glass transition temperature, and Raman spectroscopy. In addition, environmental data was gathered as appropriate to each retrieval process including: external soil conditions and pH, and internal waste stream pH. The findings from the testing conducted so far are presented in detail in this report and a short overall summary is given below.

All of the samples retrieved from the four locations involved in the pilot study testing were in excellent condition after being in use for 25 years, 23 years, 21 years, and 5 years, respectively. Three of these liners had already been in service for approximately half of their originally expected service life. Two

Appendix I (cont.) – Product Life Expectancy Documentation

samples had a flexural modulus value that was lower than the originally specified value, but this cannot be tied directly to deterioration of the liner over time. In the case of the Denver 48-in downstream liner, in particular, it appears likely that the poor physical test properties may have resulted from variability within the liner rather than a change over time. Some indication of a softening of the interior surface of the liner that was exposed most to the waste stream (interior invert and spring lines) relative to the interior crown location and that of the exterior surface of the liner was noted in surface hardness testing. However, it is not yet possible to isolate any effect on the resin liner itself from the hydrolysis of the handling layer that was originally present on the inside surface of the CIPP liner. For newer CIPP liners, a different handling/inner layer with greater durability is used.

In Denver, a few specific defects were noted at different locations in closed-circuit television (CCTV) inspections of nearly 5,800 ft of CIPP liners installed at the same time as the retrieved sample. Most of these appeared to relate to poor practices in cutting or reinstating lateral connections and only three appeared potentially unrelated to lateral reinstatement issues. These were a local liner bulge, a separation of the liner from the wall of the pipe, and a local tear in the liner.

Overall, there is no reason to anticipate that the liners evaluated in this pilot study will not last for their intended lifetime of 50 years and perhaps well beyond.

Given the insights provided by the pilot studies in Denver and Columbus, an expansion of the retrospective evaluation study is recommended to create a broader national database that would help to better define the expected life of sewer rehabilitation technologies. Specifically, it is recommended that the pilot studies and retrospective evaluation program be extended to cover the following activities:

- Additional CIPP sample retrieval in other cities with a wider variety of site and sewage flow characteristics.
- Pilot studies of other sewer rehabilitation technologies – focusing initially on those with the greatest number of years of service. As with the current CIPP study, the pilot study would seek to identify the most useful quantitative tests that could be used to evaluate performance, degradation, and expected remaining life.
- A broader survey to capture the locally interpreted data from a wide range of cities on their experiences with rehabilitation technologies.
- An effort to encourage sewer agencies to keep as-installed material test data for later comparison with follow-up testing. This should include working with the most widely used database and asset management systems to make sure that such information can readily be incorporated and identified using their software.
- Adaptation, development, and/or calibration of non-destructive testing (NDT) methods plus similar efforts for material test methods that could use small physical samples that are easily retrieved robotically from inside the pipe and for which the damage could be easily repaired. Several quantitative liner characterization tests that could be expected to be developed for robotic deployment within sewer mainlines of 8-in. diameter and larger have been identified as part of this project.

The outcome of an effective evaluation process would be to address one of the largest unknowns in terms of decision-making for engineers carrying out life-cycle cost/benefit evaluations and to facilitate the sharing of lining performance data among municipalities in a systematic and transferable manner. Evaluating rehabilitation technologies that have already been in service for a significant length of time could also provide data that could be used immediately by other municipalities (e.g., what properties/defects are critical; what accelerates deterioration) and could establish benchmarks for vendors

Appendix I (cont.) – Product Life Expectancy Documentation

against which they can improve their products (i.e., it could become a driver for achieving excellence). It is an opportune time for such a concerted push in terms of evaluation because there has been a significant time in service for many technologies and there is a continued strong investment in the use of the technologies across the U.S.

Appendix J- Public Hearing Documentation

Public Hearing Attendee List

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Appendix M - Public Hearing Documentation (cont.)
Public Hearing Advertisement

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Appendix M – Public Hearing Documentation (cont.)

Public Hearing Transcript

INSERT TRANSCRIPT PDF

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Appendix M – Public Hearing Documentation (cont.)

Resolution Approving Project Plan and Selected Alternative

INSERT RESOLUTION PDF

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